Contents

Click on the colored texts:

If you want to learn how to use Windows help, press F1 key.

Special Thanks

Special thanks to:

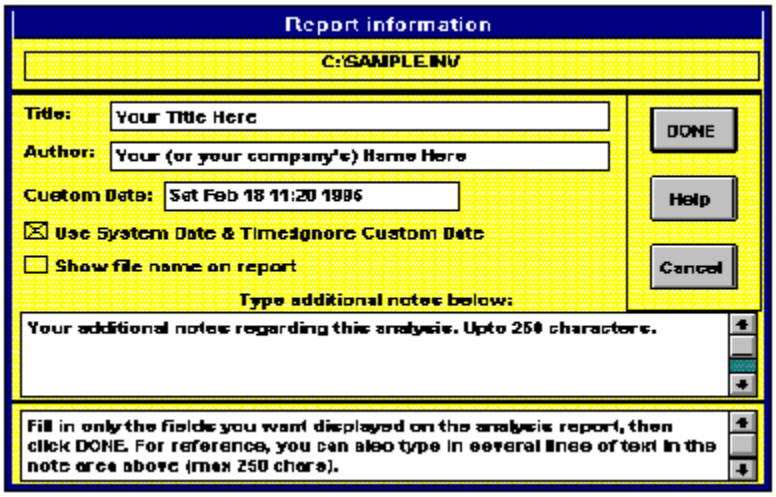
William D. Whisler < Professor, School of Business & Economics> for concepts, tips, accuracy
Javed Rahman <Software Engineer> for comments, insights.
George Van Gilder <Entrepreneur> constant motivation, support

Report Info parameters

Report info dialog lets you choose what non-computed information you want to attach to your report. For example, you might want to include author, report creation date, file name (if any), and additional notes in the report. This is the dialog where you type in the information you want to include. The result of this dialog is Report info table included at the top of your report.

Fill in only the fields you want displayed on the analysis report, then click DONE. For reference, you can also type in several lines of text in the note area above (max 250 chars). You can ask INV to fill in the date and time for you by clicking on the checkbox until it says "Use system date & time:ignore custom date". When you ask the program to use system date and time, INV retrieves the current date and time from your computer and uses that value. On the other hand, you may want to choose your own date and format, to do so, click on the checkbox until it says : "Use Custom date input above"
Now, you can type in virtually any date in the field above the checkbox.

Once the report has been saved to disk, you can also choose to show the actual file name along with your report by clicking on the checkbox until it states "Show file name on report". On the other hand, you may choose not to include the physical file name on report, in that case, click on the checkbox until it states "Don't show file name on report".
Result on screen is updated when you click DONE.

