



Introducing iStorm. Think Together.

Introducing iStorm. The world's most *innovative* collaboration tool, that lets users work, talk, and think together. With iStorm, a user can open up a document, and immediately start brainstorming it with other collaborators over a network.



Sometimes, even a genius needs a prod to make things happen. iStorm incorporates a chatting function, which allows you to argue with peers while editing the document. The chat function also includes a unique emotion system, which allows collaborators to express their emotions while chatting.



iStorm uses the new *Rendezvous* technology to let users connect to hosts with zero configurations! When a user hosts a document, others on the local area network will see it immediately in the join list without any hassle.



iStorm features an elegant one-button interface that lets users utilize all of iStorm's networked editing functions with a click of a mouse. (Or command + return.) The button doubles as a status indicator of the availability of the document. If it is red, a collaborator is editing the document. If it is blue, you are editing it. If it is green, the document is free for anyone to edit. Could it be more intuitive?



iStorm includes a net-enabled chalkboard. It also features an intelligent yet non-intrusive built-in calculator. Just type a math expression, and a single keystroke will get you the answer. You don't even have to select the expression. For serious scientists, it provides an integrated TeX equation interface which works in the similar way. History making collaboration is now within a few clicks away.

iStorm requires Mac OS 10.2 and a local area network.



iStorm sports an elegant yet intuitive interface that skips the usual jet-plane control panels for a functional and easy to use collection of buttons. Most of the controls and even the iChalk module may be hidden, if a user would like to make the interface even simpler to concentrate more on the creative output.

iStorm in Action

Often, it requires a singular genius to move the earth. However, there is also an endless list of great collaborations in history. Just to name famous duos will fill up pages: Rogers & Hart, Elton John & Bernie Taupin, Watson & Crick, Billy Wilder & I. A. L. Diamond. Truffaut & Jean-Pierre Léaud. (Jobs & Woz). Lennon & McCartney. Erdős and the company of the week, Nichols & May. C. N. Yang and T. D. Lee. The silly and the serious Woody Allen. Julia Childs & PBS?

How about the Bloomsbury circle? The Lunar Society of Birmingham. King Sejong's Jip-Hyun-Jeon. The early cast of Saturday Night Live. Nicolas Bourbaki. Architects of Quantum Mechanics?

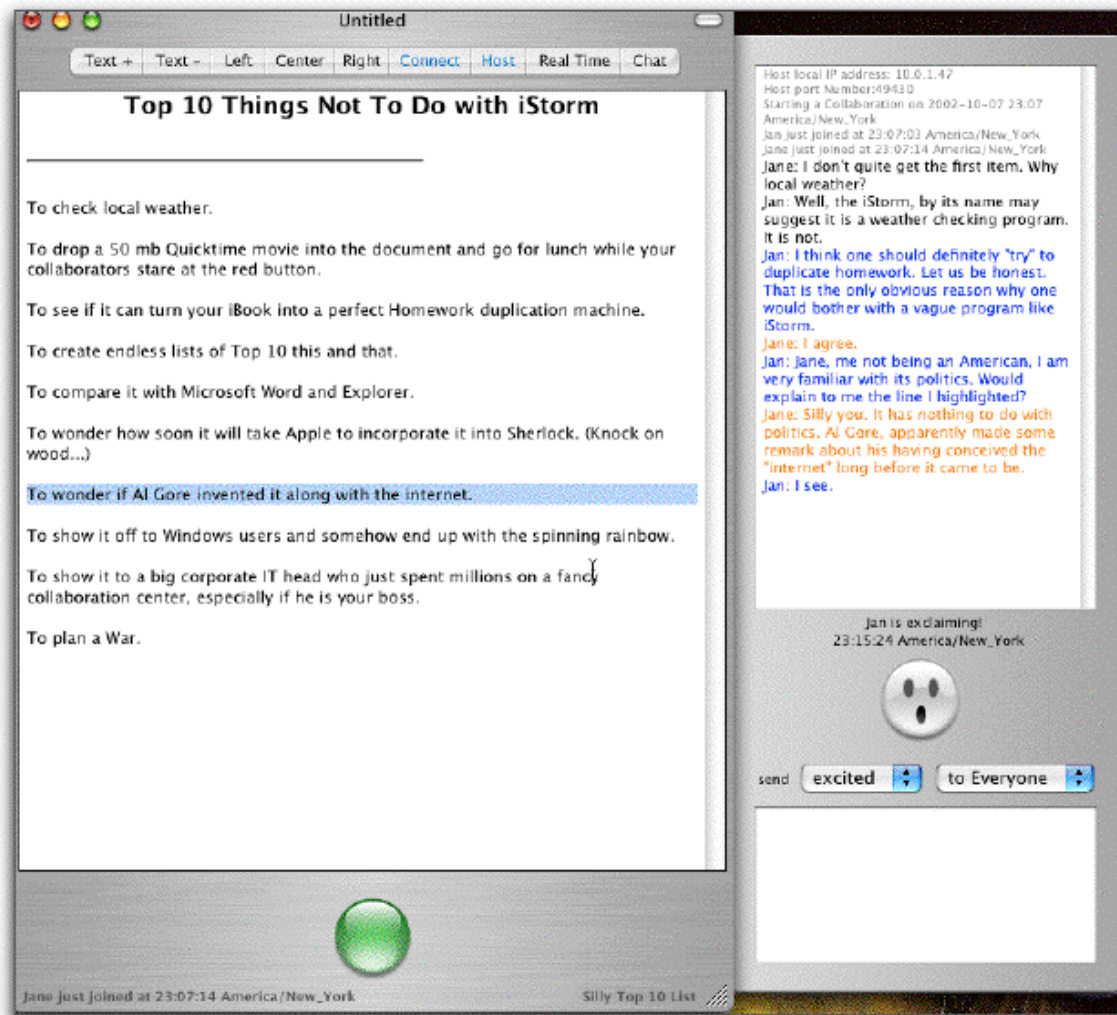
But what about the rest of us, who are not exactly doing a Pantheon-worthy work with friends? While we admit that it will be extremely flattering if a Nobel laureate picks up iStorm to start his next project, we also note that the next big theory, poem or tune may well come from any room in our neighborhood.

Even the lesser prose is measurelessly valuable if our small children wrote it together. Do not be too grandiose. Just experience an intimate moment of coming up with a perfect phrase after another in composing a poem about a birch tree!

In the following pages, let us make some suggestions about how to use iStorm. We challenge you to the task! But no matter what you choose to do, don't forget to have fun.

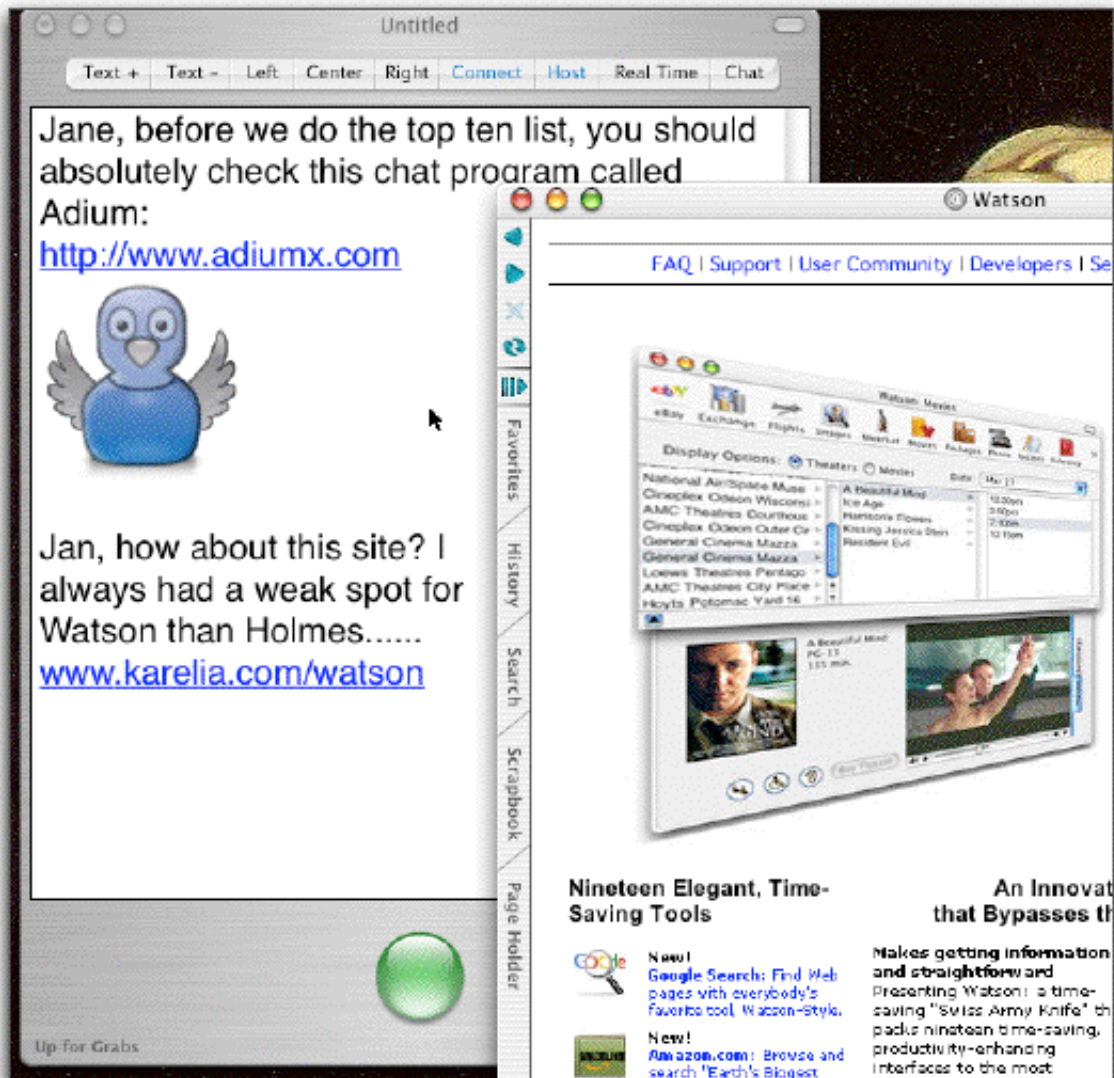
Create anything together, be it serious or silly.

Here, Jan and Jane are putting together a top 10 list together. They are using the chat function to debate on issues both serious and silly, while making up the list line by line, taking turns to top each other. While Jan is using the emotion function to "emphasize" his ideas (blue color in the chat window), Jane is in a lighter mood, as she often chooses the "happy" mood (orange color) for her remarks.



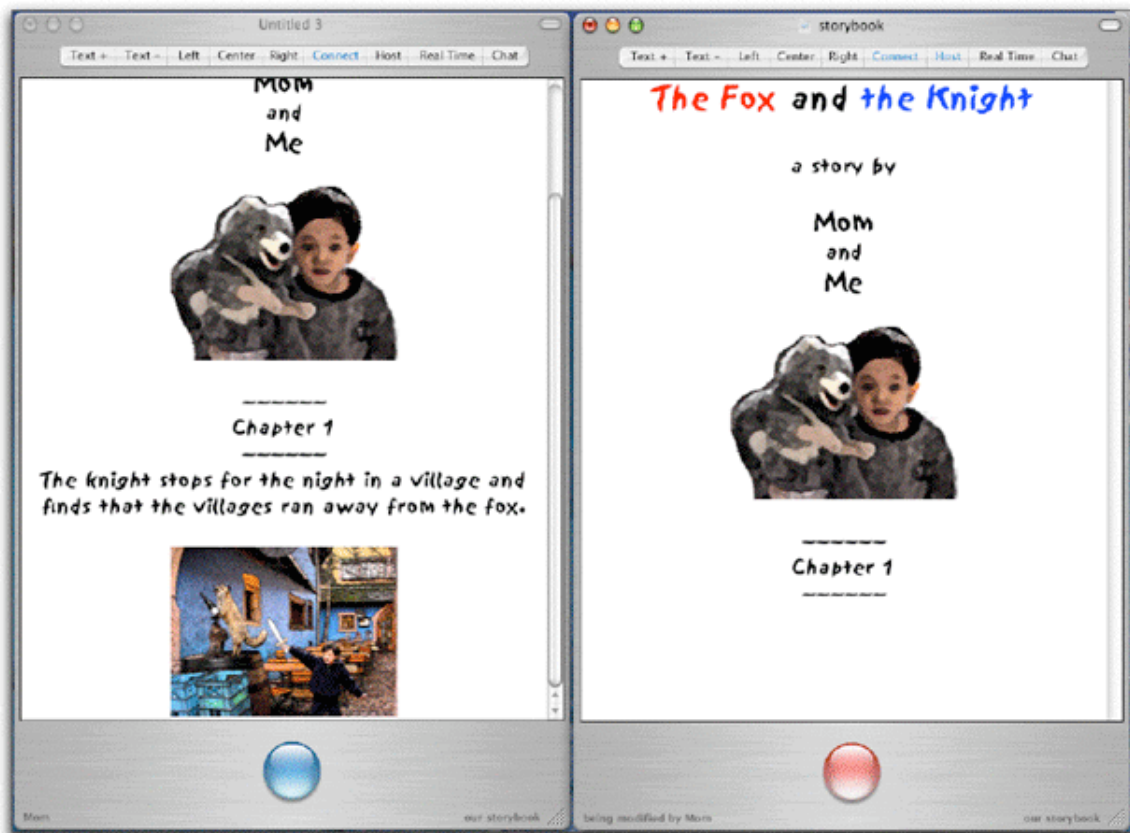
Find something fascinating and share it.

Here we caught Jan and Jane digressing from what they set out to do. Jan is pitching his favorite Chat program, even taking pains to lift its fantastic icon to show Jane. Of course, being a good sport, Jane has her own favorite program to sell Jan about. The exchanged web link is automatically httpified, and a click on it will take Jan to the site via his favorite web browser. Why not try shopping together?



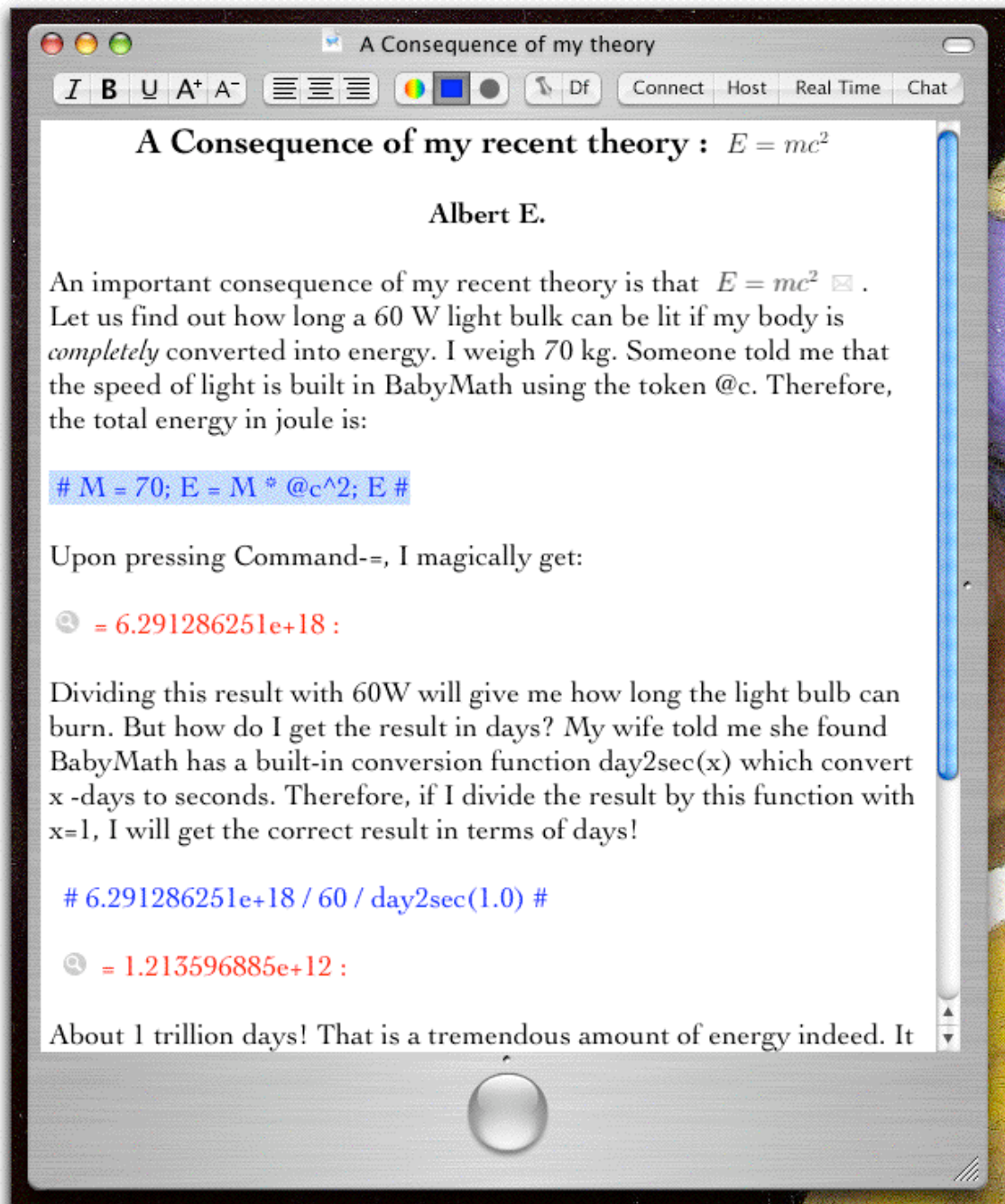
Compose a poem or a story with your child.

Mom and child. And two computers? While it is good to work together on a computer, it may encourage your child's independent thinking and let his imagination soar if he works on his own computer with just occasional help from Mom.



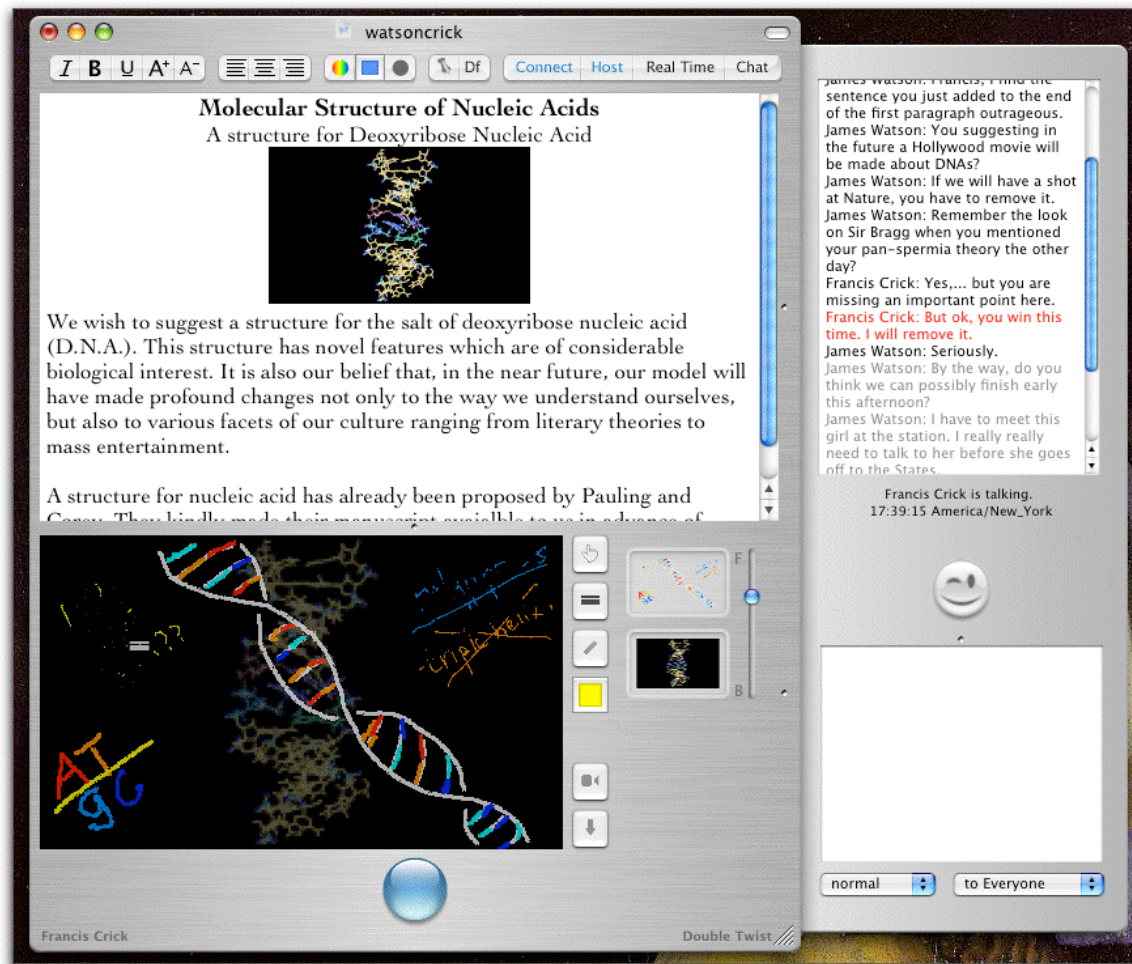
A Day in the life of Albert E.

On a clear, innocent day in Switzerland, young Albert E. set out to do a quick estimation of how much energy his mass was equivalent to. Baby Math came handy, as it assisted him with the value of the speed of light and carried out the calculation.



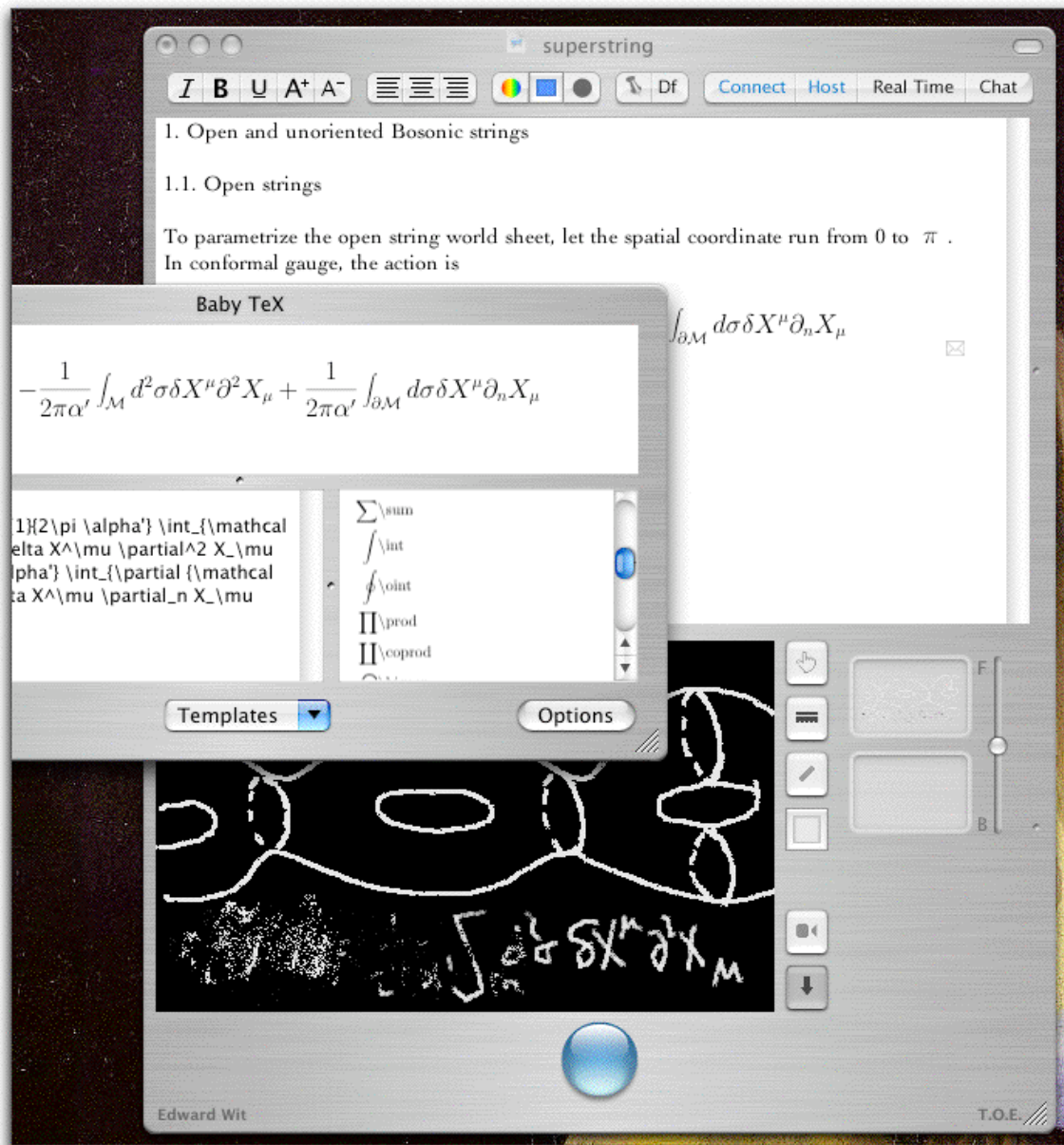
Watson and Crick, Back to the future!

