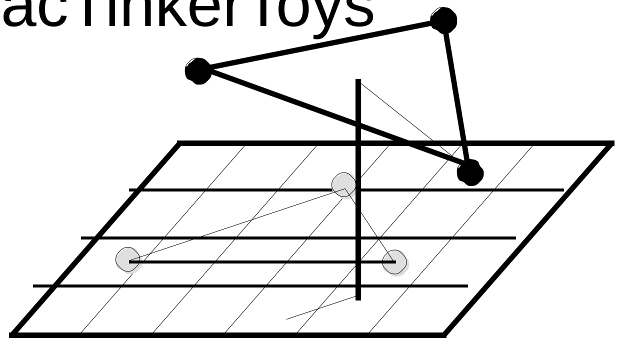
MacTinkerToys



by Lunarmobiscuit

Documentation

What is Tinker Toys?

Tinker Toys is a real-time physical simulation of a particle system of mass points connected by springs.   All frames are updated by calculating the acceleration of each mass point Euler's method of integration is then used to compute an updated velocity and position for each mass point. It's actually more fun to watch then to read about.

What do I need?

Tinker toys requires a math coprocessor to run. I didn't add the code to check, so if you try and run the program on a Mac Plus or SE, it will crash. It has been tested on a Mac II, IIx, and IIci successfully.

How to use Tinker Toys:

To make TinkerToys operate fastest, make sure your monitor is in Black&White (one color) mode. It will run in color mode, but it will be obviously slower.

The cursor moves around the ground plane with a one-to-one correspondence with the TinkerToys main window.

To make the cursor grow or shrink in height, hold down the shift key and move the mouse vertically. The cursor gets taller as you move the mouse away from you and shorter as you move the mouse closer to yourself.

Click anywhere in the 3D space to create a new point.

Pressing the Command Key (Squiggly Box) [or Z key] grabs hold of the nearest point.

Pressing the Option Key [or C key] connect the current point to the nearest point.

Holding down the Control Key pulls the current point toward the top of the cursor.

Pressing the space bar [or X key or esc key] will "let go" of the current object.

Pressing the Tab key or choosing "Calculate" from the "Tinker" menu toggles the computations, i.e. all objects will stop or start moving. This can be used for finer editing of the objects.

Changing the simulation:

By choosing "Adjust Parmeters" from the Tinker menu, you can get a window of scrolling controls. The following is a definition of the controls:

- Spring adjusts the spring constant, i.e. how hard each spring pulls the mass points

- Dampening adjusts the dampening constant, i.e. how fast the springs return to their rest length (adjust this too high without lowering the time control causes the formuli to "blow up")

- Rest Lenth adjusts the the length which each spring "like to" remain.

- Gravity adjusts the downward force. This rangest from 0 to some large amount

- Pull adjust the amount of force the cursor "pulls" on its connected mass point. This ranges from nearly 0 to a very large pull.

- Bounce is a percentage 0%-100% of how much energy is returned from an object boucing off a wall, ceiling, or floor.

- Friction is a percentage 0%-100% of the force of friction of the walls, ceiling, and floor.

- Time is a control which affects the size of the computation between frames. Shorter time lead to more accurate modeling of real springs, but it is "painful" to watch slow animation.

If I didn't mention the range of the controls, then it is from some reasonable small number or some reasonable bigger number. The general rule I used to find the bounds was trial-and-error.

The controls will display a number from 0 to 50 corresponding to how far (in 1/50ths) the control is set from its lowest value. NOTE: 50 was chosen since the control can move 50 pixels from top to bottom.

Features Lacking:

Tinker Toys was written as an assignment in 15-462 Computer Graphics here at Carnegie Mellon. It didn't need certain features to get a good grade. For instance, you cannot delete any mass points or remove springs. Also, there is a "Save" item in the "File" menu but it doesn't do anything. Its a fun program anyway.

Distribution Information:

Tinker Toys is being placed in the public domain for all to use and enjoy. This means you can give it to everyone and copy it at will. Tinker Toys was written in THINK C 4.0 (Copyright Symantec Inc.), but the code should be compatible with version 3.0 and easily converted to MPW C. If you are interested in the source code, send me $5 and I'll send you a disk.

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