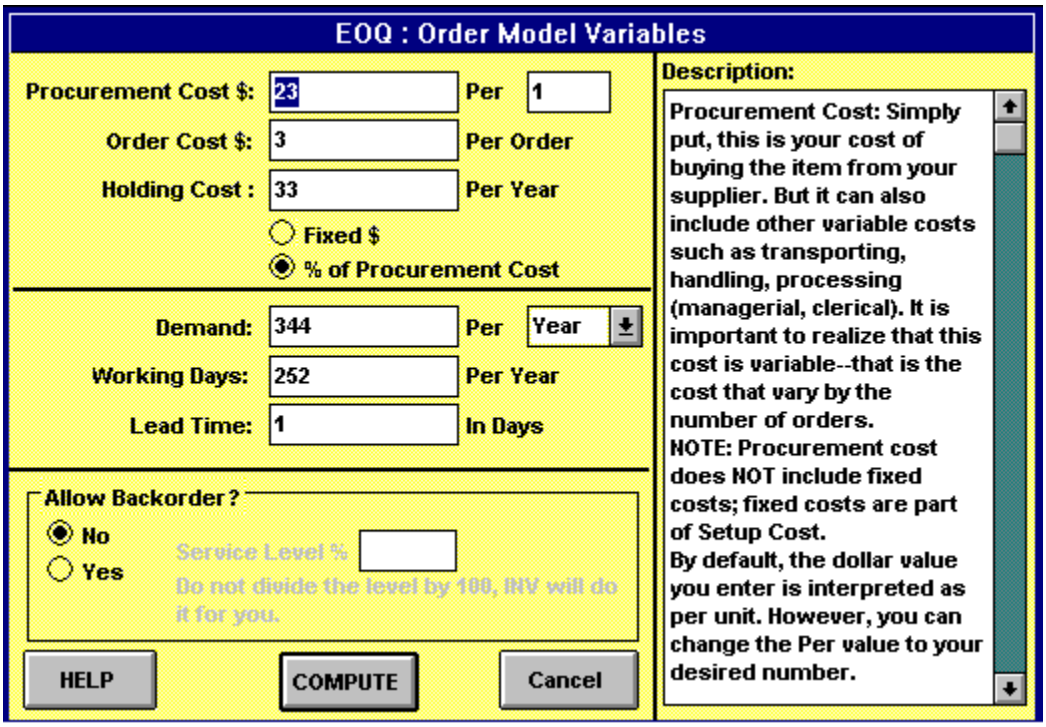


Note that you can always decide to change the values, or even delete the Report info table altogether. For these operations, see Editing a report .

EOQ parameters

EOQ (Economic Order Quantity):

INV analyzes your inventory item-by-item. That is, each report refers to an item's inventory factors and solution. In INV, you need to decide on the model before you can generate an ouput. EOQ is one of 2 primary inventory models.
The way you decide on the model is simple: if you produce the item (the item you're seeking solution for) in-house, then you want EPQ (Economic Production Quantity) model. However, if you order the item from a manufacturer or supplier (that is, you don't produce it in-house, but sell to your customers), then you want EOQ (this dialog is shown below):



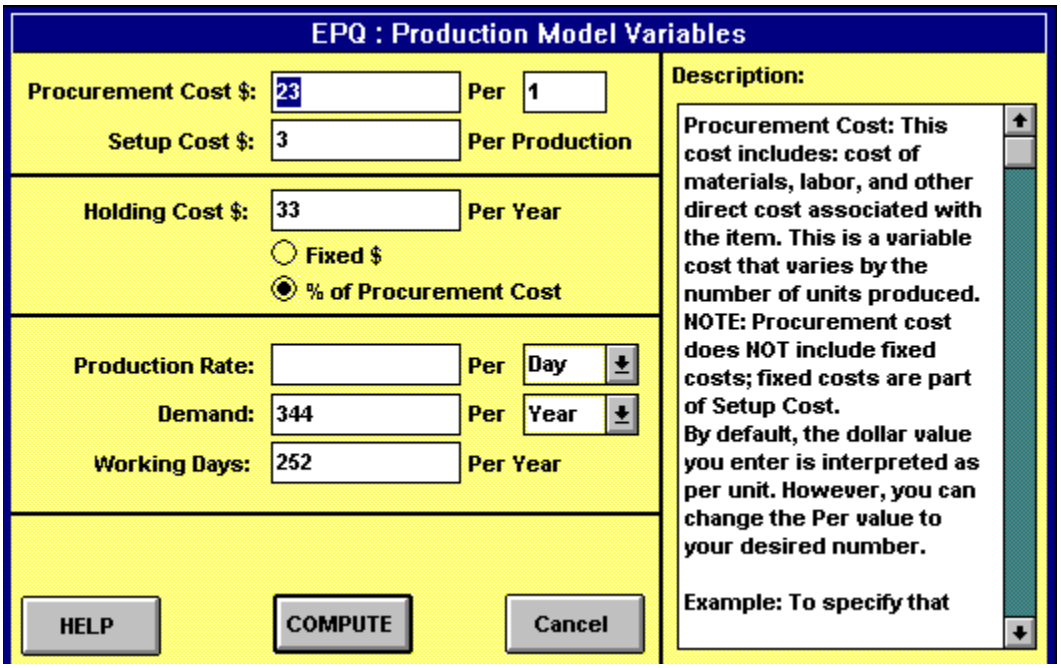
Simply fill in a few related data about the item, and select Compute.....and that's all there is to it, you get the complete optimal money saving solution for the item.
You can get further information on each required parameter on the right Description pane on the dialog. As you click on different fields, the description on that field appears on the right pane to guide you.

See also: Getting a solution
Concepts of Inventory analysis
Sample problems
Editing a report

EPQ parameters

EPQ (Economic Production Quantity) :

INV analyzes your inventory item-by-item. That is, each report refers to an item's inventory factors and solution. In INV, you need to decide on the model before you can generate an ouput. EPQ is one of 2 primary inventory models.
The way you decide on the model is simple: if you produce the item (the item you're seeking solution for) in-house, then you want EPQ (this dialog shown below) model. However, if you order the item from a manufacturer or supplier (that is, you don't produce it in-house, but sell to your customers), then you want EOQ (Economic Order Quantity) model.