Very probably, nothing beats the actual encounter with Francis Crick, but for Watsons of 21st century who can not afford the travel to Cambridge, iStorm may well be the second option. If one could come up with a double twist, who cares how one arrived at it?



















Here we caught Edward Wit or Stephen Hawk moving an equation from superstring theory...

While the chalkboard is the cradle of every significant discovery in science, there are some ideas which just cannot be contained in it, even at the hands of the Masters. For those of us to whom equations are much more comprehensible than anything else, iStorm offers an elegant way to communicate complex mathematical ideas via what we named "Baby TeX".



How to Use iStorm

 Before You Start...	11
 Starting a Collaboration	12
 Joining a Collaboration	18
 Brainstorming	22
 Buttons and Controls	33
 Chatting	36
 iChalk	39
 Baby TeX	49
 Baby Math	66
 Umbrellas for iStorm	72
 Leaving iStorm	77
 Beyond LAN	79
 Preferences	83
Top 10 Things	
 To Do	88
 Not to Do	89
 Appendix	
Under the hood	90
Brief summary of LaTeX commands	92
Summary of constants and functions for Baby Math	101
FAQ	106
Credits	110
About the developers	111
How to reach us	112

Before you start

If you are trying iStorm for the first time, please keep the following aspects in mind:

The current version of iStorm works only with OS X 10.2 (Jaguar) or later. For up-to-date information and coming attractions, visit www.mathgamehouse.com/istorm/.

Unregistered copy of iStorm will drop you off the collaboration 20 minutes after you join one. To obtain appropriate user licenses, please visit our web site: www.mathgamehouse.com/istorm/purchase.html .

A single user license allows up to two people to work in a collaboration using the same license key and code pair. More people with distinct license may still join.

The one control to remember: [command-return](#). Puzzled? Please consult the rest of this help. Remember that you can cycle through different options by repeatedly pressing the tool button (Hand, Chalk, Eraser) in the iChalk module. The same can be achieved by double-clicking the board itself. Also don't forget to try intelligent in-line modes with Baby TeX ([command- /](#)) and Baby Math ([command-=](#)).

Some of the screenshots may slightly differ from what you see depending on the version of iStorm. You can access the most up-to-date help at iStorm Help.

Think different *together*. And have fun.

Please memorize the following and support the American legal system:

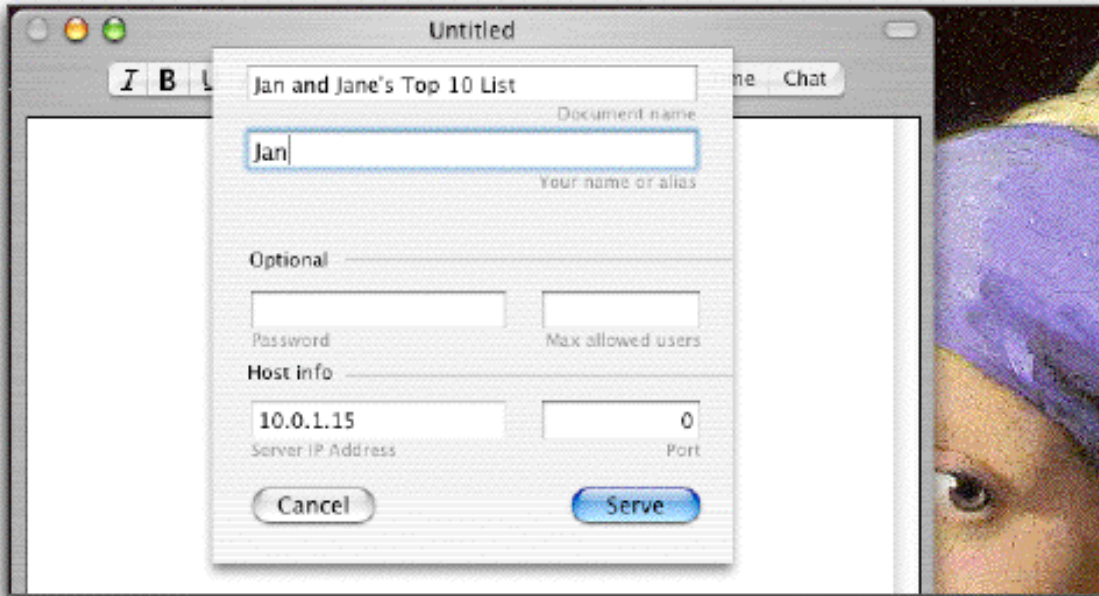
THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT OF THIRD PARTY RIGHTS. IN NO EVENT SHALL THE COPYRIGHT HOLDER SPECIFIED IN THIS NOTICE BE LIABLE FOR ANY CLAIM, OR ANY SPECIAL INDIRECT OR CONSEQUENTIAL DAMAGES, OR ANY DAMAGES WHATSOEVER RESULTING FROM THE NATURE OF THE CONTENT OF DATA OR THEIR LOSS WHETHER IN AN ACTION OF CONTRACT, NEGLIGENCE OR OTHER TORTIOUS ACTION, ARISING OUT OF OR IN CONNECTION WITH THE USE OR PERFORMANCE OF THIS SOFTWARE.

Starting a collaboration

While the iStorm may function as a stand-alone rich-text editor with built-in equation and math processors as well as a chalkboard, it really shines when used with a collaborator or a group of people on a LAN (local area network). It is possible to work over internet (WAN, wide area network) with some extra measures, but we will get to that later.

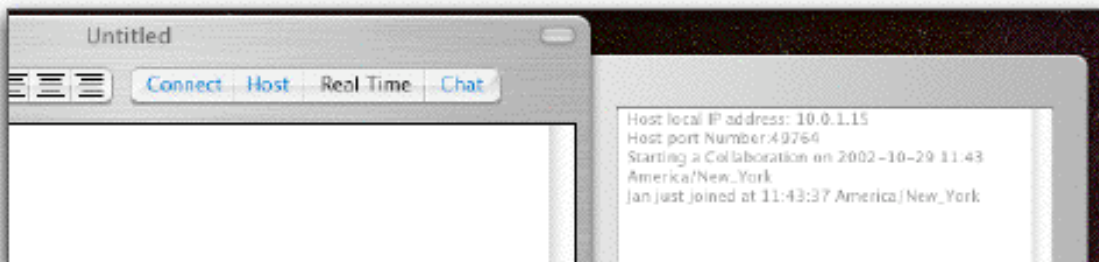
You, Jan, want to start a document in which you list ten books to read during the summer vacation and would like to work on it with your dorm friend Jane. Start iStorm. Make sure you are connected to the local network, either through ethernet cable or via Airport. A blank document should open.

1. Important: As a host, you should disable the sleep mode. Go to the System Preferences. Choose EnergySaver module. In the Sleep tab, choose "Never" for the "Put the computer to sleep.....". You may keep the display and hard-disk sleep On if you want to.
2. Click on the Host button or choose Host (Cmd-Shift-K) from the Connections Menu.
3. Pick a good name for the shared collaboration (Jan and Jane's Top 10 List).
4. Pick a unique name or alias for yourself. (If you get tired of typing the same alias and document name over and over, you may specify your default choice in the Preferences.)
5. Disregard other boxes (password, server IP Address, port) and simply press Serve button. There will be a momentary pause while iStorm allows the served document to start, and then it will automatically join the collaboration. Then the Host window will close itself.
6. At this point, you are ready to let other people join your party.
7. (To gracefully terminate the collaboration, follow instruction in the page titled "Leaving iStorm".)



If everything went well,

You should see something like this when you click the "chat" button to open the drawer. Notice that the Connect and Host buttons in the toolbar are lit blue, indicating that you successfully started hosting (serving) the collaboration as well as becoming a member (naturally!) of the collaboration automatically. The chat box also serves as an information board. Here it shows some relevant Host information, the IP addresses and the name of your machine. It also shows that Jan joined the party at a certain time from Eastern USA.



On the bottom of the window, the button should have turned from gray to green. The shared document name and some relevant information are displayed there. When you save the

document later, the top of its window will display the local file name, which is different from what is shown in the bottom right corner. The latter is the shared collaboration name. The latter is the shared collaboration name which will be the same for everybody connected to it.



If you are curious,

Here are some details depending on your system version:

Pre-Rendezvous Mode

If you have played a networked game in the host-client mode, you should be already familiar with the way you connect with other people in what we call pre-Rendezvous mode. The host on whose machine the actual file resides, should start a shared document, and will give two vital numbers to the collaborators to connect to: First, the IP address of the hosting machine, which can be either looked up from the Network module in the System Preferences or from the chat drawer as shown in the figure above. Secondly, the port number to which the hosting iStorm listens for incoming messages from the clients. [You may pick a number between 49151 and 65535 which are available private ports. If you don't pick a number and leave the port number cell as is (usually displaying 0), a number will be automatically picked. The chosen port number may be found by opening the host panel again after the serving started successfully. Then call your friend and give the IP address and port number.

Rendezvous Mode

Things have gotten much easier with the Rendezvous technology. Finding an available shared document is as easy as finding a printer in the Chooser (if you still remember what Chooser means....) of old Mac OS. Here you don't have to worry about any numbers, but should just come up with the names of the document and yourself for your collaborators to recognize.

If you are having these troubles:

It seems the host is not visible to others?

First, make sure if the firewall arrangement is not causing it. Open the Sharing panel in the System Preferences. Choose Firewall tab. If you find firewall off here, close it and move on to the next step. If the firewall is on, you may want to add an item to the Allow list to let the iStorm traffic through. Find the port number (you may choose a number here and manually force iStorm to use it) of current iStorm shared document (by opening the Host panel in iStorm) and add to the list.

If this is not an issue, maybe your network set-up demands a bit more looking into. Here are some of the hints we can offer. Beware of IP addresses starting as 10.0.x.x or 192.163.x.x: These are "internal" IP addresses given out to machines by DHCP servers/routers and therefore are not very useful for machines outside its domain. If you live in an apartment #66 on Broadway, New York, it is like giving just the number #66 to your friend to find your home in New York. It works well if all your friends live on the same street. If your network is made of ten iBooks connected by Airport, (lucky you!) it should work just fine by giving the address you see (10.0.1.3, say) to other 10.0.1.X's. However, if there is someone who is connected to the network through a router at the same level as the Airport, a rung above your level, then the machine may not be able to see you easily. What is called "Port forwarding" may be a

solution in such cases. We recommend finding the person responsible for creating such a messy network environment and make him/her solve your problem and pay for the sin.

That same person probably has made it even harder by setting up firewalls in the name of network security. Not that it is a bad habit, but firewall requires that you take extra effort to allow (at your own risk!) the special communication through the port of your choice in advance. We believe that one of the important ingredients of creative collaboration is openness and it conflicts head-on with the notion of tight security, which seems to be the big idea with all the IT professionals these days. (Remember Y2K?)

We need to make a compromise. Be nice to your IT specialists as you won't have much creative juice left in you if you have to figure this out by yourself!

It seems the hosting starts, but the Host window would not close and the big gray button at the bottom of the document window remains gray. The bottom of the main window says "local but serving".



This problem should no longer arise for iStorm [1.1](#) and later. For iStorm [1.0](#), this indicated the following:

Somehow, your machine or network is not in an optimal mood, and it took a while longer to start the document server. As long as the Host button is lit blue, and the bottom of the main window says "local but serving", you are OK. Just proceed to join (connect) the collaboration yourself. (Follow the instruction on Joining.)

Even the Host button in the toolbar is not lit blue.

It is likely that you tried to set the port number manually and the port was not available. If you keep it empty or as 0 (zero), the system will automatically provide a private port. Also, for some reason, if a previous collaboration attempt aborted anomalously using a given port number, subsequent trial to start a new one using the same port number may fail until the port clears. Allow a few minutes, or choose 0 for the port number so that an available one is picked automatically.

I already joined an existing collaboration, and then I tried to Host from the same document. It does not seem to work!

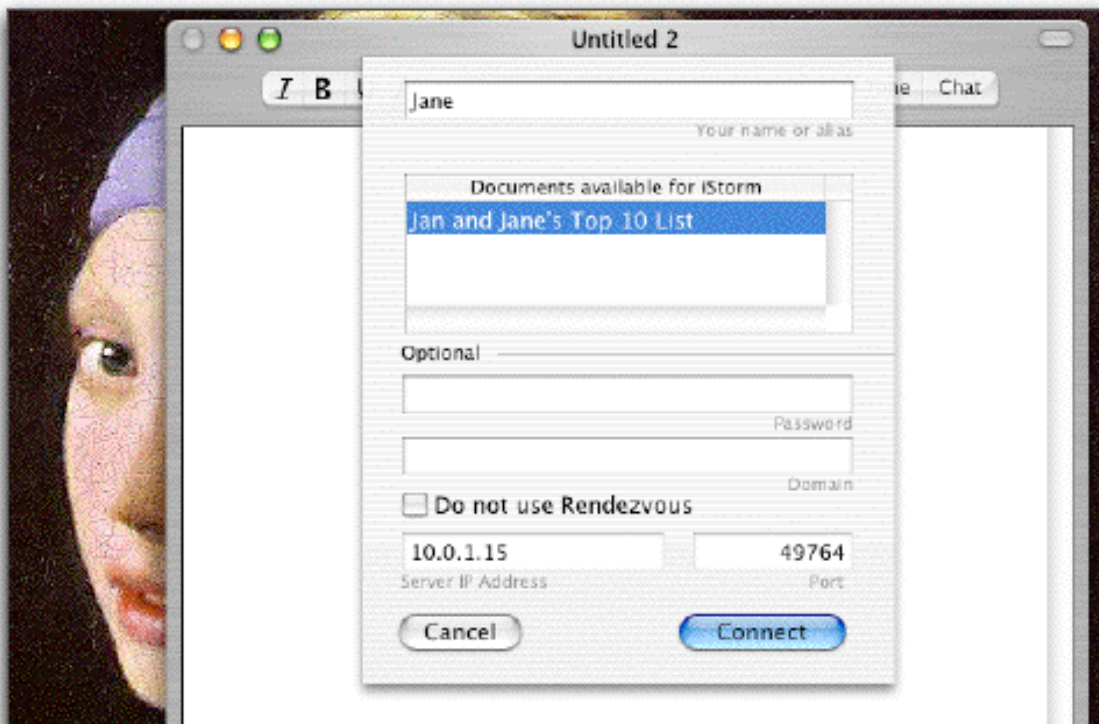
What exactly are you trying to do? We have done that in our extreme testing, and the result was not very pleasant. While it is possible to host a document and not connect to it (server only mode), it is not possible to join a collaboration first and then start serving the same document. The world has a notion for it: a coup d'etat.

Joining a collaboration

Now that your friend Jan has set up a collaboration, you want to join the fun.

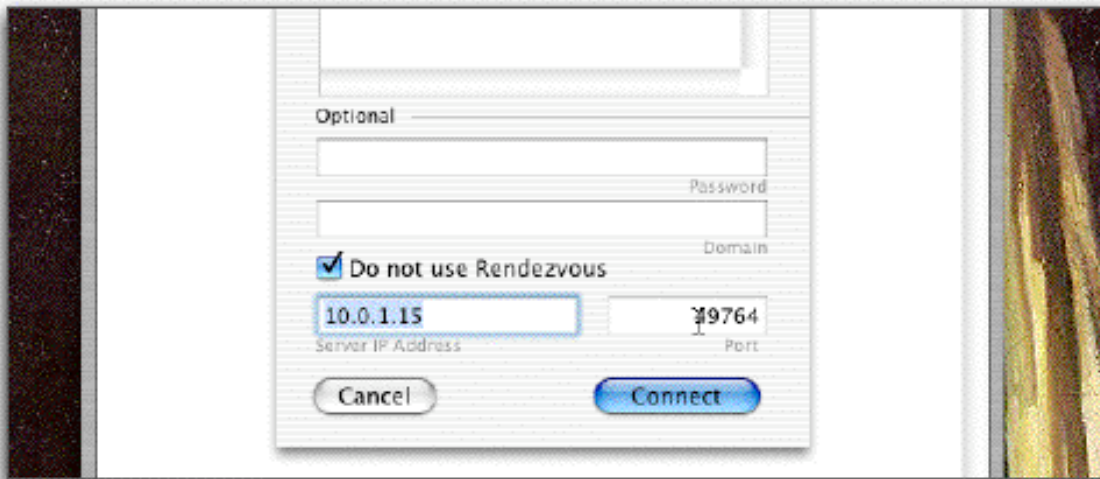
Start your copy of iStorm. Make sure you are connected to the local network, either through ethernet cable or via Airport. A blank document should open. [If you are still Jan, you may impersonate Jane: Remember the old gentleman who played chess with himself in the short Pixar movie? You could try that by duplicating a copy of iStorm and run it on the same computer to join the collaboration you set up yourself.]

1. Click on the Connect button or choose Connect (Cmd-k) from the Connections Menu.
2. Pick a unique name or alias for yourself (Jane).
3. If you choose to use Rendezvous, you will see that it works behind you and has already found the collaboration. If you see the desired document in the table, just click it to select, then press connect button. Note that the connect button becomes active only when you select a valid document in the list.



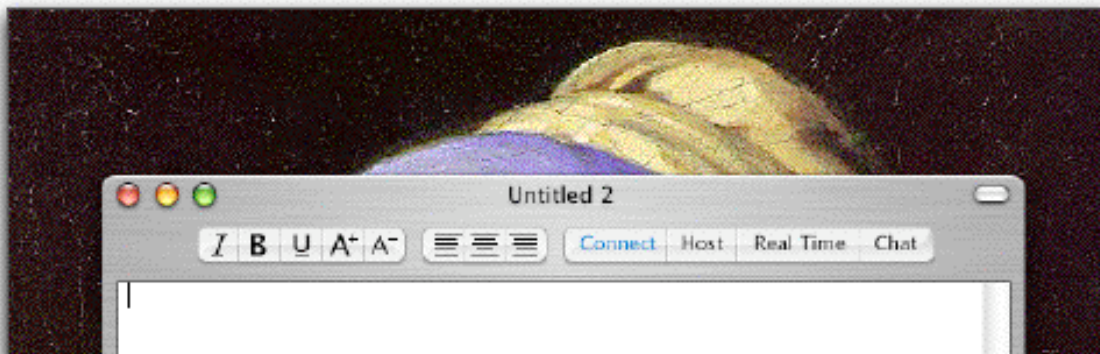
3-alt. If you need to type in the IP address manually, click the checkbox (do not use Rendezvous) on, and type in the IP address and the port number Jan gave you as shown below. Press the Connect button. When you try to connect beyond LAN, most likely you will use this method, until the whole world gets in the mood for Rendezvous.

4. (To gracefully leave the collaboration thus joined, follow instructions on leaving group.)

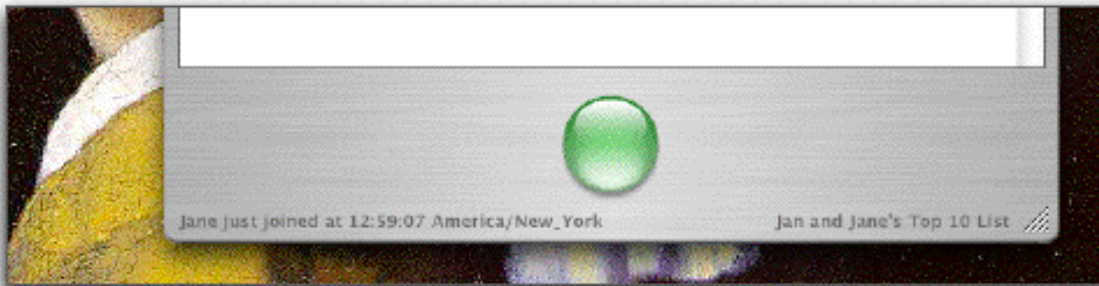


If everything went well,

The Connect button in the document toolbar should lit blue, indicating that you successfully joined the collaboration.

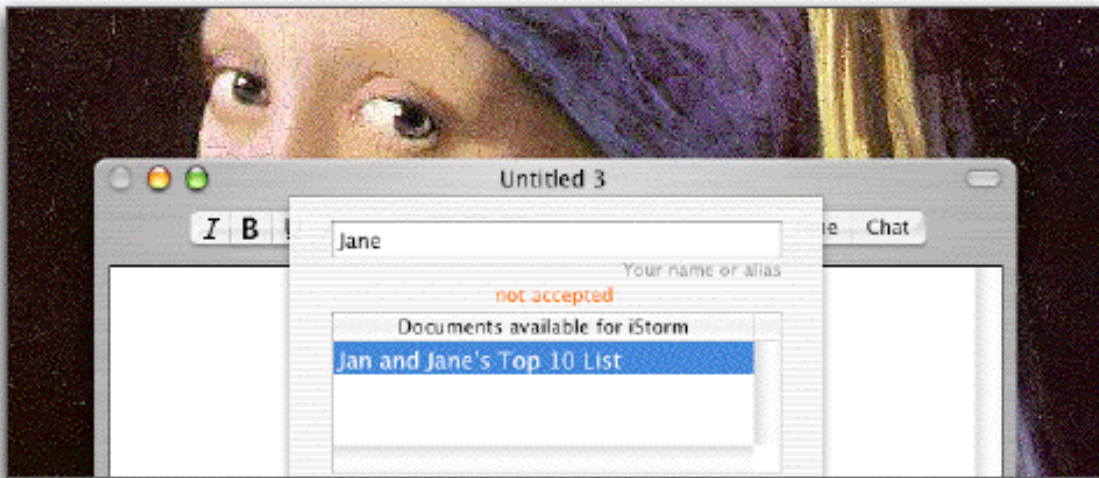


On the bottom of the window, the button should have turned from gray to green. The document name and some relevant information are displayed there. If Jan had already started and is in the middle of editing the document, you would instead see the red button, and you will not be able to edit it unless Jan frees it.