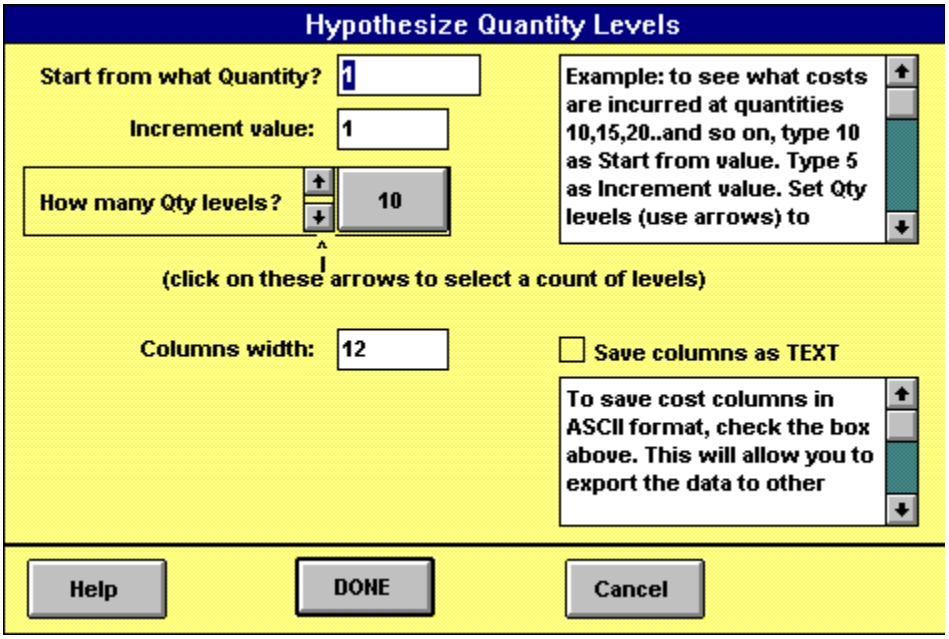


Simply fill in a few related data about the item, and select Compute.....and that's all there is to it, you get the complete optimal money saving solution for the item.
You can get further information on each required parameter on the right Description pane on the dialog. As you click on different fields, the description on that field appears on the right pane to guide you.

See also: Getting a solution
Concepts of Inventory analysis
Sample problems
Editing a report

Cost Columns parameters

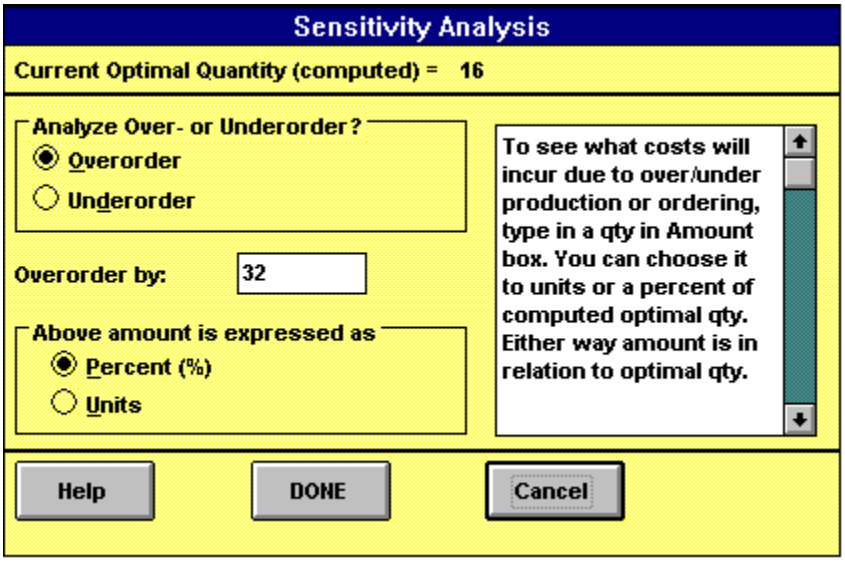
Dialog for inputting Hypothesize analysis parameters:



See also : Optional analyses
Sample problems
Editing a report

Sensitivity parameters

Dialog for inputting Sensitivity analysis parameters:



See also : Optional analyses
Sample problems
Editing a report

Using Toolbar

The toolbar is a collection of frequently used commands linked with graphical objects. The toolbar is by default conveniently placed along the right vertical edge of the INV application window. However, you can move it around, minimize it, maximize it, or even hide it whenever you wish.
To Hide the toolbar, select the Tools | Toolbar menu until the menu item is unticked. To make it visible again, select Tools | Toolbar until the menu item is ticked.
The minimize control on the toolbar "shrinks" the toolbar--suitable for saving screen real estate without hiding the toolbar. The maximize control restores the original dimension of the toolbar by "expanding" it. Note that the width of the toolbar is fixed, the height is variable depending on "shrinking", "expanding", and height of the application window.
A sample toolbar appears as below (shown smaller than actual size):