If you are having these troubles:

I pressed the connect button, but it will not let me join. An orange message appears below the Name/Alias field.



This happens if somebody else has already used your name/alias (Jane) and joined the collaboration. iStorm running on Jan's machine (as he is serving) keeps track of the list of participants and the name/alias you type in here is meant to identify you uniquely. A way around would be to add more descriptive words to it, such as "an Angry Jane".

OK. I made sure there is nobody named "Bad Jane", yet it still refuses with other messages.

This happens for various reasons:

***wrong password** The collaboration requires the correct password to be typed in the password field. Ask the host to find out.

***no more clients accepted** The host has decided that there are too many in the kitchen and therefore set up a bouncer. Beg the host to change its mind.

***allowed clients number exceeded** iStorm allows only up to two people using the same License code (this is the 16 characters code you type in the Preferences after purchasing the license) to join a group. May we suggest somebody in the group [purchase](#) his/her own license unless we have a multiple personality syndrome here?

***maximum connections exceeded** When the host starts a collaboration, he/she can set a limit to the allowed number of people in the group in advance. The number is reached and you are out of luck, until somebody leaves.

***not accepted** This may be the case where either the host or the client is using an older version of iStorm.

***no clue!** We don't have a clue either. Hopefully, nobody will ever encounter this message.

***protocol mismatch:3.0 vs 1.0:Update iStorm.** A message like this indicates that some one needs to update the iStorm. The most up-to-date protocol with iStorm version 2.0 is 3.0.

Brainstorming the iStorm Way

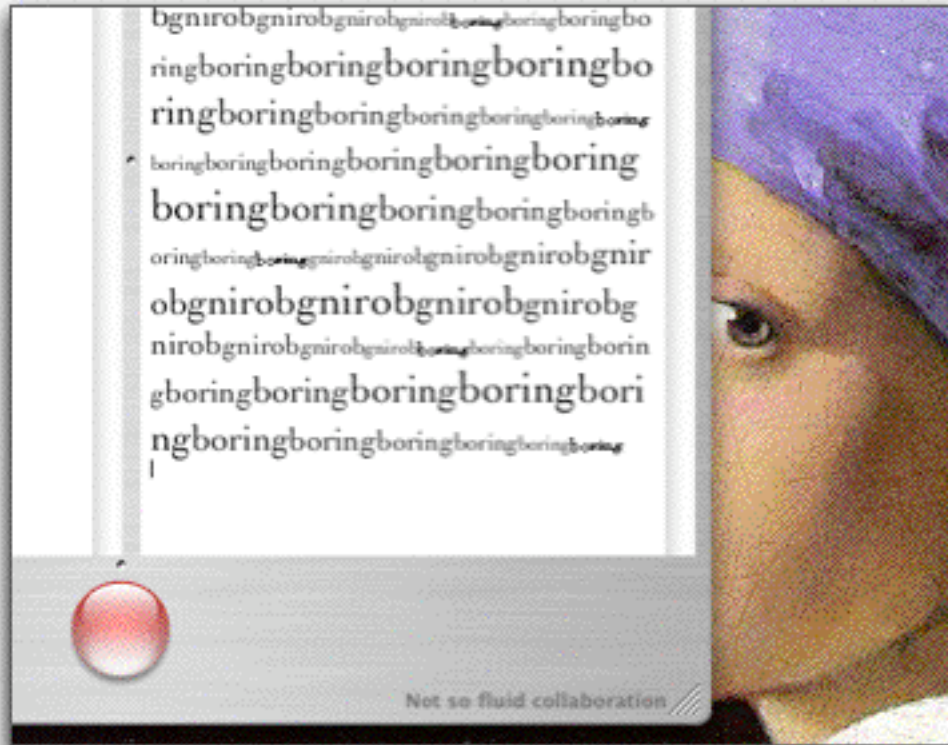
Now that you and your friend Jane started a brainstorming session, you want to finish it before evening since you have something more interesting to do together later.

1. Click on the main document window. If the big button at the bottom was green, you will notice it now turns blue. On the other side, it should have turned red, preventing Jane from taking control.
2. Make some changes to the list. When ready, press the big button or hit **command-return**. Notice that after a brief pause, the button turns green. It means you have updated the shared document with your changes and gave up the control. (If you do not want to lose control, but would like to send update, you could have pressed **control-space**. That way, the button will still be blue, and would allow you to keep editing.)

Here are some features you may find useful:

Scratch Pad: while you wait....

While Jane is editing the document, you suddenly have a brilliant idea which you might forget in a moment. If such an illusion grabs you, just hit the red button (or **command-return** or choose from the Tools menu) to slide out the scratch pad, in which you can contain your precious but fleeting idea. When the document becomes available for you to edit, just drag its content into the main document. That way, you didn't exactly waste your time while waiting. Only if you are that diligent in real life....



iCourtesy: If you take control and do nothing for too long:

It happens all the time. You thought you had such a cool idea and seized the control but immediately hit the writer's block. Then, you just remember the Ben and Jerry in the fridge and suddenly worry that the electricity may be out and it's all melting. Of course, you catch sight of Wallace and Gromit on TV on your way back to iStorm. Being creative is such a hard job!

This is not a commendable behavior! Therefore, after a few minutes (which you can change from the Preferences) of such indulgence, iStorm will automatically yield your control so that other people can do something slightly more useful.

Real time update:

If you and collaborators have fast and robust connection, you can send your update every few seconds (the interval can be changed from the Preferences) to your collaborators while

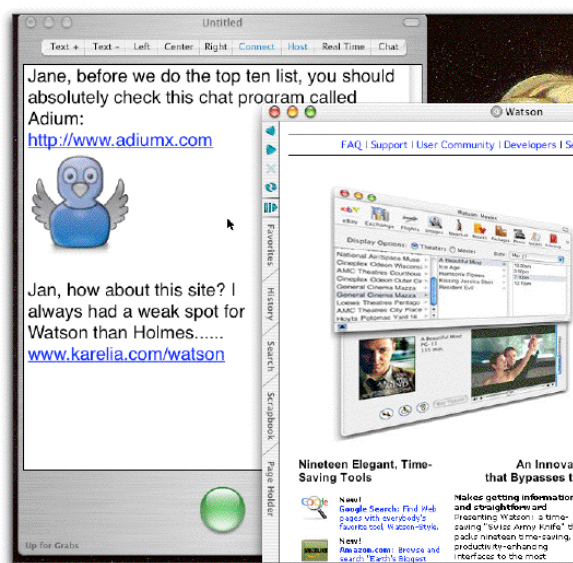
editing the document. You turn this on and off either from the Realtime button in the toolbar or in the Connections menu.

We strongly discourage you from using this feature if you have a slow connection (especially across internet) as it often bogs down the performance due to network contingencies. The situation may turn graver if your collaboration is graphics heavy. As in real life, your collaborators have only limited amount of patience. (iStorm understands it in terms of connection timeouts set in Preferences.)

Use it only to impress your friend still enslaved to the Windows world.

Automatic HTTP link recognition:

These days, no collaboration is complete without exchange of a few useful http links. If you type a link which starts with `http://`, `https://` or `www.` and ends with a space, iStorm will recognize it upon updating and will create the link for you. If you click such a link in the document, the default web browser will automatically launch to the link. The default is on. You can change this behavior in the Preferences. In the local (unconnected) mode, you can manually activate all http links by choosing the command in the Tools menu. (iStorm 2.0 or later) It can be done also by pressing the big gray button.



Transferring the text selection range:

As the shared document grows in length, it becomes increasingly difficult to keep track of the changes made by your collaborator. You may exchange such information through the chatting channel, but another convenient way is to highlight the changed region. If you made some changes in the middle of the document, say between line 3004 and 3007, just select them before you hit the button or Cmd-Return. The receiving party will see the selection as the window automatically scrolls to the selected region. (Selection does not work in Real Time mode.)

Drag and dropping jpg pictures:

To include some graphics into the document, the best way is to use a small jpg representation of your graphics file. If you are tempted to dump a 10 mb Photoshop file into the window, think again before you do it: Unnecessarily large graphics means serious performance hit not just for you but everybody in the group! Be nice to others.

An ideal graphics files is the thumbnail picture such as generated by iPhoto, which you find by digging deep into the iPhoto Library folder. They look good only for small sizes, but remember: if you wanted the fully polished pre-press document, you probably chose something like QuarkExpress to begin with. iStorm is rather for the messy brain picking than for polishing! Repeat this sentence five times like a mantra now.

If you still need to send a large file despite this plea, do it only once and suggest others to immediately copy it to a local file, thereby freeing subsequent exchange of content data of the huge burden. We wish we could have this as a built-in feature, but then we would be developing a errrr web-browser.... Right? And we seriously do not want to attract Microsoft's attention by even thinking about it!

With iStorm 1.1 or later, the gray paragraph above does not apply any more. The data transport has become intelligent enough to avoid unnecessary transmission of large graphics

files. Roughly speaking it works in a way similar to the "caching" of web browsers.

Pasting equations or tiff data from other programs:

You can paste equations made with the Equation editor (which comes with the program named Microsoft Office in case you never heard of it) into the document.

Drag and dropping QuickTime movies:

Transmitting Quicktime media data is possible with iStorm. When you drag and drop a quicktime file into the document, (files with extension: .mov, .avi, .mp4, .mpeg, .mpg are currently recognized.) the standard movie player interface will be placed, enabling the movie to be played within the document. When you transmit the document, the movie will be replaced by a movie icon. Double clicking the icon will bring up a simple movie player window which will play in the background. Note that it is also possible to transmit and play audio data in the same manner. Currently, the following audio formats are recognized: mp3, mid, aif, wav. But it is not such a good idea to transmit large media clips in a collaborative environment as it will dramatically strain patience of everybody involved. If you came up with a movie, everybody else is bound to come up with his/her favorite clip too! We suggest using a dedicated file transfer program to do it in the background (such as Fetch or Transmit) if you need to exchange a large amount of data (> 1 Mb). Even better: just send the link and let the big boys (Time-Warner or Apple, or whatever) donate some bandwidth for your group!

If you desperately need to recover a stand-alone media file from the document, we suggest you save the document as a rich text file, and try dragging the movie out into the Desktop, or if you are comfortable with dirtying your hands, control-click on the rich text file to open its content. The opened window will show all the media files attached to the document. Just option-drag the desired file to make a copy. Rename it as you wish.

When you play a media file within iStorm, iStorm uses a temporary media file named "___istorm_mediascratch.xxx" with appropriate extension (xxx=mov, mpeg, mp3 etc...). The file exists temporarily inside the iStorm support directory :

[Your Home]/Library/ApplicationSupport/iStorm/QT/Temporary and is deleted when iStorm quits. If you had imported a 2 Gb movie file (God bless you!) and if for some reason, iStorm crashed, it is possible that the 2 Gb temporary file still resides there for no good. It would be a smart thing to do remove it by hand.

Time stamp:

In the Tools menu, you will find an item called Insert Timestamp. It does exactly what it says.

Word count:

In the Tools menu, you will find an item called Word Count. If a block of text was selected at the time you issue this command, the word count will be performed on the selection. Otherwise, it is performed over the whole document. If you were in the middle of completing a word at the end of the selection (or document) it may be counted as a complete word. Please keep in mind that there may be an error by a word in some special circumstances.

Special items in the toolbar

There are some special items in the toolbar. If you have not done so already, select the Customize Toolbar item in the Tools menu to examine available toolbar buttons which are not visible in the toolbar. The following will come handy when you work with a group each member of which would like to keep distinct font characteristics as a way to embed his identity in the characters added.

Strikethru toolbar item:

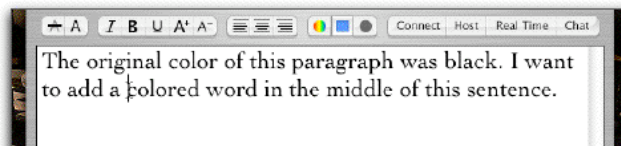


Sometimes you want to cross out part of the text rather than erasing or replacing them so that your collaborators see the before and the after side by side. These buttons apply or cancel the so-called strike-thru bar across your selection. Note that these buttons work only when there is a range of text selected.

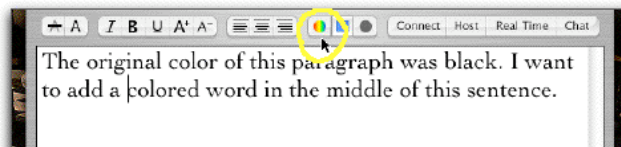
Color toolbar item:



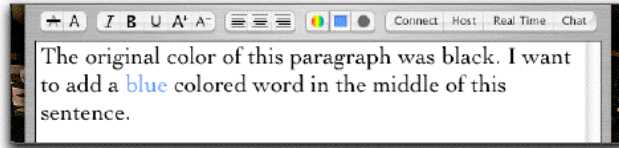
Another useful tool in a collaborative editing is creative use of colors. OS X has an extremely powerful color management tools, but for simple document editing, it tends to be overkill and often confusing. We have devised a very simple color management interface for iStorm. A possible use of color is that each member of the group may choose a favorite color at the beginning of the session. This can be done by clicking on the center of the color toolbar item. It will bring up the color picker panel showing a variety of colored crayons. Choose a favorite color. It will be displayed at the center until you change it to another. Note that the color displayed does not necessarily match that of the character you are typing. It just shows your choice of color ready to be applied when you dip your pen into the ink to wet it. Suppose you want to add a word in blue in the middle of an existing sentence originally in black. Move the cursor to the position where the blue word is to be inserted.



Click on the left (rainbow) button. You just dipped the pen into the blue ink to wet it.



Type in the word. It should come out as blue.



If you want to insert yet another blue word in the other part of the paragraph, you move the cursor to the insertion point, and click on the rainbow ("dip the pen") again and type. To terminate (or switch back to the default (black) color, you should click on the right ("black") button to "dry the pen".

- * Note that you can click either the wet (left) or the dry (right) button to apply it to a selected region of the text.
- * Note also that when you choose a color by clicking the center button, the pen is already dipped in that color by default.
- * Remember that the color toolbar has three buttons with functions: "wet"-"choose color"-"dry".

Some users may find this color management somewhat less intuitive. After getting acquainted with how this toolbar item works, most will find it takes full advantage of what OS X provides with minimal interface element. Except for those of you still living in the '60s and trying to design a rainbow T-shirt using iStorm, this tool will satisfy the need of most casual users.

Font toolbar item:



Some people can't stand their day starting with a letter from Helvetica. To set the default font for all new iStorm documents, select a region of text with your desired font or insert the cursor in the zone. You may use the font panel to choose one from. (Choose *Show Fonts* in the *Format* menu.) Then click on the "pin" toolbar item shown in the left panel of the picture above. Until you do this again with a different font selection, all subsequent new iStorm document will use the **designated font**. You may consider the beauty as well as the distinctive character of the font to represent yourself in a collaboration. Generally it is a good idea to avoid an extremely exotic variety if you collaborate with grownups as they tend to get

personally offended by a funny font.

Your collaborator may disagree. You find all her writings come back in glorious American Typewriter font and whenever you try to modify a word in her paragraph, the typewriter font is used! (this is the generally the way font works in OS X). In the manner similar to the wet-dry color behavior described earlier, iStorm provides you with a way to easily pick the “pinned” default font of your choice by pressing the “Df” button.

Super/Subscript toolbar item:



We provide a toolbar item to access subscript and superscript buried in the Baseline submenu of Format.

A note on Symbol font

When life was simpler, there used to be good old *Symbol* font, which produced □ when you press “a” and □ when you press “b”. With the adoption of 2-byte Unicode standard, it no longer works that simple. Some programs such as MS Word maintains the old functionality, but as of January 2003, Apple has not made up its mind about how it is going to make life easier for us.

For now, the official way to access various symbols and other exotic characters is via the Input Menu. The input menu usually appears system-wide in the rightmost end of the Menu bar, next to the ubiquitous Help item. If you do not see one, do the following:

Open the *System Preferences* in the Apple Menu. Choose the *International* item. Choose the *Input Menu* tab. Find and choose the *Greek* type and *Character Palette* if you see one as well as your default language. You will see this adds the desired input method item in the menu bar.

For casual users who need only a couple of Greek letters

occasionally, it is quite a burden to do all this. We anticipate that Apple will come up with an improved scheme eventually.

Here are the features introduced in iStorm version 2.0:

With realistic chalkboard and TeX/Math capability, you don't have any excuse not to do some serious scientific collaboration in the 21st century style.

Baby TeX:

A must for hard-core scientists is to have TeX generated equations. If you have a TeX system with pdf- and latex-capabilities installed on your OS X, you will be able to call it directly from iStorm and embed the TIFF or pdf image of the generated equation in the document. The equation may have an optional icon attached to its end. Double-clicking on the icon will bring up the decoded TeX commands which can then be pasted back into the Baby TeX window by a click of a button to be edited. [More details in the Baby TeX section of this document.](#)

Baby Math:

A must for almost everyone! You have a fully functional calculator on your fingertips right in the middle of writing a paragraph in iStorm. Call up pre-defined universal constant such as speed of light or Planck constant as well as your own. Enclose the expressions in # # and click Command-= to see it replaced by the answer. More details in the Baby Math section of this document.

iChalk:

Any self-respecting scientists/children need to spend some time arguing in front of the chalkboard with their hands and hair messed up with chalk dust. We provide iChalk as a part of iStorm 2.0. Don't use iStorm to play Pictionary! More details on

the iChalk section of this document.

Buttons and Controls

The most conspicuous thing that strikes you when you open an iStorm document would be the big round button at the bottom of the window. We thought it important to minimize the user interface elements so that you can concentrate on the creative process without a moment's confusion in front of the control panel of a Jet plane. Therefore, it is there to serve most of the important functions during your collaboration.

The Button as Status indicator

The colors of the button in iStorm display the status of the document.



You are not connected to a shared document yet or have lost connection to one.



The document is open for anyone to grab and edit.



You are editing the document. Others will see Red.



Someone else is editing the document, and you can not take control. (If you press the button, it will slide open an auxiliary window for you to doodle. It also enables you to snatch control, if you are desperate. See below.)

The Button as Control



Pressing this button in the local mode will simply find all the http links in the document and enable them. (iStorm 2.0 or later)



The button when pressed while it is green will try to take control of the document for you if it is free to edit. When the document is free, just pressing the main editing window to start typing will grab the control.



Pressing it when it is blue (while editing) will update the document for everyone else, and free up control. To avoid yielding control while sending out the update, press control-space key instead.



Pressing it when it is red (while somebody else is editing) will initially bring up a Scratch Pad, on which you can jot down your ideas while waiting for the other person to free up the document control.

Pressing it repeatedly twice more will send a private message to the current holder of the document saying you'd like to get the control as soon as possible. (Both parties will hear the "Frog" sound when iStorm does this.)

Pressing it repeatedly further four more times in a row will snatch the control away from the current owner. Do not use it unless you know what you are getting into.



The button can also be activated by pressing the [command](#) and [return](#) keys together.

Other control elements

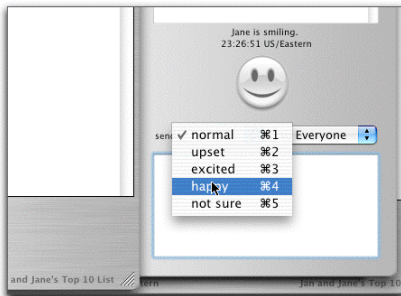
There are times when you are rapidly writing a stream of ideas down, and do not want to be interrupted. At the same time, you would like others to follow you closely. You already know that pressing the Button (or [command-return](#)) will update the document on their window, but will also yield control momentarily.

In such special occasions when you cannot afford to lose control, you may press [control-space](#) to send updates as frequently as you'd like while maintaining the document control.

The Discourse Module, or should we say *Chat* ?

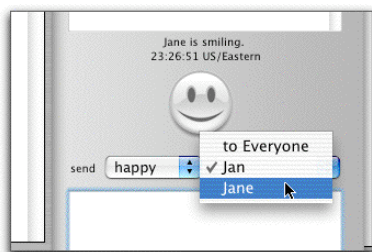
While the official, boring bits of the collaboration go into the main document window for posterity, the real action should happen in the more informal, ephemeral realm of Chat. There are several excellent chat programs on the platform such as Adium and Apple's own iChat. So why bother? We recommend those dedicated programs for your daily need to "connect".

The chat window in iStorm functions occasionally as an information dispenser, but its main function is to fully integrate those "thinking out loud" moments into the iStorm process. Also, note that there are some rare occasions where thousand words are indeed better than a picture. You can also "gesture" your comments by selecting a symbolic icon (along with some funky sound effect if you choose to in the Preferences).



The range of emotion available here may disappoint some of you well-informed on human psyche. But allow us make some sacrifice there for the sake of efficiency. An advice: do not overuse the emotion. Once your collaborators find about your tendency to make every comment with

angry gesture, they will stop being intimidated by you.



Sometimes, you may need to talk to a member of the group individually. We will not speculate on why you would want to do that. You do that by selecting the name of the individual you want to address privately. The remarks thus made will be delivered only to you and

the target individual and displayed in small gray font. The list shown here also serves as a way to check up on all current members of the collaboration.

Collaborate now, Dispute later.

iStorm will record and display in and out of the participating members. When you save the document, the whole history of the chatting is also saved. (Not in the case of Save As RTFD) Granted, not everybody needs this. Indeed, if you read back your daily chat transcript, you will be quite ashamed at the paucity of any meaningful and durable content.

Often, it requires a singular genius to move the earth. The lone genius may accomplish the work mainly through inner dialogues and has no need for iStorm. However, there is also an endless list of great collaborations in history. Just to name famous duos will fill up pages: Rogers & Hart, Elton John & Bernie Taupin, Watson & Crick, Bill Wilder & I. A. L. Diamond. Truffaut & Jean-Pierre Léaud. (Jobs & Woz). Lennon & McCartney. Erdős and the company of the week, Nichols & May? C. N. Yang and T. D. Lee. The silly and the serious Woody Allen. Julia Childs & PBS?

How about the Bloomsbury circle? The Lunar Society of Birmingham. King Sejong's Jip-Hyun-Jeon. The early cast of Saturday Night Live. Nicolas Bourbaki. Architects of Quantum Mechanics?

Is it preposterous to assume that any of these teams could have made good use of iStorm and its chat module?

In the recently published biography of the celebrated movie director Billy Wilder, there is an anecdote about him and his collaborator Diamond, crediting each other with the famous line "Nobody's perfect" at the end of the movie "Some like it hot". It is an example of a perfect and beautiful collaboration. But collaborations sometimes end up in a bitter dispute over

who said what when. More so when a big prestige or reward is at stake. Once you have this experience, it begins to undermine your confidence in working in a group. Even if the group manages to keep, the constant strain will drain creative energy. What a pity. With iStorm, you will have a tangible record of everything that went on. Not that it will be legally effective. But at least you will have something to show your sympathetic colleagues when the other guy who snatched your idea just won an award and is heading for Sweden.

Let us look on the brighter side. Often, it is worthwhile to revisit what went on at a distance and try to grasp a deep undercurrent which you missed during the heat of debates. That's what this is really for.

Chalking the iStorm Way



Many of the features here are shared with our stand-alone iChalk program. If you are interested in more detailed information, you may look into the built-in help of iChalk.

The on-line version is available at:

www.mathgamehouse.com/ichalk/help/manual.

With iStorm version 2.0 and later, Jan finds a handy chalkboard tucked under the main document view. The module can be opened by pulling up the lower half of the split-view, as if drawing a blind up. Choosing *Chalkboard* in the *Tools* menu (Command-B) does it too. (If your collaborator made some changes to the board, and if your board panel is closed, it will indicate the change by momentarily lifting itself up with a noise.)

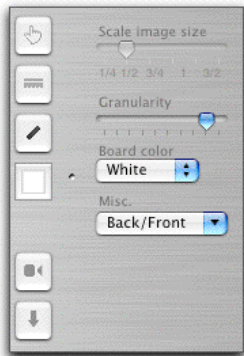
Clicking on one of the three buttons (hand, the eraser and the chalk) at its upper right corner repeatedly, he finds that **each button cycles through different options**. They are followed by the color well and two more buttons: one for QuickTime movie making and the other for controlling pressure sensitivity of stylus.

Explore what you can do with the tools

Chalks

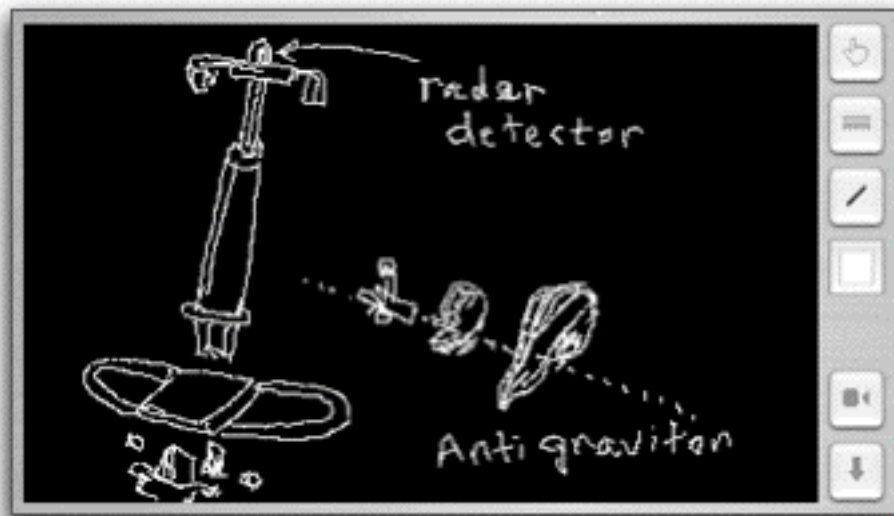


Jan finds the range of drawing tools offered in iChalk extremely limited as it is not exactly a *Photoshop Redefined*, but rather an appendix attached to iStorm as an afterthought. (However, he also remembers that he is yet to pay the shareware fee.) Anyway, Jan sets out to realize his long-harbored ambition of inventing the anti-gravity machine.



First, he finds that the chalk tool cycles through three different sizes as he keeps clicking on the button. Double-clicking on the main drawing board also cycles through the currently selected tool. However, if you use a stylus, you may find the board responding to double clicks interfere with your rapid strokes. In that case, you may switch off the response behavior by clicking the appropriate button in the tool chest. The tool chest is accessed by sliding open the panel next to the buttons. Selecting a chalk, Jan notices that the granularity slider becomes available which controls the texture of the chalk.

The color of the chalk is what is shown in the color well. When you choose a different tool, the chalk tool switches back to its default (medium size).



Erasers

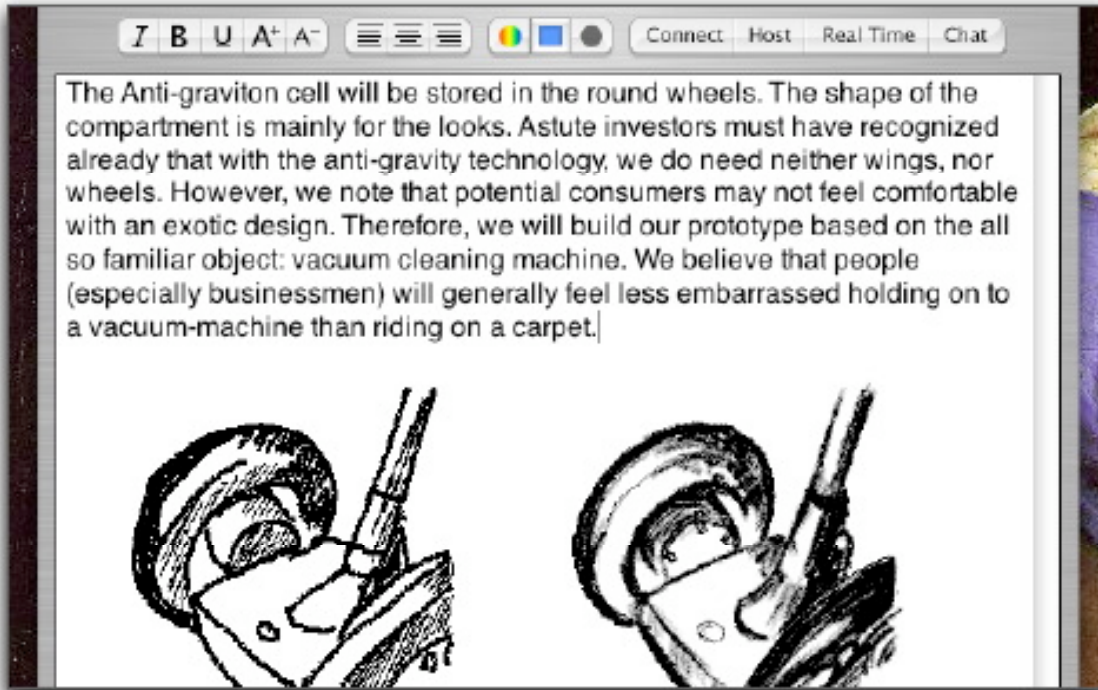


Jane is trying to help Jan and put erasers to a good cause. (Did we tell you that Jane has a PhD in physics and has low opinion of anti-gravity?) The eraser button cycles through four different types. The first one with the rugged bottom has a slightly annoying feature of leaving some dust. This is partly developer's whim, and partly to provide some sense of history of activity on the board as it gathers dust and leaves trace around. The more you use it, the more dust it will gather, up to a point. The second one with flat bottom will correspond to super-clean eraser with slightly bigger size. (The dust on the first one is reset to minimum once you choose the super eraser.) The third one, which looks like the eraser tip of a pencil provides finer eraser control. The last one is a puffer. Choose it and click on the board to erase all previous drawing of Jan. (If Jan had imported a background picture, it will offer options on whether to erase the main drawing or the background picture or both. More on this later.) A feature Jane is resisting hard to use now.

Pressure Sensitivity



Jan has a pressure sensitive stylus, so he can take advantage of it by toggling the button for pressure sensitivity. Both the chinks and erasers become pressure sensitive when the button is lit blue. Even without pressure sensitivity, he finds that the use of tablet and stylus immensely enhances the experience with iChalk.



On the left is how Leonardo would have sketched his version without pressure sensitivity. With the pressure sensitivity, Jan could be more expressive. With the second drawing, he feels quite confident about persuading the venture capitalists he's meeting this afternoon.

Undoing a stroke

IChalk has somewhat limited undo capability. Only the immediately preceding stroke will be undoable. This limitation is due to some compromise we had to make in optimizing the network communication of changes made.

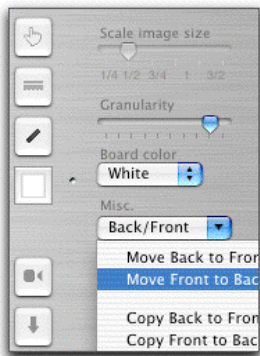
Hand tool



The hand tool is for moving the picture into the main document window. When moved onto Finder, it will be in the format of in the format of the ubiquitous tiff file, which

may be imported into Photoshop or similar programs for a very serious touch-up.

The first two hand tools will give you either original drawing or an inverted color version of the front layer (only those touched by a chalk or an eraser). The last two hand tools are to move both the front layer and the dropped-in background picture (if any) together.

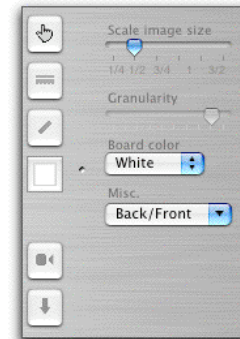


Another way to move images back and forth is to use the Misc. selection bar which gives four different ways to move or copy the images from back to front or vice versa within iChalk.

Normally, iChalk shares only what is on the front over network. The background is hidden from other members. The move- or copy- to Front operation provides a way to share an image. Of course, one can drag the image into the main document window. The move to back operation is handy for rotoscoping (more on this later) and the same functionality is accessible also from a button which appears (named “to Back”) next to the Quicktime movie button.

Scaling big images down to a manageable size

One of the most useful features of the chalkboard in iStorm is that you can use it as an intermediary between a huge image and the main iStorm document. Jan wants to show the Manhattan building which he would like to purchase eventually to house their anti-graviton company. It is a multi-mega-pixel digital photo and due to its high resolution, it becomes Huge (22 by 17 inches!) when Jan drops the picture directly into the document. Jane can see only a small portion of the picture, missing the real thing.



It occurs to Jan that if he drops the picture first into the iChalk board, and then use the third hand tool to move the background (along with chalk drawing,

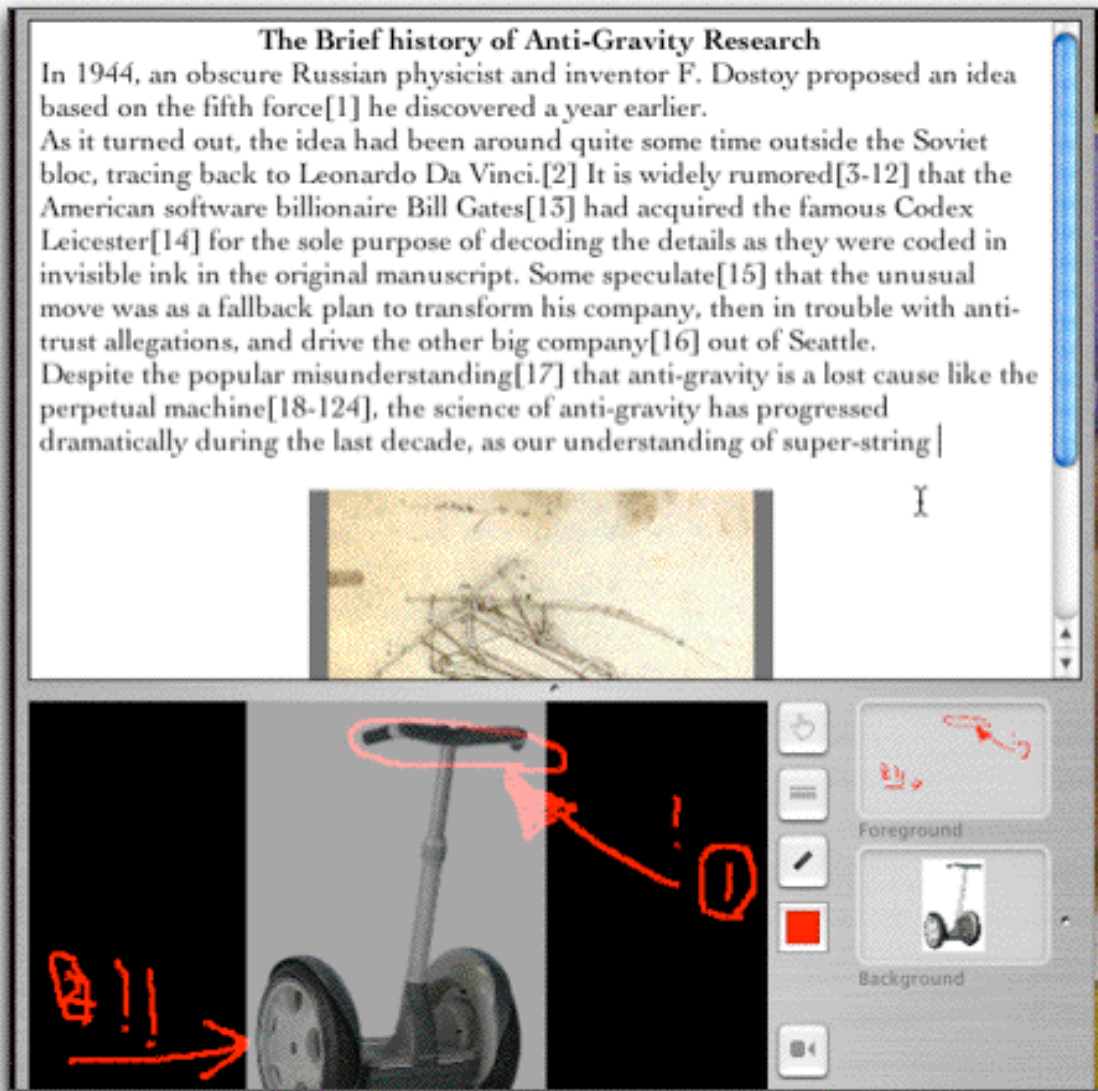


as he added some comments) onto the document, he will have the picture scaled down to the board size and Jane will finally get to see the black building with the sexy curve.

By default, the image scaling slider defaults to half of the board size. This size is big enough to give details of the image yet small in consideration of network efficiency.

Exchange graphic commentary

Another useful feature is to add chalk-commentary on the imported picture as part of your collaboration. Jane has found out about something called Segway by an inventor more experienced than Jan and managed to find its picture.



In the iChalk module, she added some comment on its similarity before sending it off to Jan by using the third hand tool to move the annotated image into the document. Unfortunately, that was the end of happy collaboration for Jan and Jane. Jan will have to call the venture capitalists to cancel the meeting.

Play with the tracing and Quicktime archiving features



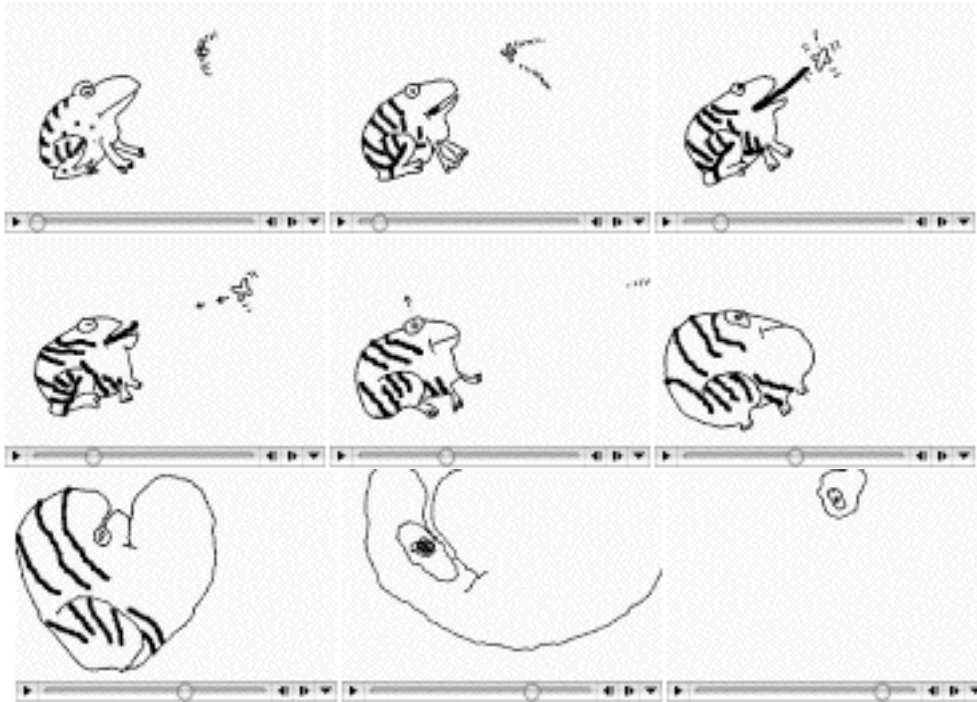
For more creative use of tracing, check out the Camera Obscura section for iChalk (www.mathgamehouse.com/ichalk/cheat.html) and the gallery (www.mathgamehouse.com/ichalk/top10.html) for iChalk.

With the anti-graviton project out of the way, Jan and Jane are back to having some fun. Jan drops a picture of Tintin and Snowy, his heroes, and trace over it. Pressing the Quicktime button, he opens an empty movie file and names it "Tintin doesn't need antigravity anymore.mov". A button appears with "0" on it. When he presses the button after each stroke, it changes to "1", "2", ... and accumulates his drawings (tracing!) as successive frames into the movie. When he is done, he presses the Quicktime button again to close the movie file. Jane agrees that time was better spent creating this amusing clip than on the silly anti-gravity machine.



iRotoscope

Ever being someone chasing dreams, Jan is now considering to take over Pixar. It is one thing to accumulate an ongoing art work such as a snapshot of Tintin and snowy above yet another to create a smooth animation such as the clips shown below:

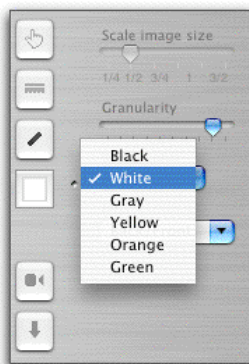


Unless you have genius in animation, you will find it rather difficult to create a smooth animation, even with the help of a background picture. That is because as you move along the succeeding frames, the scene eventually changes significantly from the static background, if you use one. More helpful will be if you use the previous frame as a template for the next frame. Here is how:

1. First, open a QuickTime movie. Drag in a background picture if you want to start with a guide.
2. Draw a small scene. In our example, we start with a frog and a fly.
3. Add the scene as the first frame in the movie file. Then press the "to Back" button. You will notice that the scene is slightly dimmed and recede into the background. Notice now that you have a blank board with the first frame as a guide.
4. You may trace it with variation appropriate for the next frame in the movie. For example, the fly would move a tiny bit, the frog may move its eyeball a bit. After you finish drawing the second frame, add it to the movie file. Then move it to the background by pressing "to Back" again.



Change chalkboard background color



For some people, blackboard is not really black. We find some believe it is actually white, or even orange colored. If you play with switching the board color on the fly, you will notice that the chalk drawing is more or less independent of the background color. When the board is completely covered by an imported image, erasing a part will reveal the current background choice. The choice has some consequence on the eraser action however. If you use the dirty (default) eraser as it leaves dust with color determined by the current chalk and the background colors. Also, it has non-trivial influence on the pressure sensitive strokes. Therefore we suggest experimenting with various combinations of chalk and board colors before you set out to work on your project. In collaboration, it is best to agree beforehand on the board color and stick with it to avoid confusion and some ugly side effect. The change of background color by a member of the collaboration is immediately conveyed to other members' boards.

Using Baby TeX

The TeX King perplexed with the illegitimate Baby TeX
drawing in the style of Duane Bibby created with iChalk



Extremely brief introduction to TeX

If you are new to TeX, (rhymes with the word blecchhh) you are in for a treat to find out one of the most beautiful computer programs written by a very delightful person in the name of Donald Knuth. He is widely considered the father of computer science, the author of the Bible on programming and an accomplished organist. During the past few decades, he has been writing a series of books called the Art of Computer Programming, and having been frustrated by the inadequate typesetting technology, set aside a few years to develop a digital typesetting and font-design system during the seventies (!). TeX predates Word or Framemaker by at least a decade, and today's font technology owes much to his Metafont. The system works on any self-respecting computer systems, the output completely platform independent and superior to any other competitors. It was picked up by mathematicians and physicists early on and has become the pen and pencil for much of the scientific discourse. And it is virtually free. Sounds too good to be true? Well, the price for casual users is that it is rather difficult to master, despite the beautiful manual written by Knuth himself with illustrations by Bibby (who is poorly imitated in the picture above).

Many attempts were made to sugarcoat TeX. One of the most widely used such macros is LaTeX, made by Leslie Lamport. On Mac OS X, several implementations of TeX and macros are available. While the original TeX output was in a format called dvi, it is more convenient to have the output in pdf format these days. The most popular version capable of doing it is teTeX which includes pdftex and pdflatex written by Han The Thanh, Petr Sojka, and Jiri Zlatuska. It is a big system but is available for free. iStorm assumes that you have installed this or at least a similarly capable TeX package which can output in pdf format. If you are going to use TeX seriously on OS X, a program called TeXShop provides an elegant graphic interface to edit, process and print beautiful TeX documents.

Why Baby TeX?

Then, why do we bother with yet another interface for TeX? Because it renders the mathematical equations in the most beautiful manner. Once you get used to typing the commands in text, most of you will agree that it is far superior to having to click-click-click..... in a typical Equation editor program. (After clicking, you will then have to spend some time "tweaking" spaces here and there to have it look as good as a TeX output.) And we want the users of iStorm to exchange equations in their best forms. We named our module Baby TeX since we are acutely aware that we are just scratching the tip of an iceberg called TeX. We hope that the priests of TeX are not too much annoyed by it being used in this manner.

Installing the requisite TeX software

Here we will assume that you are going to install the freely available teTeX. The best way to do so is by an i-Installer program (named TeX-fat.dmg, about 60 Mb!) created by Gerben Wierda, which you can download from:

<ftp://ftp.nluug.nl/pub/comp/macosex/volumes/tex/TeX-fat.dmg>

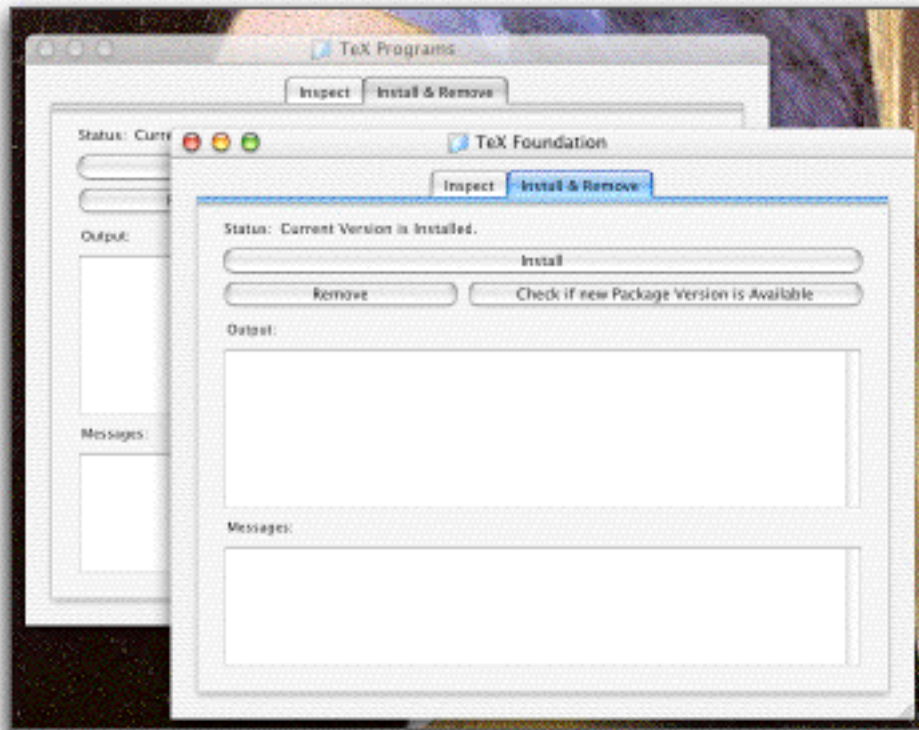
or its mirror:

<ftp://ftp.tug.org/mirror/ftp.nluug.nl/pub/comp/macosex/volumes/tex/TeX-fat.dmg>.

Some details on TeX install on OS X can be found here:

<http://www.rna.nl/tex.html> .