The controls (buttons, combo box) on the toolbar take actions that are identical to their corresponding menu commands; the only difference is that you can access these commands more easily and graphically using the toolbar. If you do not use toolbar and prefer to use menu commands, you can set preferences such that toolbar will not be visible by default.
See Customizing the program for more details.

You can issue following commands from the toolbar:

Select / Change Model:

This combo control allows you to select a model (EOQ or EPQ). Click on the down arrow to select the model from the list.
When you select either EOQ (Order model) or EPQ (Production model), the corresponding input dialog for the model will appear. This dialog includes all required variables necessary for the basic set of computation. If you have a computed analysis in one model on screen, and you select another model using the toolbar, INV will automatically fill in existing values to proper fields such that you need not reenter the same values. See Entering Data for more details.
(Menu alternative : Analyze | EOQ, or Analyze | EPQ)

Get Hint:

Click on this button to bring up the hint window. For more details on Hint, see Using Hints.

(Keyboard Shortcuts : F2 key, or 'H' key)

Create a New Analysis Report:

Click on this button to prepare for creating a new report. If a report is currently open, INV closes it and initializes application work environment.
See Creating a new report for details.
(Menu alternative : File | New)

Open a Previously Saved Analysis File:

Click on this button to open a previously saved report from any location.
See Opening reports for details.
(Menu alternative : File | Open)

Close an Open Analysis File:

Click on this button to close. INV application window can have one analysis file open at one time (to have multiple files open simultaneously, see Running Multiple Copies).
See Closing reports for details.
(Menu alternative : File | Close)

Save Results as a report:

Click on this button to save a newly created report, or save changes to the open report on screen.
To get details, refer to Saving reports.
(Menu alternative : File | Save)

Copy Analysis to Clipboard:

Click on this button to copy the entire analysis as text to the clipboard, or to copy a selected object to the clipboard. See Clipboard copying for details.
(Menu alternative : Edit | Copy to Clipboard)

Print Analysis:

Click on this button to send the output on screen to the printer of your choice.
See Printing for more details.
(Menu alternative : File | Print)

Change Font of the Analysis:

Click on this button to choose a font for the entire report.
See Customizing the output more details.
(Menu alternative : Options | Font)

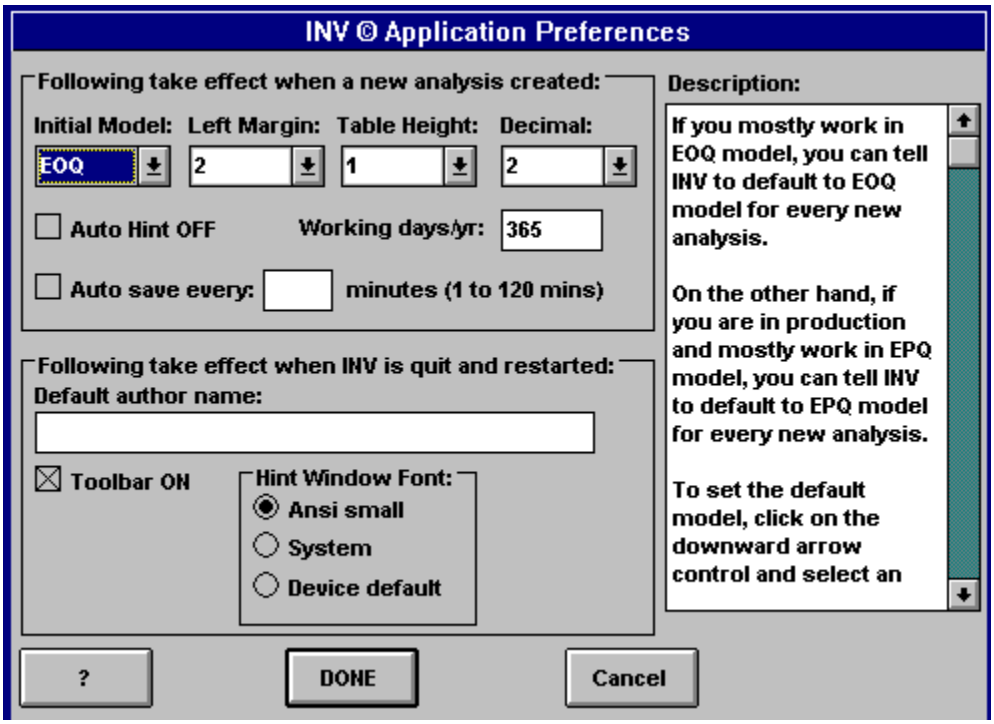
Delete a Selected Object:

Click on this button to delete an output object from the report. An object must be first selected by single-clicking an object on screen (a thick border around the object indicates selection), then click on this button to delete the object. Normally, INV will ask you to confirm the deletion (to prevent accidental deletion), however, you can bypass the confirmation by pressing down the Ctrl key while clicking on this button.

(Keyboard Shortcuts : Del key, or Ctrl-Del key to bypass confirmation)
See also: Editing reports

Customizing the program

To better suit your computing behavior, you can set application preferences in Preferences dialog.
To open the dialog, choose menu commands: Options | Preferences...
The dialog is shown below:



Parameter descriptions:
You can get description on each parameter by clicking once on it, then simply look at the description window (on right side pane).

Once you are happy with your selections for all parameters on this dialog, click on DONE button to save your changes. Click Cancel to restore to the previous settings.

NOTE:
Changes in most of the parameters are effective when you create a new analysis (no need to relaunch INV) , except for Default Author name, Toolbar ON/OFF, and Hint Window Font which are effective when INV is restarted.

In addition, INV gives you control to create your own menu items and associate your own applications with those menus. You can also set default application font, and font size. To explore these hidden powers, see Understanding the Initialization file.

Customizing the output

INV offers you great flexibility in customizing all elements of the output. All display related customizing commands are under Options menu.

Apply your own font:
INV uses Arial font (point size 12) as the default font on a new report. To apply another font to your entire report, choose Options | Font... and you will be able to select any True Type font installed on your system. You can also choose a different size of font (from 8 to 12). Once you choose a font and size the report is instantly updated.

Apply your own text color:
INV uses navy blue as default text color of your output. To apply another color, choose Options | Text Color... and a color palette will open up. You will find all colors supported in INV depending on your monitor color display capability. Click on the desired color and click OK to apply instantly.

Apply your own screen color:
INV uses white as default screen color of your output (here screen refers to the document background). To apply another color, choose Options | Screen Color... and a color palette will open up. You will find all colors supported in INV depending on your monitor color display capability. Click on the desired color and click OK to apply instantly.

NOTE: INV will warn you (but will not prohibit) if selected text color and screen color is same.
INV does not allow custom color creation.
To make efficient usage of memory, INV reports share screen color in a given session. You are allowed to have different screen color for each report, however, if you launch multiple copies of INV (see Running Multiple Copies), the first copy will inherit the screen color of the subsequent ones temporarily.

Apply your own pen:
INV uses two types of line drawing. One to draw frames around output objects (such as around Main Table), and another to draw frames around cells within a table. The latter uses a "pen" drawing mechanism that you can customize. INV offers you 3 different types of pen styles: Solid (default), dotted, and dashed. To apply a pen style, choose Options | Pen Style and a submenu opens up. Drag the mouse to hilight the desired submenu item (a tick mark denotes currently applied style). Report is updated instantly.

Apply your own table height:
Each component of the output is a graphical table. INV offers you a choice of three table heights: 1, 1.5, and 2. To apply a new table height to your report, choose Options | Table Height and a submenu opens up. Drag the mouse to hilight the desired submenu item (a tick mark denotes currently applied height). Report is updated instantly. Default selection depends on your setting in Preferences dialog.

Apply your own precision:
You can choose to display more or less decimal portions of the numeric ouput. INV offers you a choice of: 0, 1, 2, 3, 4.
For example, selecting 0 means the figures shown are rounded up to be integers (less accurate), conversely, selecting 4 yields 4 digits after the decimal point (more accurate).
To apply a new precision to your report, choose Options | Decimal Precision and a submenu opens up. Drag the mouse to hilight the desired submenu item (a tick mark denotes currently applied precision). Report is updated instantly. Default selection depends on your setting in Preferences dialog.

Apply your own left margin:
You can select a left margin for your report from a choice of: 2, 3, 4, 5, 6.
[These numbers are logical units depending on the currently selected font's average character width.]
To apply a new margin to your report, choose Options | Left Margin and a submenu opens up. Drag the mouse to hilight the desired submenu item (a tick mark denotes currently applied margin). Report is

updated instantly. Default selection depends on your setting in Preferences dialog.