When you run the i-Installer program, packages called **TeX Foundation** and **TeX Programs** should be chosen and installed for Baby TeX. Others ("Ghostscript" and possibly some others) are optional and you may need them for more serious TeX uses such as TeXShop. Keep the i-Installer program around as you may use it later to update or remove the packages without hassle.

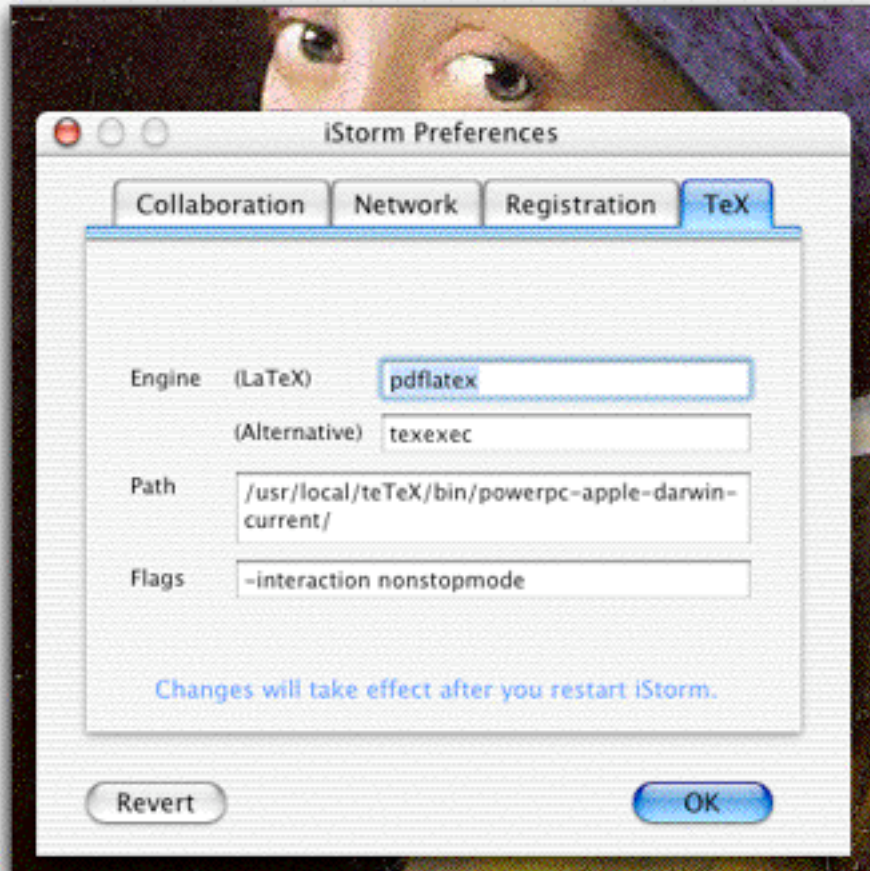


The picture above shows you how i-installer program might look like. Note that it is NOT included as part of iStorm, but you may get it for free from <http://www.rna.nl/tex.html>.

It is possible to use a different configuration of teTeX or even a completely different implementation of TeX as long as preferences are properly set.

Configuring Baby TeX

Here is what you need to do in the TeX panel of iStorm Preferences.



*Engine (LaTeX) : This is the name of the binary which processes tex file with LaTeX. For teTeX implementation, it is called pdflatex. This is the preferred engine as LaTeX is one of the most popular macro packages and provides an easier user experience than TeX.

*Engine (Alternative) : This is the name of the binary which processes tex file with an alternative engine. We chose "texexec" which is included in teTeX and runs the modern challenger to LaTeX called conTeXt.

*Path : This is the path to the directory where both engines above are located. As of December 2002, if you had run i-

Installer as recommended above to install teTeX, the path will look like the one in the picture and iStorm will initially place it as the default path. If your installation differs, you will have to modify it.

If you are already using TeXShop successfully, you must already have everything. You can easily find the necessary information for the three items above in TeXShop Preferences (in the TeXShop program) : they are listed under Path settings, TeX program, Latex program.

*Flags : Most of you should know that unix applications expect flags to be set at the time the commands are issued. For example, our pdflatex engine should have its interaction mode set to "nonstopmode" to avoid it forcing iStorm to hang when a serious TeX error occurs. For pdflatex, you need to have

-interaction nonstopmode

or with its equivalent if you are using something other than pdflatex. More user flags may be necessary if you are a TeXpert using some obscure options. Add those in the box following the example.

Using Baby TeX

There are two ways to use Baby TeX. First, most convenient for expert users will be the in-line equation substitution mode. More casual users may want to use the Baby TeX window to compose and drag the equation onto the document. One can carry the source code attached to the graphics for others to modify. (See below)

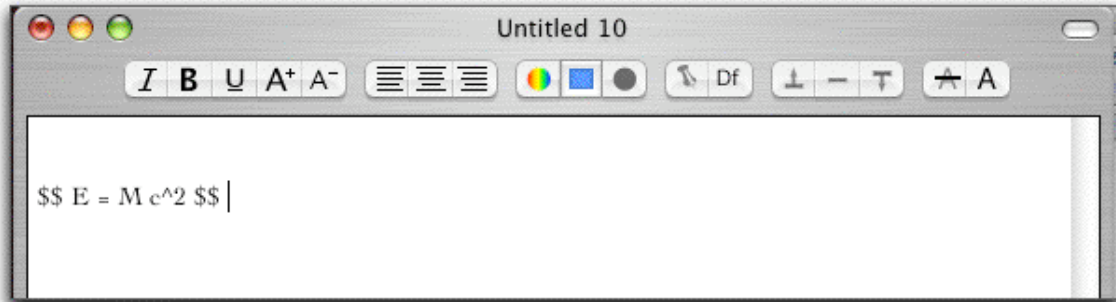
In-line substitution mode

First, let us find out what we mean by in-line substitution.

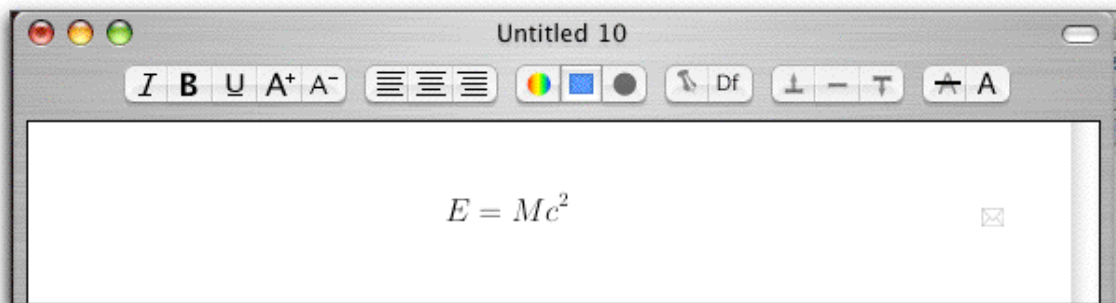
Open an iStorm document. Type something like :

$E = m c^2$

in the main document window.



Then with the cursor still in the vicinity (say at the end of the expression or in the middle of the `$$... $$` block), press **Command- /** . You will observe that iStorm automatically detects the appropriate TeX commands and select it. After a brief moment, it will then replace the selection with an equation image generated by Baby TeX in the background.



This automatic detection of TeX equation code works only with the following math delimiter pairs:

`$... $`

`\(... \)`

`\begin{math} ... \end{math}`

for the inline math, and

`$$... $$`

`\[... \]`

`\begin{displaymath} ... \end{displaymath}`

`\begin{equation*} ... \end{equation*}`

for display math, and finally

`\begin{eqnarray*} ... \end{eqnarray*}`

for multi-line equations.

(* in some of these are necessary to suppress the equation numbering.)

If you are using an alternative engine, note that delimiters other than $\$$ and $\$\$$ may not be properly interpreted and the resulting image may not be what you want. We suggest using the standard LaTeX engine if you use in-line mode heavily.

How does Baby TeX pick one if you have many of these pairs in the document? It uses the following heuristic rules:

- 1) First, it finds any of the delimiters closest to your current cursor position.
- 2) Then, it tries to find the relevant match nearby.
- 3) If it finds more than one possible candidate matches, it prefers the pairing which lies on the left side of your cursor than on the right side, unless your cursor is in-between. This relies on the likelihood that you would issue the command-`/` after typing in the full TeX code enclosed with any of the above delimiters.

Except for a few contrived trick situations, this would work most of the time. Once you figure out some obvious pitfalls to avoid, you will enjoy a good relationship with inline. One less reason to make a trip between the keyboard and the mouse

If you need to use anything other than these common math delimiters, just manually select the code before issuing the command with Command-`/` . If you manually select the block of code, Baby TeX goes through the following routine:

- 1) First, it tries to determine if the block is any of the valid math codes listed above. If so, it applies the appropriate algorithm to construct the tex commands before delivering it to the engine.
- 2) If it passes step 1), then Baby TeX uses the generic header and footer on the code. Unlike a math block, it will not try to outguess the size of the equation and will produce a box of height 4 inches. Depending on what you typed, the box may be too large or small. If you double click on the attached source or look into the Baby TeX input window, you will notice that it has appended the following two lines of code:
`\setlength{\pdfpageheight}{4 in}`

```
\setlength{\pdfpagewidth}{7 in}
```

You can modify the height and the width to appropriate sizes after examining the output. Now issue command-`/` again on the modified code to get the right size.

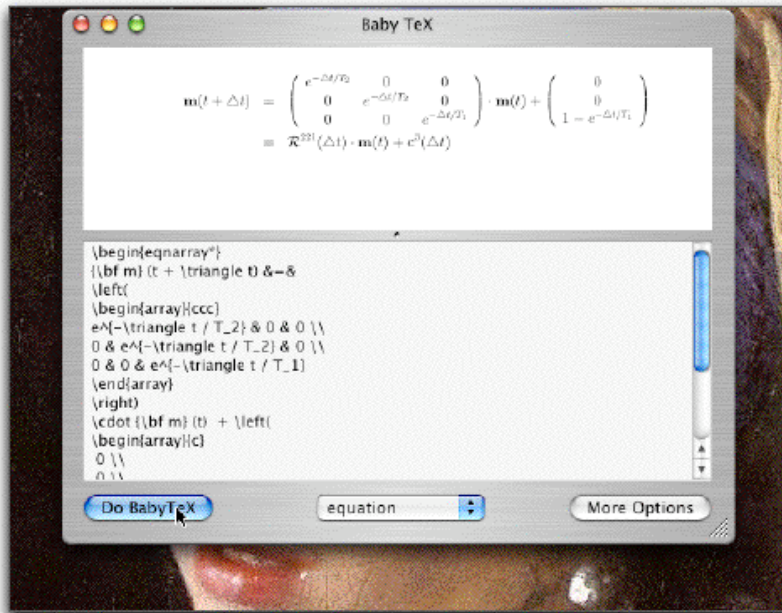
A word of acknowledgement is in order:

In developing the in-line substitution mode, one of the stumbling blocks we had to clear was to generate the equation pdf file with its size precisely determined around the given equation. We benefited from communication with Doug Rowland (dougrowland@mac.com), author of the shareware program *Equation Service*, who kindly offered some TeXnology to do so. His Equation Service provides a similar capability system-wide. If you like our in-line sub and would like to have a similar functionality within other applications, you should look into his *Equation Service*. As of Jan 2003, it can be obtained from <http://www.esm.psu.edu/mac-tex/EquationService/> .

Baby TeX Mode

In the Tools menu, choose "Baby TeX"(Cmd-Shft-E). It will open up a small window. The upper panel displays the equation you create. The lower panel is where you type in the TeX or LaTeX commands for creating math equations and arrays. You may instead type in any valid TeX commands to get something other than an equation. (see Hacking below) Type in some TeX code in the bottom panel of the window and click the *Do Baby TeX* button (or press the **Command-Return**). After a moment, the window should look like the following figure.

Double click on the equation window, and depending on the code ($\$ \$$ or $\$$ for example), Baby TeX puts an appropriate selection rectangle around the equation. Generally, for $\$ \dots \$$ (or $\backslash(\dots\backslash)$ or $\backslash\begin{math}\dots\backslash\end{math}$ blocks, the selection will be tightly around the equation, while for display math ($\$ \$ \dots \$ \$$, $\backslash[\dots\backslash]$ and $\backslash\begin{equation*}\dots\backslash\end{equation*}$ as well as the $\backslash\begin{eqnarray*}\dots\backslash\end{eqnarray*}$), the selection will span the whole page in width.



If you process Baby TeX without any of the math delimiters listed above, it will process the code you type in as a normal text input. In that case, a whole page (7 inch across) will be the default size.

If you want only a part of the equation, drag your mouse diagonally to redefine the selection. You can now drag the selection into the iStorm main document. For most people, this will be one of the main reasons to use this window at all.

If for some reason your Baby TeX configuration is not correct, you should have gotten a message. Carefully follow the steps described earlier to install the requisite TeX system and try again.

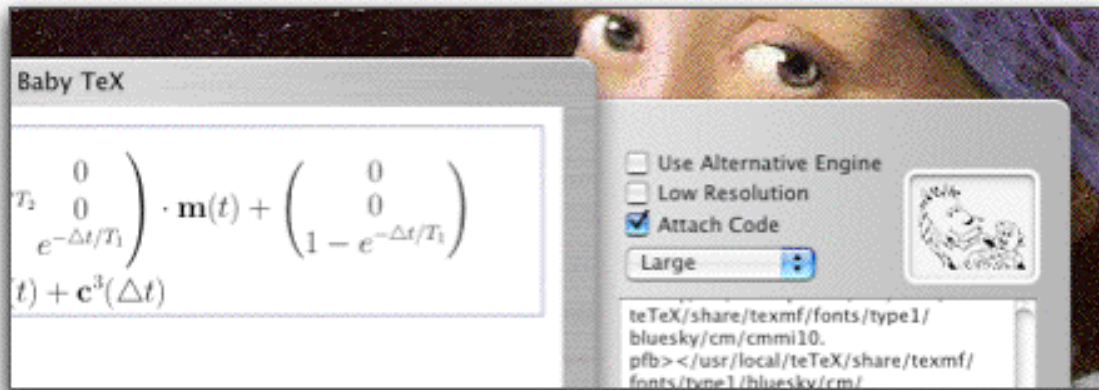
The drop down menu at the bottom-center of the window is to further save you from typing the usual markers for equations.

You may have noticed a small panel next to the input panel. It contains a brief summary of math commands available in LaTeX mode, that is the default engine. Those new to TeX will find this very handy, while self-conscious grads students will

generally prefer to have it shut, especially when a colleague is looking over their shoulder.

Accessing more controls of Baby TeX

More options are accessible in the drawer.





*Low Resolution: By default, when you drag a selected area in the processed equation, Baby TeX uses the pdf data. This is good for high-resolution printing. However, even a simple equation is sizable (tens of kb) compared to a compressed Tiff format (a few kb). If you do not plan to print the document out, choosing the low resolution option here will be much efficient in exchanging equations with your collaborators.

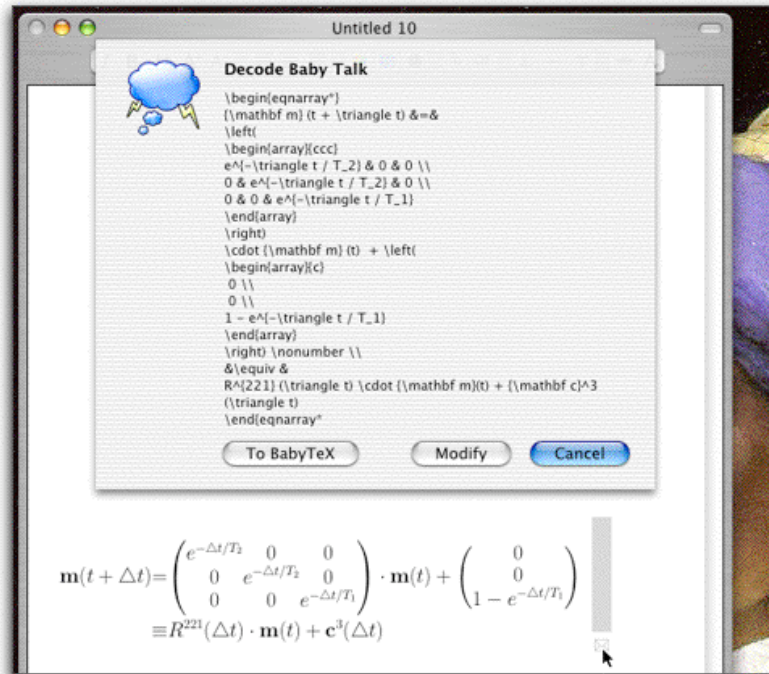
*Large Equation: One can choose appropriate size for generated equations. Default is set to Large as we find it easier for the eye.

*Drag Equation into Keynote: With iStorm [2.01](#) and later, you may drag a selection from the BabyTeX window into Keynote or any other program which accepts a pdf image into its document. Note, however, that dragging from the iStorm *document* window into Keynote will work only for the text.

*Export x4 tiff: So, you can drag the equation into the iStorm document either in neat pdf format or low resolution Tiff. What if you want to use Baby TeX to make equations for Word or

Powerpoint? Currently, it seems neither of them take pdf bits. As a temporary solution, we offer an option to export a high-resolution tiff image. Just select this option, generate an equation, and drag the image into MS products. The resulting image will be disturbingly large, but the mighty programmers at Seattle provide a way to reduce the size if you double click on the image. Choose 25 % with aspect ratio preserved. It may look ugly on the screen, but the print out will look almost as good as the pdf. (Given this much hassle, you may stick to their Equation Editor module, after all.....)

*Attach Code: You may occasionally spend 30 minutes to code a complex equation array which takes up a whole page. You think you do not want to see it again for the rest of your life. Alas, your collaborator just informs you that the equation is just one character short of revealing the secret of the universe! Since iStorm by default attaches the code to the equation, you are saved! If your equation in the document has a round gray figure  at its end , you may double click either the equation cell or the gray symbol  to bring up the original TeX codes to examine or copy into the equation editing panel. (See figure below) If you do not like this symbol next to your equation, you may delete them, but you will then lose the attached code.



*Use AMS TeX Macro: Mathematicians are strange breeds. Many of them were not quite satisfied with the overwhelming degree of control the original TeX/LaTeX provided. So Dr. Spivak developed an extension called AMS TeX geared toward higher mathematics. In fact, some of it is quite handy for lower mathematics as well. As it takes slightly longer to load them all, we suggest you keep this option unchecked unless you need AMS TeX.

The small panel in the drawer displays the message from the (La)TeX binary. The hefty message TeX normally generates may contain some information to improve the look of the output or the nature of error if you made a mistake in typing the code. For the sake of speed, we have suppressed most of it by using the command `\batchmode` in the header files (see section on Hacking below). To restore the message in glorious detail, you may comment out that line in the header files.

If what appears on the equation window looks satisfactory, just don't bother with it. It is pretty verbose even when everything went well. Even so, being tucked inside the drawer, you will find it much easier to ignore than the Helper guy in MS Word.

Hacking Baby TeX

Caution: Reading the following section without a compelling reason may unnecessarily complicated your life. Choose a simpler life whenever you can!

For those of you (very) familiar with TeX, if you would like to try all kinds of things other than making just neat equations, iStorm may bend its ways to a degree. First, let us describe the basic process by which Baby TeX runs TeX or LaTeX on your code. It creates a temporary .tex file by combining the header and the modified version of the text you typed in and the footer. Imagine a typical tex document which contains an equation in the middle of it. The header portion is the part of the document up to the equation, the footer is the rest of the document after the equation. Normally, the header should contain documentclass declaration (if used with latex) and some preambles.

Middle (body) part is largely based on what you type as the input but is generated differently depending on what type of equations and engine you use:

For example, if you choose Large equation size, and if the formula is an array using LaTeX,

```
\Large \newlength{\myfont}\setlength{\myfont}{16pt}
\newcommand{\putstuff}
{ Your formula }
```

For a single line equation using LaTeX, (\$..\$ or \$\$...\$\$ or \begin{equation}...\end{equation}), iStorm generates the following body part:

```
\newcommand{\putstuff}
{ Your formula }
\newcommand{\whatsize}{\Large\newlength{\myfont}\setlength{\myfont}
{16pt}}
```

By modifying the header and the footer content, you may attempt further manipulation given the constraint hard-coded in making the body part described above. The question is: where are they? They are included as part of the iStorm application package. If you have administrator's privilege, you can access them by control-clicking the iStorm application itself. Choose "Show Package Content" to view the innards of iStorm. Inside the Contents/Resources directory, you will find the following text files among others:

latexEqHeader, latexEqFooter, latexArrayHeader, latexArrayFooter, amstexEqHeader, amstexArrayHeader, altEqFooter, altEqHeader, altArrayHeader, altArrayFooter, genericHeader, genericamsHeader, genericFooter.

The first six are used for pdflatex (or other LaTeX processor) and the next four for conTeXt (or potentially other base-TeX processor). The last three are for more general TeX commands outside the math mode. For example, when you process a block of commands which is not enclosed in any of the math delimiters, (\dots , $[\dots]$, etc) then these generic Header and Footer files will be used sandwiching what you provide as the body. You may want to use this, for example, if you need to access the `\newtheorem` environment from AMS TeX theorem package.

Examine the content of each file carefully. If you do not understand what you find there, maybe you should re-adjust your ambition. Find a seasoned theoretical physicist. About 87 % of the time, he or she will be free and glad to spend a few minutes to help you out. Mathematicians will be even more accommodating. Even if you piece together what is going on in the header-body-footer construction, note that room for tinkering may be limited by the hard-coded body portion except for the genericHeader/Footer. For one, any tex commands which introduce or defines new variable will have trouble as they are executed twice in cases where `\putstuff` is called.

An exception to this is the generic files, which literally sandwiches your command between header and footer and thus involves no hard-coded manipulation. Here your hacking task will be very straightforward.

Further adventures

You may get away without poring seriously into a TeX manual to make neat equations for an iStorm collaboration. Brief survey of some of the online resources given below for LaTeX should satisfy most casual need. However, for completeness, we also offer links of general nature.

The most comprehensive resource available on TeX is TeX User Group (<http://www.tug.org/>). Almost every piece of software written for TeX may be found in CTAN :

<http://www.tug.org/ctan.html>. To become a serious user of TeX on OS X, the best vehicle would be TeXShop by Richard Koch:

<http://darkwing.uoregon.edu/~koch/texshop/texshop.html> .

There are several excellent online manual for TeX and LaTeX. We offer a few links for LaTeX here:

**LaTeX Online Manual* maintained by Koji Yokota :

<http://www.sns.it/~Help/tex/latex/TeX.html>

**Getting Started with Latex* by David R. Wilkins:

<http://www.maths.tcd.ie/~dwilkins/LaTeXPrimer/>

*Hypertext help with Latex offered from Goddard Institute, NASA: <http://www.giss.nasa.gov/latex/ltx-2.html>

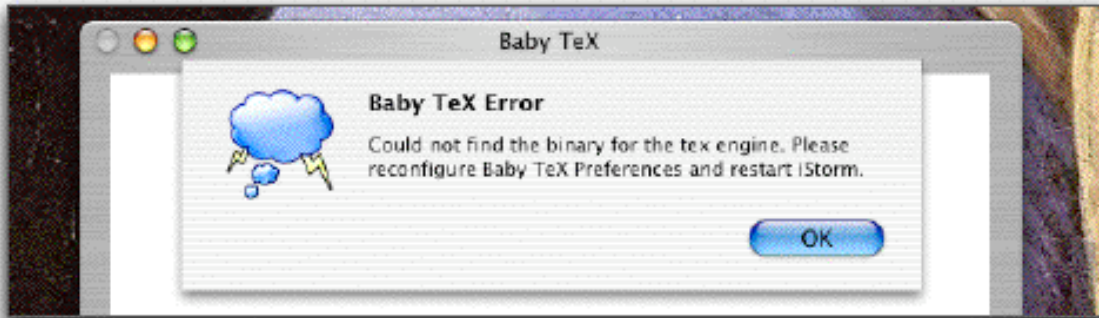
*Introduction to using TeX (LaTeX) in the Harvard Math Department: <http://abel.math.harvard.edu/computing/latex/manual/texman.html>

*If you'd like to purchase a book on LaTeX, make it the one by its creator: "LaTeX: A Document Preparation System" by Leslie Lamport, 2nd Edition, Addison-Wesley.