Choose your own table widths:
INV automatically computes the best width of Main Table, Sensitivity Table, and Cost Columns. You can however still adjust them manually.
To adjust the width manually of Main Table (EOQ or EPQ), double-click on Main Table, then type in a value in logical units. To instruct INV to compute it for you, you can type 0. Since Sensitivity Table width depends on Main Table, setting the width of the Main Table automatically adjusts the width of Sensitivity Table.
To adjust the width manually of Cost Columns, double-click on Cost Columns Table, then type in a value in logical units on the dialog. To instruct INV to compute it for you, you can type 0.

Running Multiple Copies

You can run multiple copies of INV program. The exact number depends on available memory. Although INV allows one report (file) to be open at a given time, the ability to run multiple copies gives you the ability to have several reports side by side running simultaneously. Each copy can be terminated independent of other running copies at any time, and has full computing power.
To run multiple copies, simply double click on INV icon in Program Manager. When another copy is already running, INV asks you if you're sure to invoke another copy. If you say "Yes", another copy is launched. If you say "No", the already running copy is brought forward to you for easy access.

Important notes on running multiple copies:
* Running multiple copy requires more memory than running a single copy.
* It gives you the ability to compare/view several reports side by side.
* To prevent inadvertent alteration of a report (especially for Network environments) INV locks the report once opened, thereby prohibiting its alteration by another user (or copy of INV). Once the report is closed, other users (or copies of INV) can modify the report as usual.
* To make efficient usage of memory, INV reports share screen color in a given session. You are allowed to have different screen color for each report, however, if you launch multiple copies of INV, the first copy will inherit the screen color of the subsequent ones temporarily.

Saving reports

You can choose to save your report in either native inv format or in text (ascii) format.
The menu items File | Save and File | Save As remain grayed until a report is computed or opened.

To save a computed in inv format, choose File | Save.

If the computed report is new (i.e. no file name has been given), a dialog opens up where you can choose to name the report and its location. The file name extension must be either .txt or .inv.
If you have chosen .txt extension, the file is saved as text with the given file name. However, when you save the report as text, the INV window title will remain as "# Untitled #" , but the saved text file is available to you immediately.
If you have chosen .inv extension, the file is saved in native inv format and the INV window title changes to the chosen file name.

If the computed report has already been saved before (i.e. a file name has been given), everytime you choose Save, the report is saved on the disk with the name and location previously selected.

If you want to make a copy of the current report (i.e. save it with a different name), choose File | Save As and type in a new name (with .inv extension) and a location in the dialog. INV then performs several tasks internally (transparent to you): it automatically closes the currently opened report, writes out the content of the report to a newly selected file and creates the new file if necessary, and opens the newly created report. If a file exists in the chosen location by the name of the new name you have typed in Save As dialog, INV will ask you if you want to overwrite the existing file or not.

To save any opened report (.inv extension) in a text format (.txt extension), choose File | Save As, and then change the File Type to Text(ASCII) at the bottom of the dialog, choose a name and location, and click OK. The opened report is unaffected and remains open, but you also have a text file created for you.

INV -> Text conversion:
When you choose to save the report as text, INV performs INV to text conversion. This conversion is necessary because native inv format is more complex than simple text. Once converted to text, the text output content (i.e. numeric output and texts) is identical to inv report content except for the following differences:

- The text file does not store color, font, size, pen, table heights, or other graphic attributes.
- The text file always uses decimal precision of 3.

Remember however that your inv report is unchanged (thus retains all graphic attribute) even when you choose to save as text because the text file is a separate file.
INV can save in both inv and text formats, but can open only inv format files. This format is a special format specific only to INV and stores all attributes of the report in a very compact format...only 735bytes regardless of the actual complexity or length of the report.
The ability to save as text allows you to transfer the computed output to virtually any editor or presentation program if desired.

See also:
Using the Toolbar, Clipboard Copying , Saving Cost Columns as text
Autosave

Clipboard Copying

INV allows you to copy an entire report, or a selected output component to the clipboard. Copying to clipboard enables you to paste the content to any application that can paste text. INV copies the content of a report (or selection of it) to the clipboard as text.

The menu Edit | Copy to Clipboard (TEXT) is enabled only when a report is opened or computed.

To copy the entire report to clipboard, double-click on whitespace and then choose Edit | Copy to Clipboard (TEXT) menu command.