*If you think an excellent site for reference is missing, please let us know at mathgamehouse@mac.com.

If you are having these problems/questions:

When I click the Do BabyTeX button, I have an error message.



You get this message since Baby TeX could not run the (La)TeX engine. Either its name is not correct or the path to the binary is not set correctly. Please open the iStorm preferences, and correct the information. You may have to retrace carefully what we described earlier about configuring Baby TeX. Your version of iStorm may display more options such as downloading the TeX packages. Be brave and go ahead!

Nothing happens....

You may have typed something TeX does not understand at all. Open the drawer of Baby TeX (click More Options button) to examine the message from the engine.

I cannot think of any equation to write?

Maybe you are a Geometry person unfortunately dragged into a group of Algebraics. Try instead iChalk to *draw* what's on your mind rather than fighting your true genius.

My Equation is too long and gets truncated?

We cannot speculate on what you are up to, but all correct equations in the universe are short. Very short. If you insist, one way to solve it would be to cut the equation into pieces. Baby TeX does not support multiple pages output. If the generated pdf file has many pages, unpredictable result may follow.

Where can I access the temporary TeX files such as .log, .aux, .pdf as well as the source .tex files used in generating the equation?

They are stored in the directory :
(Your Home)/Library/Application Support/iStorm/TeX/Temporary
with the names “_istormEquation” and extensions .aux, log, pdf, tex, tmp, tui, and tuo if these mean anything to you.
When another equation is processed, they are overwritten.

Can I save the whole iStorm document in text format with equation sources in tact ?

Yes. In the *File* menu, you will find *Export Text/TeX* which saves it into a text file, with the following features. The equations with sources attached will be replaced with the TeX sources. The Baby Math results with sources will be replaced with the appropriate commands. The graphics will be replaced by simple tags with their names. They are preceded by the usual TeX comment sign %% so that they do not interfere with TeX when you import the file into TeXShop for example.

Give up on TeX?

OK. You tried but decided TeX is not your cup of tea. You can always fall back on the Equation Editor program and click-click away! As far as iStorm is concerned, you should not let visual aesthetics come before creativity. But during a coffee break, examine the quality of a paper written with Word + Equation Editor and another one with TeX. Then ask yourself the hard question: Are you so sure of your genius that you don't have to

worry about how it looks to your colleagues? We bet you will come back to tackle this section again sooner or later.

Although the http-links in this document were all active as of Dec, 2002, some of them may become stale in the future. If you find any, please let us know so that we can update them in the future version of iStorm.

Using Baby Math

While Baby TeX is useful for communicating elegant yet abstract formulae, we also need to have our feet on the ground. High school students. Engineers. Tutors. Lawyers. Accountants. Teachers. Composers. Chefs. What do they have in common? They all own and use some kind of calculator. iStorm provides a pretty powerful calculator with two modes just like the Baby TeX. It allows users to define their own variables initially up to 1000 instances. If the slot is exhausted, it will dynamically allocates more slots (each allowing 500 variables at a time) up to 100 times! That is, you will have practically unlimited number of variables to define.

It is important to understand what it does not do: it will do most numerical operations using standard double precision mostly on the built-in standard functions of math library in C. It will not do calculations with an arbitrary precision as Mathematica does. It will not do matrices. It will not do 2D or 3D plots. It will not do symbolic mathematics.

What it does is simple numerical evaluation of mathematical formula using predefined constants and user-defined variables. It also does fairly complete unit conversion to SI system.

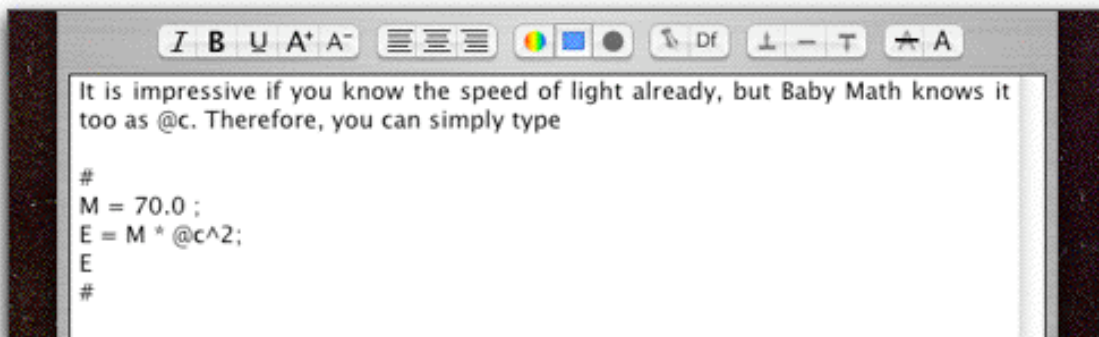
In the Appendix of pdf version of this help, you will find the list of built-in functions and the syntax. Concise summary is also available in the Baby Math module window of iStorm.

Inline Substitution Mode

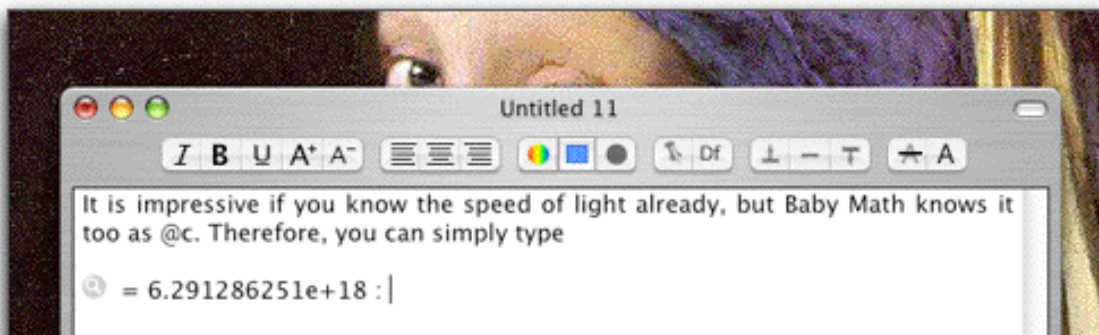
Just like TeX equations were enclosed by $\$ \dots \$$ or $\$\$ \dots \$\$$ pairs, Baby Math expressions are enclosed by $\# \dots \#$ or $\#\# \dots \#\#$ pairs. $\# \dots \#$ expression will be replaced by the result, while $\#\# \dots \#\#$ expression will remain intact, with the numerical value appended. Just as in the inline TeX Mode, the intelligent substitution may break down if you have several suspect $\# \dots \#$


zones near the current cursor location. Baby Math follows a heuristic rule: if it finds more than one possible pair of # . . . #, it prefers the one on the left side of current cursor position. When in doubt, manually select the target block and then issue the Baby Math command.

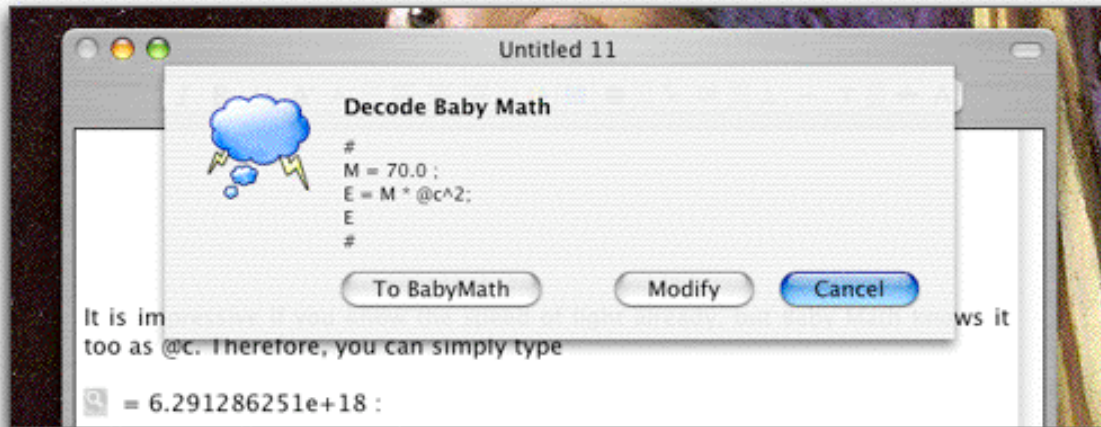
Several math statements may be combined in a single expression separated by semi-colons ; . For example, let us evaluate how much equivalent energy there is in joule for a mass of 70 kg using the famous Einstein's formula : Energy = Mass * (speed of light)^2. It is impressive if you know the speed of light already, but Baby Math knows it too as @c.



Therefore, you can simply type
`# M = 70.0 ; E = M * @c^2; E #`
and press Command-= . You will see the whole expression being selected and replaced by the result as shown in below.



If you do not think you really weigh 70 kg, you can double click on the small symbol  to bring up the code and revise the formula either in the Baby Math module or by replacing the result with the code in line.



If you are experienced with variables and calculators, you may now wonder about the persistence of the variable M and E. They will remain until you redefine them later. If you doubt, try a mile away from the original block of code, processing

`#E #`

simply to see what value it has. You may therefore build up a series of calculations, using many variables scattered all over your document. It is perfectly reasonable to define Mass and what not in a paragraph and carry out the numerical evaluation of some formula using those variables in another paragraph.

Caution regarding variables in a group collaboration

Reading the following section may induce a headache for those of you who were happy with the silly calculator Apple provided in the last century. If "persistence of variables" does not ring anything, skip ahead.

However, there is one note of **caution** following this observation. While the values you define persist in each variable until you redefine it, it may lead to some error as the piecemeal expressions get exchanged and modified on

different machines. Remember that the variables in Baby Math are not shared among group members.

To illustrate this further:

Suppose Jan processed `# M = 70 #` on page 10 of their paper, and then used `# E = M * @c^2 #` in page 14 to get the number 6.2912e+18. Without knowing this, Jane takes the control of the document, and decides to re-evaluate `# E = M * @c^2 #`. To complicate the situation, she had her own definition `# M = 55 #` in page 12, which Jan didn't notice. Now, having evaluated earlier `#M = 55#` on her machine, she re-evaluates `# E = M * @c^2#` to get an answer different from what Jan got.

The implications of two NASA engineers making this error on a Mars landing project is pretty chilling.

Given this potential confusion, it is generally safe to define all variables inside a single `#...#` block. That is, if you use Baby Math in a group collaboration, do not ever trust a variable defined somewhere outside the current block being evaluated. As we mentioned at the beginning, Baby Math is very generous with how many variables you can define and use! So do not recycle them outside each block unless you are absolutely sure.

If you still need to have variable assignments scattered all over document, one possible precaution to minimize risk is to follow a strict convention in naming them, so that other people understand that the variable named `Jan_M` refers to Jan's Mass and was introduced and assigned a value on Jan's Baby Math. If anyone else need to use it in other part of the document, he can make sure of its value by printing `Jan_M` and other suspect variables as in the first line of the following code:

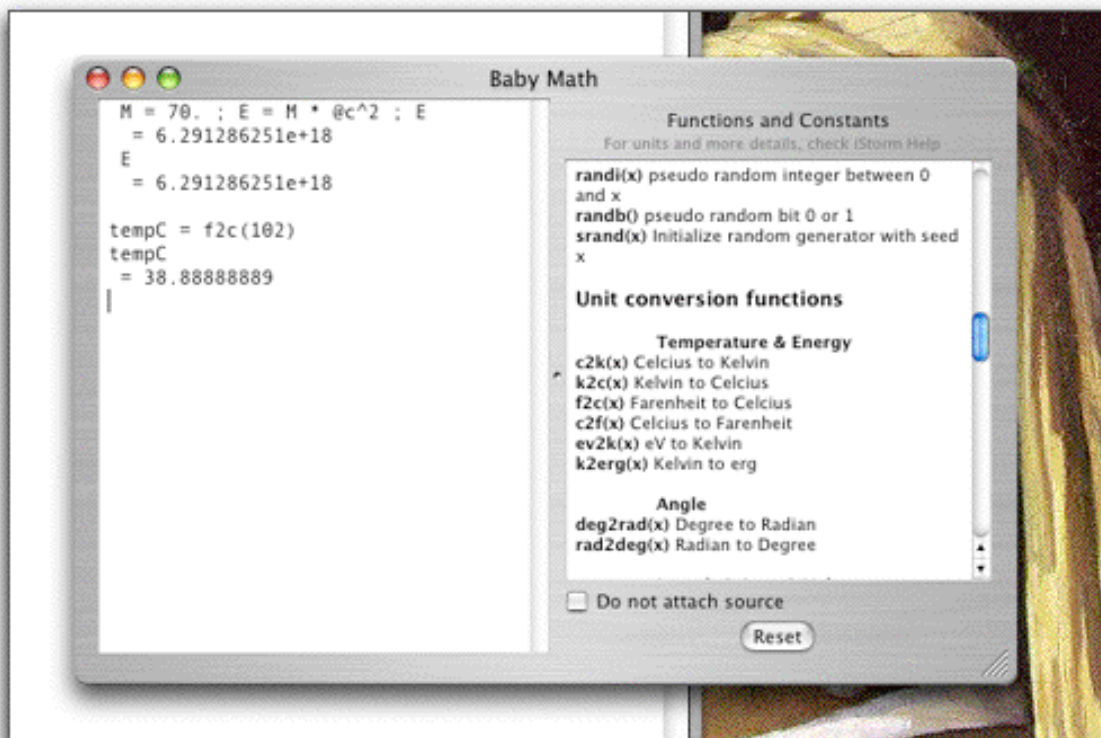
```
#  
Jan_M ;  
Jane_M;  
.....  
Jan_E = Jan_M * @c^2; Jan_E  
#
```

Baby Math Module

You can bring out the separate Baby Math module by pressing Command-Shift-M or choosing *Baby Math* in the *Tools* Menu. You don't need the #...# symbols for typing in the expressions to be evaluated here. On the right side, one can look up the list of functions and predefined constants.

If you check "Do not attach source" option, the source code will not be attached to the result. Generally it is a good idea to keep the source code attached so that you or other collaborators may examine or modify them later.

Reset button is to clear Baby Math when an expression with bad syntax caused it to hang.



If you are having these problems/questions:

If I assign a value of 10 to a variable a_1 in a document, can I use the a_1 in another document? Will it have a value of 10 in another document or is it treated as a separate variable?

The variables of Baby Math are shared by all open documents in iStorm on a given machine. However, only the expressions are shared over network. If Jan processes `#a_1 = 10 #` in Document_1, and uses it in Document_2, he may assume a_1 to be 10 in both documents until he redefines it. However, on Jane's machine, even if they are collaborating on Document_1, a_1 will not have 10 unless she process the assignment herself on her Baby Math.

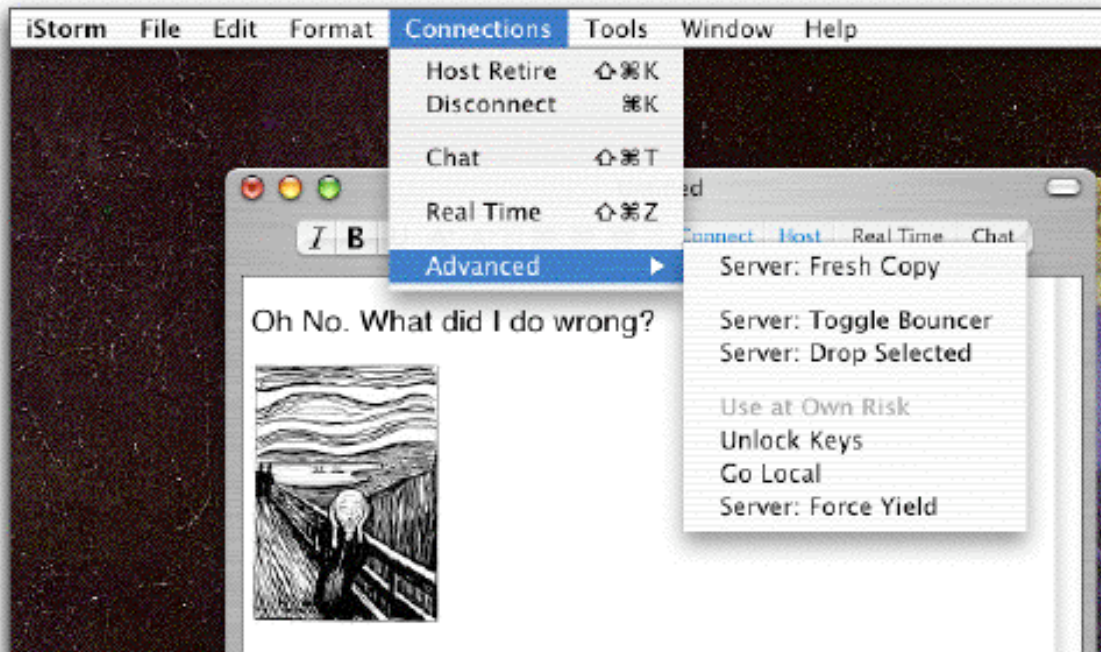
Will iStorm have fancy graphing tool someday?

We want to keep many possibilities open, but given limited resource, we do not want to spread too thin. Instead we would like to focus on a few things and get them done superbly. Therefore, do not keep your hopes too high on this. Yes, it is still tempting....

Umbrellas for iStorm

Things break inevitably. The more creative you are, the more often it would break. Not taking risk is the most risky thing to do.

Enough of this non-sense from the *spokesman for the programmers*. In truth, you will occasionally run into an impasse due to imperfection in iStorm or in your network condition. And this tends to happen only when the collaboration was just getting interesting. Here is what you may try in such emergencies, until we waterproof the future version of iStorm.



Using Panic Items in the Menu

*It pays to SAVE often. That way, at least someone in the group has the up-to-date copy of the group work, and in the worst case, the whole group can start from there afresh.

If not, before folding the table, try one of the items from the sub-menu humorously titled "Advanced" in the "Connections"

menu. Please do not try them if not as the last resort. Some of the items are available only for the host. As someone who did extra work to set up a collaboration, we thought he or she deserves some extra control. They will be gray-out for non-hosts.

***Unlock Keys** The most benign problem may arise because some of vital exchange of information got sucked into a network congestion. This could have left the server in an inconsistent state, especially leaving its content in a "locked" state. Any subsequent attempt to change the document may be bluntly ignored even when your button indicates green or blue. Although we do not encounter this in our test anymore with iStorm 1.1 or later, it may still happen. Here is what you do: in the Connection menu, go to the submenu called "Advanced", find the item called "Unlock Keys". It is safer if you do this when everybody has green button.

***Force Local** More serious trouble may have left your connection in such a mess that you really feel like opting out to rescue whatever remains on your machine. Item called "Force Local" will force you dropped from collaboration into the local mode. This is similar to the normal "disconnect" action, but this time you do it without notifying the other members of the group. This may leave other people (if they are still there) in a slightly confused state since they may still have you in their list. But what do they expect? You didn't cause this yourself! As a penalty, you may have trouble joining again later, since the server still carries your (ghost) name with it and may refuse your reentrance in certain situations.

Server only

***Server:Force Yield** As the server, you (and only you) have the authority to make anybody in the group yield control of the document. This is for when, for either a psychological or physical reason, one can not let go of the hold on the document. The item called "Server:Force Yield" will cause the

document to be freed. (assuming that everybody still listens to and obeys you....)

Server: Fresh Copy** As mentioned earlier, the iStorm 1.1 or later (equipped with what we call transport protocol 2.0) employs an intelligent caching mechanism for pictures in the document. When network congestion forces an update process terminate prematurely, some members in the group may end up with a corrupted document. **A symptom will be that a picture is replaced by the character "~".** Red ** S O S ***** chat message will also be sent everyone to alert. If there is such a complaint, the server should issue the "Server: Fresh Copy" command immediately. It will initiate a process where every member will restore the document to the state when it was updated the last time. (just one cmd-return key ago) It will be rather unfortunate for someone who is in control and is busy editing it, since it will be lost, but it is better to pull everybody up to speed before it gets irrevocably out of control.

***Server: Toggle Bouncer** This is one of the preventive measures the server may take when the size of the group becomes uncomfortable for efficient communications. When this menu item is turned on, iStorm will put up a scary bouncer against anyone who tries to join the group. He will be immediately fired when the host deactivates it. If one could foresee the problem, then the maximum number may be set in the Host panel at the beginning of the collaboration.

***Server: Drop Selected** The server may choose a group member in the list (accessed in the Chat drawer) and toss out. We hope it is with a good reason. One legitimate reason could be to remove the ghost client out of the way. A client becomes a ghost when he or she chooses the "Go Local" in panic for some reason. [Under normal circumstances, the member should have left the group by choosing "Disconnect" properly notifying everybody in the group.] The ghost status will remain so unless the server detects it and take care of it as part of its automatic patrol (see below). While it is better to keep clean

account of everybody, this may not be a critical issue for most cases.

Automatically tossing out unreliable members

This may sound a little harsh, but no hard feelings. The server checks on regular basis (called poll-interval in the Network pane of the Preferences) to check on every active member of the group. If any one misses this important call given number of times in a row (set by No Answer Tolerance in the same panel), the server will drop the member off the list as it has become unforgivably unresponsive. This is to save others from suffering bad connection. Server still maintains the dropped member alias in a different list, and will reinstate its status if it receives a signal from the member later. Therefore, in most the time, the dropped member may not even notice all this going on while he/she was caught in a momentary network congestion.

Hijacking the control of the document

When the status button is red, if you press it once, the auxiliary window opens for you to while away. Pressing it twice more, it will send a polite private message to the current control holder, letting him/her know you want the control. Press three more times in a row, it will snatch the control from the current (and rightful) owner. Now, let us see what a brilliant idea you had to justify this!

Fine tuning the connection timeout parameters

In the iStorm Preferences, you will come across the Network section with various timeout and tolerance parameters. Finding the right parameters may be critical for a smooth collaboration especially when group members have a wide range of network quality. With some patience, you may be able to dramatically reduce need for "umbrellas" tweaking these parameters. We find that 120.0 seconds for Host timeout works for both LAN and internet connections. Client timeout may be between 5.0

and 10.0 seconds for fast LAN, maybe 30.0 seconds for internet. Poll interval for host may be as small as a few seconds, but give it at least 30 seconds, if you anticipate a laggard among your clients.

While real time mode looks impressive, it may be better to switch it off if the group size is big or if you notice any interference with vital activity such as chalk drawing.

Leaving a collaboration

So, you feel that you had enough of your collaborators' company. Or you are being called at the dining table. How do you leave the group behind?

Save the document

*If you choose to save in the native iStorm document format (default), all the content of the document including the transcript in the chat window will be saved. If you save as a generic Rich Text file, it discards the chatting content as well as the iChat components such as the background color choice and the imported background image. This will save a file compatible with most Rich Text editors (including Microsoft Word). Also note that you can export (in the File menu) into plain text format. In that case, any pictures or Quicktime media data will be replaced by text tags which begins with `%%iStormMediaFile` followed by their internal-name of the files (as used in a RTFD file). Baby Math results, if the source code had been attached to the result, will have been replaced with: `%%iStormBabyMathFormula: # your Baby Math codes #` .

Baby TeX result will have the tag for the pdf or tiff image, and will be followed by the actual tex source code, if it was attached to the image. Note that use of `%%` is deliberate to ease the way the file be imported into a dedicated TeX program such as TeXShop.

If you were not hosting:

*Your responsibility is little. Click the Connect button on the toolbar or choose Connect (command-K) to bring up the connect window. You will see the blue button, which says Disconnect. Click. All others remaining on the collaboration will hear a rude door-closing sound and your name will be dropped from the list of people in the group. From then on, your document remains local and you are free to do whatever

you desire. Your collaborators will go on as if nothing important happened....

If you were hosting:

*You are just about to drop all your collaborators cold. With a heavy heart, click the Host button on the toolbar or choose Host (command-shift-K) to bring up the Host window. You will see the blue button, which says Retire. Click. This sends signals to everybody in the group notifying them that you are retiring. Each of them will then stop, and will drop their connection. If everything goes well, everybody will have dropped connection, with his or her document in the local mode.

Closing an active window

The first thing that happens is equivalent to choosing retire/disconnect described above. You will be asked if you would like to save if the document is dirty.

Daring to go beyond your local neighborhood?

So, you are a jet-setting, big shot researcher who routinely collaborates with colleagues across the Continent and the Atlantic... Now that you are quite pleased with how the test with Jan turned out, you are interested in a collaboration with international flavor.

It is possible to use iStorm over internet if some steps are taken with patience. Lest you should disappoint yourself, you may want to adjust your expectation here. For a reality check, run an ftp program and try downloading a file of size about 100 kb. What used to be possible within local area network during an eye-blink now requires at least a few seconds. Even though impressive progress has been made in online-gaming and video streaming lately, a free-form collaboration poses more serious challenge with all kinds of contingencies. We tried to alleviate some of the lag-problems to a degree by making iStorm multi-threaded. Still, a satisfactory experience may be expected only when every member of the group has robust (DSL or better) connection speed. According to science and telecom sources, we are entangled with fiber-optic cables all around but our neighborhood. In the near future, iStorm may benefit from such infrastructure (we are still digging our yard and yet to find that optical cable) and we will happily zap this paragraph off.

Making the shared document accessible to outside world requires some serious effort in today's security-obsessed network environment. This burden, not encountered by on-line game players who need only to connect to a big, inviting servers, comes about since you will have to the serving. To do so requires opening your machine to the outside world.

We can not possibly address all possible network variations, and we can offer only some hints here.

Serving over Internet

If your serving machine is in an institution which granted you a permanent (static) IP address, (one way to check is to look into the Network preference panel and make sure TCP/IP is set to "manually" and with a decent looking IP address.) you may simply follow steps to host a document. If your machine is directly connected to a broadband modem (be it DSL or Cable) via PPPOe, the IP address that you may read off from the Network preferences will do, although that may change from time to time (on the vagaries of your internet provider or network interruptions).

Most likely, though, your machine is heavily guarded as intended by your mighty IT administrators. You need to dig a hole (matching your chosen private port number) through your firewall to allow an iStorm connection. At this point, we recommend you watch an old movie called *The Great Escape*. For example, port number 80 is usually kept open for machines serving Web pages. With iStorm, you may manually pick a number (such as 50000, between 49151 and 65535) and stick to it among your collaborators. But you will have to ask your IT person to let it happen. [By the way, we can not be held responsible for any hacker attacks as a result of this.] Once this is taken care of, those joining you across the Ocean will need only those valid IP address and the port number and a little bit of patience.

If your machine is in a DHCP environment:

If you are like us, your machine is probably attached to a DSL/Cable router, and is sharing a dynamic internet connection with other machines. Usually the router or a machine on the network acts as a DHCP server and it distributes the "local" addresses to its siblings. If you see something like 10.0.1.x or 192.168.1.xxx as your IP address in the network preferences, this is likely the case. These local

addresses are useless for anyone outside this sub-network, since thousands of machines across the internet probably have the same local address. In this case, you need to follow the following steps:

*Find your WAN (Wide area network) IP address, which probably is the one assigned to the routing unit by the internet provider. You or your IP person should know what it is. Find that PostIt paper you slipped in a book six months ago. A better way is probably going to the www.myipaddress.com (active as of Oct. 2002) or similar services which will do it for you.

*In the router (say, the popular Linksys box or the Airport Base station) setup program, you should be able to do so-called port-forwarding. That is, all TCP requests coming to the router (at the WAN IP address) for port 50000 (assuming that is what iStorm chose) should be forwarded to 10.0.1.12 (if that is the local IP address of your serving machine).

*If you have enabled the firewall, (these days, there are many ways to set one up, so you will have to spend some time looking for all possible ways) you may have to allow the port to open for traffic.

If you are among the luckiest group with multiple iBooks equipped with Airport cards, sitting on a campus lawn in a sunny Californian afternoon or gathered around a cozy bonfire in the state of Maine:

Presumably, one person will opt to be the airport server, and everybody will have DHCP IP addresses with something like 10.0.1.xxx. Once this beautiful network is set up, it should be transparent to apply steps described earlier. Honestly, we do not have the fortune to test this ourselves, and are keen to hear about it.

Limitations

While the new Rendezvous technology seems to work well in LAN environment, it has not been tested widely across

internet. Therefore, for internet connections, we recommend direct feeding of IP address and port number method for the current version of iStorm.

Precautions

We observe that overzealous measures taken for network security tend to suppress our creative impulse. An exclusive, closed group is a notion hostile to germinating and cultivation of original ideas.

That is one of the reasons why we did not implement a tight password system for the original iStorm v1.0 to allow forming closed collaboration group. However, we received quite a loud feedback on the need for it at least as an option. Yet we were still deliberating. The clinch came when we received a short communication from a professor at Berkeley. Didn't leave much room for our would-be cyber-liberals...

Even with password protection, you should be aware that a stranger, who acquired the IP address of the server machine and the port number, may attempt to join the ongoing collaboration posing as your friend or instructor and disrupt or steal your effort. Even in a LAN environment, this could be pretty hazardous if you happen to be in a company or a family with rampant internal politics. Please use iStorm at your discretion in such an environment.

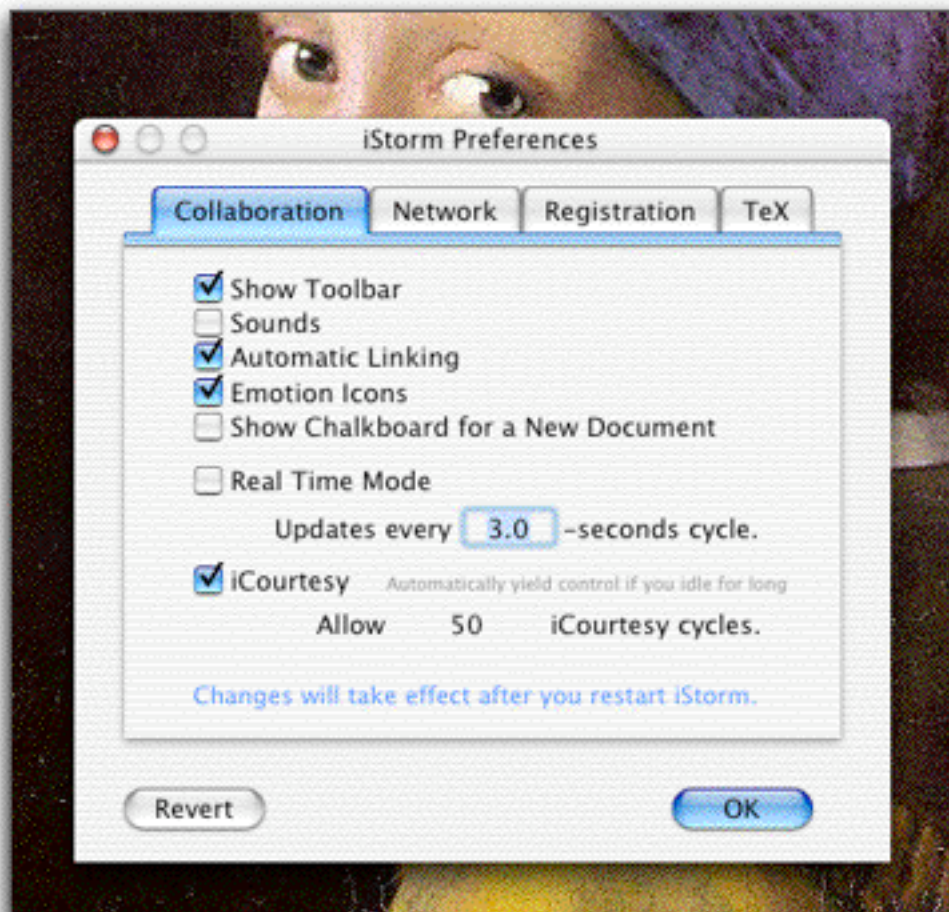
By using iStorm, you are agreeing to take full responsibility and do not implicate the developers of iStorm if an intellectual theft occurs.

Preferences

There are some parameters which you change in the Preferences and save for subsequent sessions. Here we explain what they are.

Note that all changes you make take effect after you restart iStorm. The exception is the registration code, which takes immediate effect.

Collaboration



*iCourtesy allows you to switch on or off the feature by which iStorm automatically relieve you of the control of the document

edit when you do nothing for a while. The duration of idling allowed is determined by the number of courtesy cycles times the update interval, both of which are set in this panel too.

*[Automatic Linking](#) turns on or off the feature by which iStorm automatically locates and enables the http links.

*[Real Time Mode](#) turns on or off the feature by which iStorm automatically updates and displays document at regular intervals. The interval is set below. For fast connections (LAN), and light group load, we recommend 1.0 – 5.0 seconds, but for slow connections/internet, this may be set 30–or more. In such cases, courtesy cycle should be reduced to make the iCourtesy tolerance reasonable. For example, if you set update interval to be 10 seconds, choosing 12 courtesy cycles will force you to give up control when you idle for $12 * 10 = 120$ seconds.

*[Sounds](#) toggles the funky sound effect for the chat messages. Unless you are a kid, you may want to keep this off. Happy sound effect is always on, though.

*[Emotions](#) for chat is on by default.

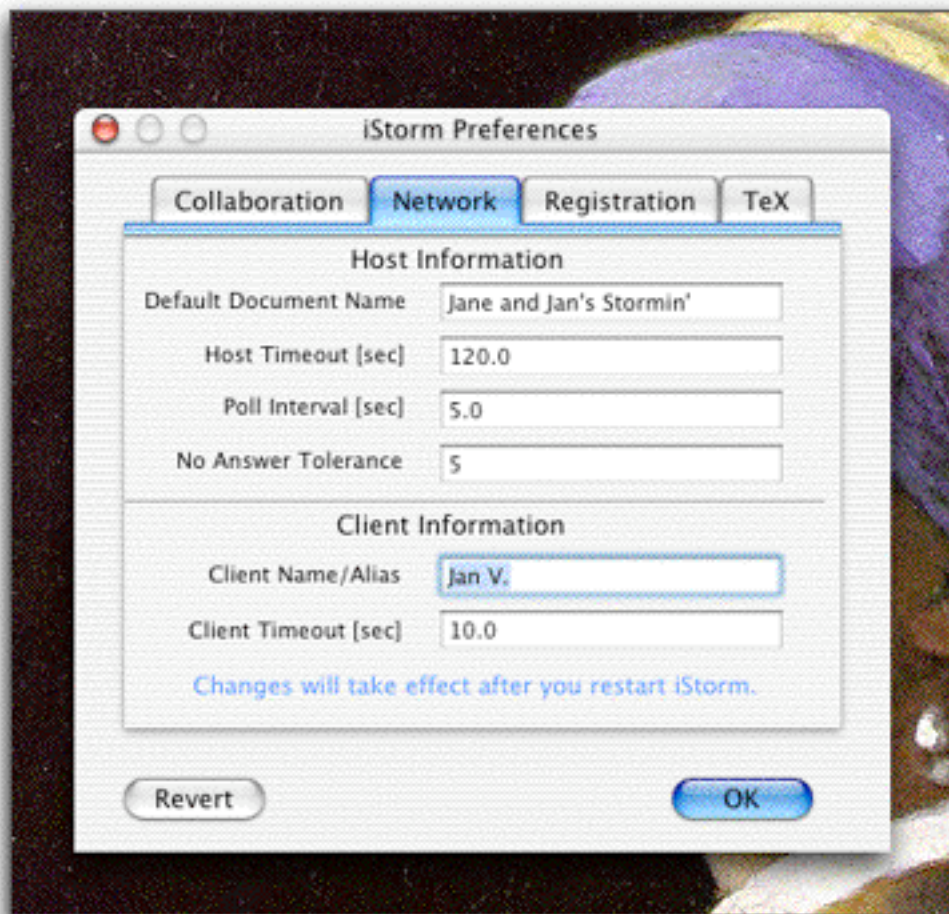
*[Show Chalkboard for a New Document](#) is off by default. If you want the new iStorm document to open with iChalk revealed, select otherwise.

Network

In making connections, you always need to supply a unique alias. You can enter your preferred id here to be automatically entered next time. Same with the Default document name. We recommend 120.0 sec for the Host timeout and at least 30.0 sec for the client timeout. If you set these numbers too low, the net connection will become very prone to lose parcels of data whenever network contingencies occurs. When the group is composed of people with a widely varying bandwidth, careful experimentation may be necessary to find the optimum values for these numbers.

The server regularly polls each member of the group to ask if they are all right. If you set poll interval at 30 sec, and No Answer Tolerance at 5, it will ask them every 30 seconds, and if a member fails to answer them five times in a row, the server

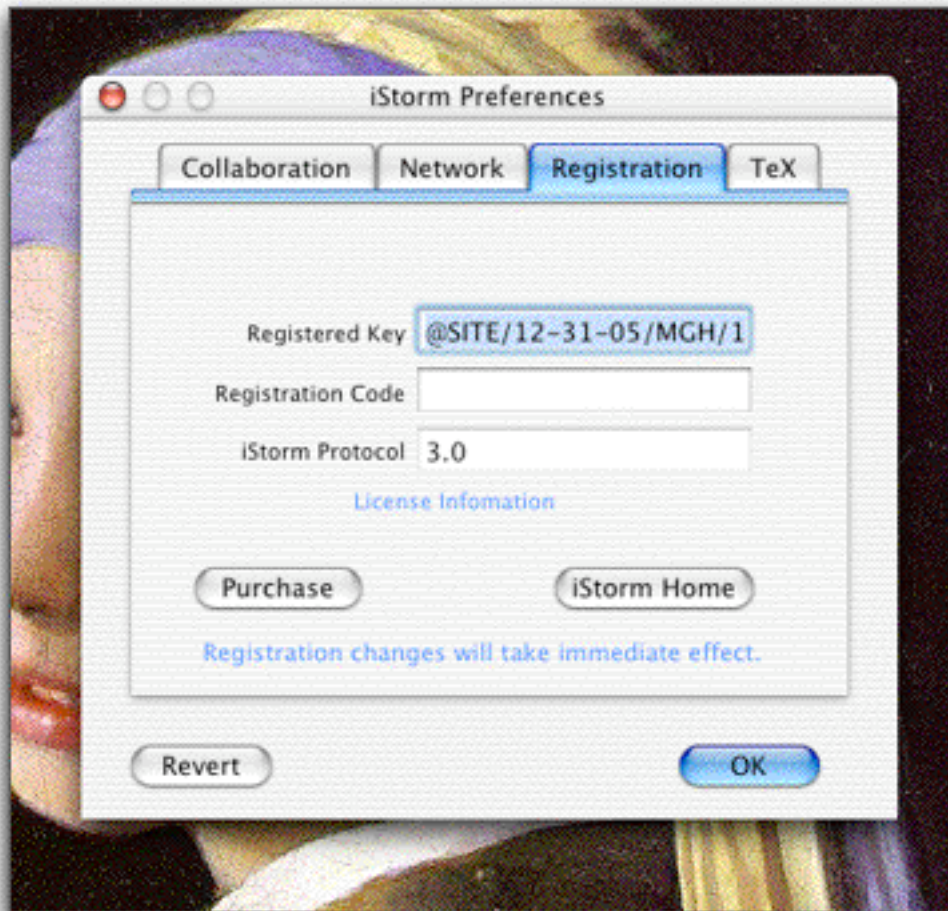
will take that the member dropped off for some reason. This is to prevent any member with erratic network environment from negatively affecting the flow of collaboration. When someone is dropped from the group all too often, the server may need to increase tolerance and also the poll interval. Especially when the document size has grown so much that it takes a while just to update the document, during which a member may fail to respond to the call.



Registration

You enter a valid license code and the key here to fully enable iStorm. The code is 16 alphanumeric string, supplied through email when you pay the shareware support fee. Type it in, and

press tab. If the code is valid, it will take immediate effect and will disable the limitations. The protocol number identifies the shared document interface used for the current version of iStorm. Generally, versions using different Protocol number will not allow connection to each other. Site license code begins with @SITE... and registration code is not displayed in the panel. Note that site licensed iStorm recognizes only those document under the same license.



TeX

The details on setting TeX parameters are described in the section on Baby TeX.

Where is this stored?

From time to time, you may need to start iStorm afresh and replace the old preferences with a new one. The file you want to delete before restarting iStorm is named:
"com.mathgamehouse.istorm.plist"
and can be found inside:
(Your Home Directory)/Library/Preferences.

Top 10 Things To Try with iStorm

To compose a group poem.

To do some research on Bugs with your Child /Parents /Spouse /Boss.

To create high quality top 10 lists such as this.

To use it in a small class equipped with iBooks/airport cards, and end up spending 40 minutes just setting it up...

But to somehow manage to come up with a brilliant result during the remaining 5 minutes of the class!

To show it off to Windows users and NOT end up with the spinning rainbow wheel.

To invent a more reliable voting system in Florida.

To become a writer for Jay Reno and bring your iBook to the set, end up discussing superstring theory with the guest of the week. Having to do some tutoring for your son on a math quiz during lunch break. Sneak into an iStorm session run by writers working for Dave Letterman, get caught and tossed out. Back to the studio, very briefly consider paying for your copy of iStorm and decide not to, manage to come up with a clever line or two mainly on the strength of your co-writers. And yet feel good about the day not quite lost.

To play "20 questions" with your inner child.

To plan Peace.

Top 10 Things Not To Do with iStorm

To check local weather.

To drop a 50 mb Quicktime movie into the document and go for lunch while your collaborators stare at the red button.

To see if it can turn your iBook into a perfect Homework duplication machine.

To create endless lists of Top 10 this and that.

To start a spontaneous book discussion in the local iStarbucks. Not a bad idea..., but this time you shouldn't have, as your significant other is getting bored sitting in front of you.

To wonder how many hours it will take Apple engineers to incorporate it into Sherlock. (Knock on wood...)

To wonder if Al Gore invented it along with the internet.

To show it off to Windows users and somehow end up with the spinning rainbow.

To show it to a big corporate IT head who just spent millions on a fancy collaboration center, especially if he is your boss.

To plan a War.

Appendix A: Under the Hood

The program is 99 % based on Cocoa. The remaining 1 % contains some generic C code and Carbon bits for QuickTime archiving.

We use Distributed Object technique for the management of shared data updating.

Rendezvous is implemented in the serving/joining part of the code.

The programs are tested under OS X 10.2.3 using iBook G3, G4 Powerbook and a G4 iMac, all connected via Apple Airport. All machines have at least 256 mb of memory or more.

Snapz Pro X from Ambrosia and MS Word were used in preparing pdf version of User Manual. Most graphics were prepared using Adobe Photoshop and iChalk.

Google and real books were used with equal frequency for research.

Serious consideration has gone into optimizing the way iStorm exchanges various types of data across network while maintaining the collaboration logistics intuitive and pleasant. (harsher critics may say *bearable*.) One of the early challenges were to minimize the amount of images sent over network. A cache-like technique was employed (v.1.1 and later) to remove any redundancies. Another challenge posed as iChalk went full color was to optimize the data communication for changes made on the chalkboard (v.2.0 and later). In a nutshell, iChalk monitors the size of minimal number of changes required to restore the screen on the other ends (differential update). This tends to grow in size as a user takes time to make changes here and there, keeping collaborators in suspense. Then the rate reaches a plateau as the same pixels get drawn over. At

some point, it becomes viable to use a compressed Tiff image of the whole board instead, thereby throwing away the redundant historical load up to that point. Behind the screen, iChalk/iStorm is very busy monitoring and judging all these, occasionally doing its own dishwashing.

Appendix B: Brief Summary of LaTeX Math Commands

We provide a brief summary of essential TeX commands relevant for math formula. The same information is accessible in the Baby TeX module.