To copy a particular output object to clipboard, double-click on whitespace, and then single-click on the object you want to copy, then choose Edit | Copy to Clipboard (TEXT) menu command. Only that object will be copied to the clipboard.

See also:
Saving reports, Saving Cost Columns as text, Using the toolbar, Launching additional tools

Whitespace definition:

It is the area (inside INV document window) not occupied by any output object. Although whitespace implies white as color, your document window (or screen) can be any color as you choose it to be.

Output object definition

INV groups output into logical objects for ease of interpreting the output. For example, Report Information (composed of Title, Author, etc) is an output object. Similarly, Main Table, Policy Summary, Sensitivity Table, Cost Columns are also output objects.

Launching additional tools

INV gives you easy access to frequently used Windows Calculator and Windows Clipboard viewer without ever leaving the INV program. Choose Tools | Calculator or Tools | Clipboard to launch the calculator and clipboard viewer respectively. Clipboard allows you to see what is copied to the clipboard, and with calculator you can perform your own calculations to justify your input.

When you're done using these tools, you need to quit them manually by by double-clicking on the system menu of these two applications (to free memory).

You also have the ability to choose other applications instead of Calculator and Clipboard viewer, to get more details on this, see Understanding the Initialization file.

See also: Customizing the program

Autosave feature

You can instruct INV to automatically save your currently open report at desired intervals. To set this parameter, choose Options | Preferences...and select Autosave ON, then type in a value in minutes for the interval. The description appears on the right pane of the Preferences dialog.
If the report has not been saved yet, autosaving is ignored. It applies only to reports that you have saved at least once (given a file name). This feature when activated, is functional even if INV is running in the background. It is suitable for guarding your data in case of power failure, or other unexpected events.

See also : Saving reports
Customizing the program.

Printing reports

INV allows WYSIWYG printing, therefore the output on the printer will look remarkably similar to how the report appears on your screen. The capability of your printer is an important factor to consider nevertheless. For example, if your printer supports color, INV can print the report in color as it appears on screen. Additional features of the printer such as scaling/zooming, rotation etc can also be taken advantage of via INV.

If the printer does not support color, a black and white representation of the report is printed. Note however that the screen color in INV is analogous to the color of the physical page on your printer, therefore, screen color cannot be printed on the page, only the text colors are considered.

To print, choose File | Print. This menu command opens a Print dialog where you can choose your printer (if several printers are installed, or in a network), choose various options such as resolution, paper size, orientation, darkness etc.

It is recommended that you make a test printout before printing the final output for the very first time. This will enable you to choose the best font type and size that will appear best on the chosen printer. To ease this process, INV includes File | Test Print menu command which simply prints the Main Table of your report.

To make multiple printouts, type in a value in Copies field in the Print dialog. Default value is 1 for a single copy.

NOTE: File | Print and File | Test Print commands are enabled only when a report is opened or created.

See also: Using the toolbar

Optional analyses

To help you analyze your inventory thoroughly, INV offers two additional optional analyses:

- **Sensitivity analysis**
- **Hypothesize analysis**

These two analyses are independent of another and both are optional.

Sensitivity analysis overview:
To see what costs will incur due to over/under production or ordering, type in a qty in Amount box. You can choose it to units or a percent of computed optimal qty. Either way amount is in relation to optimal qty.

Hypothesize analysis overview:
Example: to see what costs are incurred at quantities 10,15,20..and so on, type 10 as Start from value. Type 5 as Increment value. Set Qty levels (use arrows) to anywhere from 1 to 20.

To save Cost Columns in ASCII format, check the box above. This will allow you to export the data to other applications for graphs and presentation. If you don't choose so, the columns will appear in this analysis in INV format only.

Creating a Sensitivity analysis:
Choose Analyze | Sensitivity... menu command. This command is available only after you have computed a basic solution report. Fill in the parameters on the dialog (see below for more info), and click DONE. A Sensitivity Table object is generated and added to your report immediately.

Creating a Hypothesize analysis:
Choose Analyze | Hypothesize... menu command. This command is available only after you have computed a basic solution report. Fill in the parameters on the dialog (see below for more info), and click DONE. A Cost Column object is generated and added to your report immediately.

To find out about required inputs to compute these analyses, see : Cost Columns parameters, Sensitivity parameters

See also: Getting a solution

Output objects

Click on the pictures below to get help on the item.