Very basics

$$a^2 \quad a^2 \quad a_{n,m}^2 \quad a^2_{\{n,m\}} \quad \frac{a^2}{a+b} \quad \frac{a^2}{a+b}$$

$$\sqrt{x^2 + y^2} \quad \sqrt{x^2 + y^2} \quad \sqrt[3]{x} \quad \sqrt[3]{x}$$

$$\sum_i^\infty \quad \sum_{i=0}^\infty \quad \int_a^b f(x) dx \quad \int_a^b f(x) dx$$

$$\int_{x=0}^{x=\infty} \quad \int_{x=0}^{x=\infty} \quad \oint dV \quad \oint dV$$

$$\prod_i^N i \quad \prod_{i=1}^N i$$

Dots and ellipsis

$$\dots \quad \dots \quad \vdots \quad \vdots \quad \cdots \quad \cdots \quad \ddots \quad \ddots$$

Caligraphic letters

$$\mathcal{A}, \mathcal{B}, \mathcal{C}, \mathcal{D}, \mathcal{F}, \mathcal{G} \quad \mathcal{A}, \mathcal{B}, \mathcal{C}, \mathcal{D}, \mathcal{F}, \mathcal{G}$$

Greek Letters

α \alpha	ι \iotaota		Γ \Gammaamma
β \betaeta	κ \kappaappa	σ \sigmaigma	Δ \Deltaelta
γ \gammaamma	λ \lambdaambda	ς \varsigmaigma	Θ \Thetaeta
δ \deltaelta	μ \muu	τ \tauau	Λ \Lambda
ϵ \epsilonpsilon	ν \nuu	υ \upsilonpsilon	Ξ \Xii
ε \varepsilonpsilon	ξ \xii	ϕ \phii	Π \Pi
ζ \zetaeta	π \pi	φ \varphii	Σ \Sigmaigma
η \etaeta	ϖ \varpii	χ \chi	Υ \Upsilonpsilon
θ \thetaeta	ρ \rho	ψ \psi	Φ \Phi
ϑ \varthetaeta	ϱ \varrho	ω \omega	Ψ \Psi
			Ω \Omega

Binary operators

\pm \pm	\cap \cap
\mp \mp	\cup \cup
\times \times	\uplus \uplus
\div \div	\sqcap \sqcap
\cdot \cdot	\sqcup \sqcup
$*$ \ast	\vee \vee
\star \star	\wedge \wedge
\dagger \dagger	\oplus \oplus
\ddagger \ddagger	\ominus \ominus
\amalg \amalg	\otimes \otimes

\circ <code>\circ</code>	\bigcirc <code>\bigcirc</code>
\bullet <code>\bullet</code>	\square <code>\Box</code>
\diamond <code>\diamond</code>	\Diamond <code>\Diamond</code>
\triangleleft <code>\lhd</code>	\bigtriangleup <code>\bigtriangleup</code>
\triangleright <code>\rhd</code>	\bigtriangledown <code>\bigtriangledown</code>
\triangleleft <code>\unlhd</code>	\triangleleft <code>\triangleleft</code>
\triangleright <code>\unrhd</code>	\triangleright <code>\triangleright</code>
\oslash <code>\oslash</code>	\setminus <code>\setminus</code>
\odot <code>\odot</code>	\wr <code>\wr</code>

Relations

\leq <code>\le</code> <code>\leq</code>	\geq <code>\ge</code> <code>\geq</code>	\neq <code>\neq</code>	\sim <code>\sim</code>
\ll <code>\ll</code>	\gg <code>\gg</code>	\doteq <code>\doteq</code>	\simeq <code>\simeq</code>
\subset <code>\subset</code>	\supset <code>\supset</code>	\approx <code>\approx</code>	\asymp <code>\asymp</code>
\subseteq <code>\subseteq</code>	\supseteq <code>\supseteq</code>	\cong <code>\cong</code>	\smile <code>\smile</code>
\sqsubset <code>\sqsubset</code>	\sqsupset <code>\sqsupset</code>	\equiv <code>\equiv</code>	\frown <code>\frown</code>
\sqsubseteq <code>\sqsubseteq</code>	\sqsupseteq <code>\sqsupseteq</code>	\propto <code>\propto</code>	\bowtie <code>\bowtie</code>
\in <code>\in</code>	\ni <code>\ni</code>	\prec <code>\prec</code>	\succ <code>\succ</code>
\vdash <code>\vdash</code>	\dashv <code>\dashv</code>	\preceq <code>\preceq</code>	\succeq <code>\succeq</code>
\models <code>\models</code>	\perp <code>\perp</code>	\parallel <code>\parallel</code>	\mid <code>\mid</code>

Negative relations

$\not<$ <code>\not<</code>
$\not\leq$ <code>\not\le</code>
$\not\geq$ <code>\not\ge</code>
$\not\sim$ <code>\not\sim</code>
$\not=$ <code>\not=</code>

Arrows and pointers

\leftarrow	<code>\leftarrow</code>	<code>\gets</code>	\uparrow	<code>\uparrow</code>
\Lleftarrow	<code>\Lleftarrow</code>		\Uparrow	<code>\Uparrow</code>
\rightarrow	<code>\rightarrow</code>	<code>\to</code>	\downarrow	<code>\downarrow</code>
\Rightarrow	<code>\Rightarrow</code>		\Downarrow	<code>\Downarrow</code>
\leftrightarrow	<code>\leftrightarrow</code>		\Updownarrow	<code>\Updownarrow</code>
\Leftrightarrow	<code>\Leftrightarrow</code>		\Updownarrow	<code>\Updownarrow</code>
\mapsto	<code>\mapsto</code>		\rightharpoonup	<code>\rightharpoonup</code>
\hookrightarrow	<code>\hookrightarrow</code>		\leftharpoonup	<code>\leftharpoonup</code>
\hookleftarrow	<code>\hookleftarrow</code>		\leftharpoondown	<code>\leftharpoondown</code>

Various other symbols

\aleph	<code>\aleph</code>	\prime	<code>\prime</code>
\hbar	<code>\hbar</code>	∇	<code>\nabla</code>
\imath	<code>\imath</code>	\surd	<code>\surd</code>
\jmath	<code>\jmath</code>	∂	<code>\partial</code>
ℓ	<code>\ell</code>	\top	<code>\top</code>
\emptyset	<code>\emptyset</code>	\perp	<code>\perp</code>
\wp	<code>\wp</code>	\forall	<code>\forall</code>
\Re	<code>\Re</code>	\exists	<code>\exists</code>
\Im	<code>\Im</code>	\neg	<code>\neg</code>
\mho	<code>\mho</code>	\flat	<code>\flat</code>
		∞	<code>\infty</code>

Symbols with two sizes

Σ \sum

\int \int

\oint \oint

\prod \prod

\coprod \coprod

\bigcap \bigcap

\bigcup \bigcup

try also \bigsqcup, \bigvee, \bigwedge, \bigodot, \bigotimes, \bigoplus and \biguplus.

Function names

\arccos \arcsin \arctan \arg \cos \cosh \cot \coth \csc \deg \det \dim
\exp \gcd \hom \inf \ker \lg \lim \liminf \limsup \ln \log \max \min \Pr
\sec \sin \sinh \sup \tan \tanh

Special function names

The following functions accept an optional subscript:

\det \gcd \inf \lim \liminf \limsup \max \min \Pr \sup

For example,

$\lim_{x \rightarrow \infty}$
\lim_{x\to \infty}

The modulo function have to types: \bmod and \pmod with following examples:

$a \bmod b$ yields $a \bmod b$
 $y \pmod{X}$ gives $y \pmod{X}$

Mathematical accents

\hat{a} \hat{a}
 \check{a} \check{a}
 \dot{a} \dot{a}
 \breve{a} \breve{a}
 \ddot{a} \ddot{a}
 \grave{a} \grave{a}
 \tilde{a} \tilde{a}
 \vec{a} \vec{a}
 \bar{a} \bar{a}
 \widetilde{xyz} \widetilde{x y z}
 $\widehat{1-x}$ \widehat{1-x}

Bold faces in equations

`\mathbf{ }` puts formula in it in bold-faces.

Non-italic faces in equations : Chemical formulas

`\mathrm{ }` produces non-italic characters for chemical formulas.

`\mathrm{Y Ba_{2} Cu_{3} O_{7-\delta}}` $\text{YBa}_2\text{Cu}_3\text{O}_{7-\delta}$

Brackets : manually sizing

Precede bracket commands with the following to manually resize the brackets.

`\big \Big \bigg \Bigg`

Brackets : automatic sizing

Using `\left` and `\right` pairs, followed by the brackets, one can enclose a block of formula with brackets with adjusted size. The eligible brackets are:

`\left[\right]`
`\left(\right)`
`\left\{ \right\}`

also applicable to:

`|, \backslash, /, \lfloor, \lceil, \langle, \uparrow, \downarrow,`

`\updownarrow`, `\rfloor`, `\rceil`, `\rangle`, `\Uparrow`, `\Downarrow`,
`\Updownarrow`

Ordinary text within a formula

$X_n = X_k$ if and only if $Y_n = Y_k$
`X_n = X_k \quad \mbox{if and only if} \quad Y_n = Y_k`

Matrices and arrays

`\begin{array}{ccc} a11 & a12 & a13 \\ a21 & a22 & a23 \end{array}`
where `c` stands for centered and `@{exp }` inserts `exp` in between the elements.

$$\begin{pmatrix} a_{11} + a_{12} - a_{13} \\ b_{11} + b_{12} - b_{13} \end{pmatrix}$$

`\left(\begin{array}{c} @+ \\ @- \end{array} a_{11} & a_{12} & a_{13} \\ b_{11} & b_{12} & b_{13} \end{array} \right)`

Lines above and below formulae

`\overline{ }`
`\underline{ }`
`\overbrace{ }`
`\underbrace{ }`

Stacking symbols

`\frac{A}{B}`
`\stackrel{A}{B}` places `A` in smaller sizes centered on top of `B`.
`{A \atop B}`
`{A \choose B}`

Multiline equations

`\begin{eqnarray*} line_1 \\ line_2 \\ ... \\ line_n \end{eqnarray*}`
with each line with the form: `left_formula & mid_formula & right_formula`

$$\begin{aligned} (x + y)(x - y) &= x^2 - xy + xy - y^2 \\ &= x^2 - y^2 \end{aligned}$$

```
\begin{eqnarray*}
(x + y) ( x - y) & = & x^2 - xy + xy - y^2 \\
& = & x^2 - y^2 \\
\end{eqnarray*}
```

Framed equations

`\fbox{ $... $ }` gives an equation framed inside a box.

$$(x + y)(x - y)$$
 is produced by
`$$\fbox{ $ (x + y) (x - y) $ } $$`

Spacing fine-tuned

`\,` 3/18 of a quad
`\:` 4/18 of a quad
`\;` 5/18 of a quad
`\!` -3/18 of a quad (negative space)
`\quad` space of current type size
`\qqquad` space of twice current type size

AMS-LATEX extension

These are sampling of extra commands available with AMS packages. If AMS packages are installed, many more AMS commands will work. If not, the commands below should not be used.

```
\boldsymbol{}
\pmb{}
\text{}
\intertext{}
\iint , \iiint, \iiint, \idotsint
\substack
\begin{subarray}{pos} .. \end{subarray} (pos = c or l)
\sideset{pre}{pos}\symbol
\overset{char}\symbol, \underset{char}\symbol
\dots \dotsi \dotsb \dotsm \dotsc
\tfrac \dfrac
\binom{over}{under}
\cfrac[pos]{over}{under}
\begin{matrix} a & b & c \\ x & y & z \end{matrix}
  replace matrix with pmatrix, bmatrix, Bmatrix, vmatrix, Vmatrix to use
  different brackets.
\boxed{formula}
```

```
\begin{align*} a & b & c \\ x & y & z \end{align*}
\begin{gather*} formula1 \\ formula2 \\ formula3 \end{gather*}
\begin{split} formula\_part1 \\ formula\_part2 \end{split}
\begin{cases} a & b \\ c & d \end{cases}
```

With the inclusion of amsthm package, `\newtheorem` and etc are also available. Note that some of the AMS commands are valid only outside the math environment and therefore should be used with the generic Header using the LaTeX engine.

Appendix C: Brief Summary of Baby Math Commands and Constants

Built-in Constants of Nature

The units are in SI and cgs.

PI,Pi,pi : 3.141592654
@Euler : Euler gamma
@c, @c_cgs : Speed of light
@g, @g_cgs : Gravitational constant
@h, @h_cgs : Planck constant
@hbar, @hbar_cgs : Planck / (2 PI)
@a0, @a0_cgs : Bohr radius
@e, @e_cgs : electric charge
@me, @me_cgs : electron rest mass
@mp, @mp_cgs : proton rest mass
@mn, @mn_cgs : neutron rest mass
@eV, @eV_cgs : eV in J and erg
@kb, @kb_cgs : Boltzmann constant
@na, @na_cgs : Avogadro number
@vm, @vm_cgs : molar volume

Standard functions

x^y x to y-th power
sqrt(x)
exp(x)
log(x),ln(x) natural log
log10(x) base 10 log
sin(x)
cos(x)
tan(x)
asin(x)
acos(x)
atan(x)
sinh(x)
cosh(x)
tanh(x)
asinh(x)
acosh(x)
atanh(x)

atan2(y,x) atan(y/x) with signs taken into account

abs(x), fabs(x) absolute value of x

floor(x) rounds down to an integer

ceiling(x), ceil(x) rounds up to an integer

mod(x,y) remainder of x/y

Random numbers

randf(x) pseudo random double number between 0 and x

randi(x) pseudo random integer between 0 and x

randb() pseudo random bit 0 or 1

srand(x) Initialize random generator with seed x

Unit conversion functions

Temperature & Energy

c2k(x), k2c(x) Celcius to Kelvin, K to C

f2c(x), c2f(x) Farenheit to Celcius, C to F

ev2k(x), k2ev(x) eV to Kelvin, K to eV

k2erg(x), erg2k(x) Kelvin to erg, erg to K

Angle

deg2rad(x) Degree to Radian

rad2deg(x) Radian to Degree

Length & Area & Volume

acre2sqrmeter(x) Acre to m²

sqrmeter2acre(x) m² to acre

hectare2sqrmeter(x) Hectare to m²

sqrmeter2hectare(x) m² to hectare

darcy2sqrmeter(x) Darcy to m²

sqrmeter2darcy(x) m² to Darcy

inch2cm(x) Inch to cm

cm2inch(x) cm to inch

inch2m(x) Inch to m

m2inch(x) m to inch

ft2cm(x) Foot to cm

cm2ft(x) cm to foot

league2m(x) League to m

m2league(x) m to league

mile2m(x) Mile to m

m2mile(x) m to mile

parsec2m(x) Parsec to m

m2parsec(x) m to parsec
yard2m(x) Yard to m
m2yard(x) m to yard
fathom2m(x) Fathom to m
m2fathom(x) m to fathom
barrel2cubicm(x) Barrel to m³
cubicm2barrel(x) m³ to barrel
gallon2cubicm(x) UK-Can Gallon to m³ (for liquid)
cubicm2gallon(x) m³ to UK-Can gallon (for liquid)
ounce2cubicm(x) US ounce to m³ (for fluid)
cubicm2ounce(x) m³ to US ounce (for fluid)
pint2cubicm(x) US pint to m³ (liquid)
cubicm2pint(x) m³ to US pint (liquid)
quart2cubicm(x) US quart to m³ (liquid)
cubicm2quart(x) m³ to US quart (liquid)

Mass

amu2kg(x) Atomic mass unit to kg
kg2amu(x) kg to Atomic mass unit
ounce2kg(x) Ounce to kg (avoirdupois)
kg2ounce(x) kg to Ounce (avoirdupois)
pound2kg(x) Pound to kg
kg2pound(x) kg to pound

Power & Energy & Force

horse2watt(x) Metric Horsepower to Watt
watt2horse(x) Watt to metric horsepower
dyne2newton(x) Dyne to newton
newton2dyne(x) Newton to dyne
btu2j(x) BTU to joule
j2btu(x) Joule to BTU
cal2j(x) Calorie to joule
j2cal(x) Joule to calorie
ev2j(x) eV to joule
j2ev(x) Joule to eV
erg2j(x) Erg to joule
j2erg(x) Joule to erg

Pressure

atm2pa(x) Atmosphere to pascal
pa2atm(x) Pascal to atmosphere
bar2pa(x) Bar to pascal
pa2bar(x) Pascal to bar
torr2pa(x) Torr to pascal
pa2torr(x) Pascal to torr

psi2pa(x) Psi to pascal
pa2psi(x) Pascal to psi
mmhg2pa(x) mmHg to pascal
pa2mmhg(x) Pascal to mmHg

Time

year2sec(x) Year to seconds
day2sec(x) Day to seconds
hour2sec(x) Hour to seconds

Viscosity

poise2pas(x) Poise to pascal-sec
pas2poise(x) Pascal-sec to poise
centipoise2pas(x) Centipoise to pascal-sec
pas2centipoise(x) Pascal-sec to centipoise

Electricity & Magnetism

gauss2tesla(x) Gauss to tesla
tesla2gauss(x) Tesla to gauss
emu2ohm(x) emu of resistance to Ohm
ohm2emu(x) Ohm to emu of resistance
emu2farad(x) emu of capacitance to Farad
farad2emu(x) Farad to emu of capacitance
emu2amp(x) emu of current to ampere
amp2emu(x) Amp to emu of current
emu2henry(x) emu of inductance to henry
henry2emu(x) Henry to emu of inductance
emu2volt(x) emu of potential to volt
volt2emu(x) Volt to emu of potential
esu2farad(x) esu of capacitance to farad
farad2esu(x) Farad to esu of capacitance
esu2amp(x) esu of current to ampere
amp2esu(x) Amp to esu of current
esu2volt(x) esu of potential to volt
volt2esu(x) Volt to esu of potential
esu2henry(x) esu of inductance to henry
henry2esu(x) Henry to esu of inductance
esu2ohm(x) esu of resistance to Ohm
ohm2esu(x) Ohm to esu of resistance
faraday2coulomb(x) Farad to C
coulomb2faraday(x) C to farad
maxwell2weber(x) Maxwell to weber
weber2maxwell(x) Weber to maxwell
mho2siemen(x) Mho to siemen
siemen2mho(x) Siemen to mho

oersted2amppermeter(x) Oe to amp-m
amppermeter2oersted(x) Amp-m to Oe

**Values taken from
Physics Vade Mecum,
(American Institute of Physics, 1981)**

Appendix D: F.A.Q.

What is the best strategy to resolve a network-congestion related crisis during a collaboration?

1. Initially, *Server: Force Yield* in the *Connections* menu may be the best shot. It will take several steps to bring Green button to everybody.
2. If it is certain that a particular member causes a trouble, the server can select the person in the users list available in the chat drawer and then issue the *Server:Drop Selected* command to toss him out.
3. If the collaboration is image-heavy with fairly frequent changes in sizes exceeding 100 kb, it is strongly recommended to turn off the real time updating mode. One may also increase the real time update cycle in the preferences. Also, use the scale image feature of iChalk to alleviate the load.
4. The group size may also be a factor. Use the optional “Max Allowed Users” feature in the Host window to cap the maximum group size to begin with. The server can also put a cap later via *Server:Toggle Bouncer* command in the *Connections* menu.
5. Very rarely, one may encounter a situation where the button is green, yet can not edit the document. *Server: Force Yield* will usually resolve the situation.
6. If all fails, then try *Server: Fresh Copy* which will try to restore everybody to the last updated state.
7. If it still leaves one stuck, then as the last resort, try *Go Local* in the *Connections*. You will drop out cold, but at least will gain full control of the document in the local mode. At least part of your day is saved.

Could the chalkboard communication become faster? I have seen some shared drawing program exchange data faster.

Generally, vector graphics are much smaller in size and allow rapid data transmission. iChalk strokes are based on

manipulation of four components bitmap and thereby give far richer shared graphic experience. While it is possible that we will add vector and text layers in near future, we have almost fully exhausted various ways to optimize data transport of such complexity. Hopefully, we will all be surfing over fiber optic cables in near future ;-)

Why not allow “simultaneous” editing?

With robust network, simple text may be edited simultaneously by several people. However, we could not come up with a compelling argument for it over the current blue-green-red button method. Maybe for a musical jam, it would make a strong case. But not for text based collaboration, in our opinion. Rich text with graphics make it even less sensible as the group will experience characters as well as images popping in and out unpredictably. Boy, we are not into '60s style experimentations here.

Is there a plan for Windows version of iStorm?

No. It is beyond our capability resourcewise. We also feel slightly religious about this issue.

There are some user interface elements which deviate from Apple Guideline. Are they intended?

Most of them are not intended and we are constantly busy improving them.

So far, most of the vocal comments were made on the toolbar and the big one-button interface. Our toolbar was designed to minimize their presence. Many programs use toolbars populated with eye-candy buttons, which by themselves are pleasure to behold. They fit well in a program which *consumes* digital content rather than *creates* one. An example would be iTunes. iStorm is designed for more sustained concentration over a document. We thought it better to have them disappear from user's perception once the collaboration gets full steam.

The same principle guided our development of the scheme with the central button. The button serves at least five or six functions without cluttering users' mind and visual field. For the first-time-users of iStorm, the austere one-button-does-it-all interface may look too Spartan and cryptic, but as soon as one grasps what's going on, the majority of the people find the interface intuitive and catch on almost instantly. Its size and prominence in a relatively empty region of the document has been much commented on. Our reservation against using more informative but cluttered text messages or smaller sizes is that it adds another load of mental activity which bears down on users sub-consciousness. Any second-time user will have no trouble remembering what the colors on the button mean. If still in doubt, try your arguments against traffic lights.

In iChalk, some buttons have rather unusual functionality and behavior. If you do not find it funny at all, please consider switching to Windows: We would rather serve users who appreciate and respect the playful spirit than a huge, gray people who expect nothing but the expected. We hope many OS X users will understand and bear with quirky character of iStorm.

The buttons in the iChalk packs several different modes accessible by repeatedly clicking on them or on the board. Why not use more specific buttons? Our decision on this issue was made following the observation on how we use our remote-control for selecting channels on TV or CD tracks. Despite the ten numeric buttons and what not, we seem to enjoy wearing down the + and - buttons. Pressing a button twelve times may tire our thumb, but it requires much less mental activity than having to first decide on the number 12 and to find the right keys in right sequence, and finally landing safely on the tiny Enter button. Of course, the story is different if you have 100+ channels to surf. (We have only 13 to worry about.) That is probably why the venerable folks at Microsoft and Adobe are comfortable with the ever-proliferating buttons. Sometimes, we even find buttons to suppress other buttons from

appearing. It lead us to speculate that Bill Joy's recent polemic on the gray-goo problem was nothing but sublimated anxiety over the exploding number of buttons in commercial software.

Do you plan to extend Baby TeX to allow a shared full-blown TeX environment?

Our TeXnology is not quite up to the task. Maybe we should expect the task to be carried on the shoulders of TeXnicians mainly in the academia. Doug Rowland's Equation Service is a promising program for more versatile use of TeX. TeXShop with teTeX will satisfy most serious TeX needs on OS X, although we sometimes miss the pricey *Textures* from Blue Sky Research which used to have a nifty live-mode, but not available on OS X natively as of Jan, 2003.

Credits

iStorm Team:

The [Creative Minds](#) at MathGameHouse

Emoticons:

Hein Mevissen [MixthePix.com](#)

Application Icon:

Mike Broley [EmptyDish.com](#)

Beta Testers:

Adam Iser, Ryan Abel, Mike Broley, Andrew Cherne, Robert Herman, Jay H., Ninja, Conner O'Brien, David Paz, Andrew Proksel, Dan Shannon, Mike Taylor, Dennis Catt, Dean Ellerton, Alan German.

We would like to acknowledge frequent help from people participating in the Cocoa development forums: macosx-dev@omnigroup.com, cocoa-dev@lists.apple.com and lately cocoa-pro@cocoadevcentral.com. Lately we benefited from various comments made by people participating in the Macnn forum. Also thanks to those noble people who make their effort available free to public, especially Thomas Esser (teTeX), Richard Koch (TeXShop), Gerben Wierda (i-Installer), Donald Knuth (TeX) and developers of Apache Webserver. We also thank Doug Rowland (Equation Service) for kindly helping us with making the inline TeX process painless. The ultimate inspiration for our striving for perfection is [Johannes Vermeer](#).



Girl with a Pearl Earring, c. 1665–1666
Royal Cabinet of Paintings, the Mauritshuis, The Hague.

Who are the Creative Minds at Math Game House?

Project Management : Hyejung

Hyejung is the mastermind at Math Game House, which provides high quality, focused educational service to gifted and special-needs students. Hyejung has a Master's degree in Education from Stanford University.

hyejungK@mac.com

Daring Imagination and Program Design : Phillip

Top among his interest is everything that has to do with Mac. He also pursues graphics design as hobby. He is a serious student of music, regularly playing piano in a chamber ensemble, and recently won first prize in a competition playing a Chopin Waltz. He doesn't have any grand plan for his life yet.

phillryu@mac.com

Technical Expertise and Details : Seungoh

A theoretical physicist, trained at Stanford University. He has an unfortunate tendency to confuse his vacation activities with programming. Otherwise, he is pretty normal. The iChalk and the Baby TeX are his tribute to the community which nurtured his scientific mind.

sryu@mac.com

Extreme Test : Ben

Ben is a Tae Kwon Do master. He applied the powerful martial arts technique in beta-testing the program. He also designed the initial Help system, which seemed to require a help system all its own ;-)

benryu@mac.com

Guiding Spirit : Camadee

I oversaw everything with a disinterested mind.

You may reach the makers of iStorm at :

mathgamehouse@mac.com

www.mathgamehouse.com/istorm

To download current version of iStorm

www.mathgamehouse.com/istorm/download.html

To access various forms of support

www.mathgamehouse.com/istorm/help

To purchase single user license

www.mathgamehouse.com/istorm/purchase.html

To find out about site license options

contact: mathgamehouse@mac.com

or check at www.mathgamehouse.com/istorm/purchase.html

To find out about the sister program iChalk,

www.mathgamehouse.com/ichalk