Title:	Your Title Here
Author:	Your (or your company's) Name Here
Date:	Sat Feb 18 21:20:47 1995
File:	C:\SAMPLE1.INV

MAIN TABLE: » EOQ MODEL SOLUTION « No Backorder

ALL VALUES IN THIS TABLE ARE *OPTIMAL*

Quantity to order (units)	16.49
Number of orders (per month)	1.74
Number of orders (per year)	20.86
Frequency of orders (in work. days)	12.08
Reorder Point based on Lead Times (units)	1.37
Avg. On-hand Inventory Level (units)	8.25
Yearly Relevant Cost [fixed costs only] ($)	125.16
Yearly Total Cost [fixed+variable costs] ($)	8037.16

MAIN TABLE: » EPQ MODEL SOLUTION «

ALL VALUES IN THIS TABLE ARE *OPTIMAL*

Quantity to produce (units)	16.64
Number of production runs (per year)	20.67
Time between production runs (in work. days)	12.19
Maximum inventory level (units)	16.34
Average inventory level (units)	8.17
Days in pure consumption (days)	11.97
Days in pure production (days)	0.22
Pct. of time in pure consumption (%)	98.23
Pct. of time in pure production (%)	1.77
Yearly Relevant Cost [fixed costs only] ($)	124.05
Yearly Total Cost [fixed+variable costs] ($)	8036.05

SUGGESTED POLICY TO MINIMIZE YOUR COSTS:

(1) Order 16 units at every batch order.
(2) Place order when inventory level reaches 1 units.
Or, every 12 work days whichever occurs first.
Presently, your Yearly Relevant costs= $761.18
It can be reduced by 83.56% (or $636.02) if above policy is followed.

INPUT VARIABLES TABLE:
Procurement Cost (per item)= $ 23.00
Holding Cost (per item)= $ 7.59
Order Cost (per order)= $ 3.00
Demand per year (units)= 344.00
Working days (per year)= 252.00
Lead Times (in work. days)= 1.00
Service Level= 1.00
Production Rate (per work. day)= 0.00

SENSITIVITY TABLE:	
Effects of Ordering 22 units (OVERORDER):	
Ratio (new costs/optimal costs)	1.04
Additional Cost over optimal (%)	3.88
Yrly Relevant Cost at new qty [fixed costs only] ($)	130.02

Qty	Holding($)	Order($)	Relevant($)
1	3.79	1032.00	1035.80
2	7.59	516.00	523.59
3	11.38	344.00	355.38
4	15.18	258.00	273.18
5	18.98	206.40	225.38

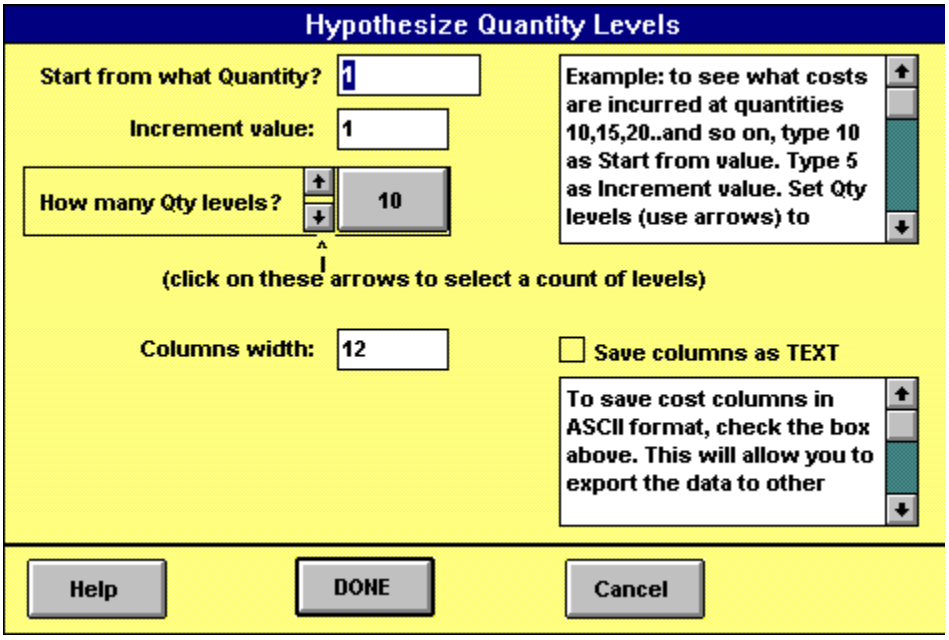
Note that you can get more information about particular output objects in INV report by opening the Hint Window (press F2 to open) and clicking once on the object you want to know about.

See also:
Understanding the output
Editing a report

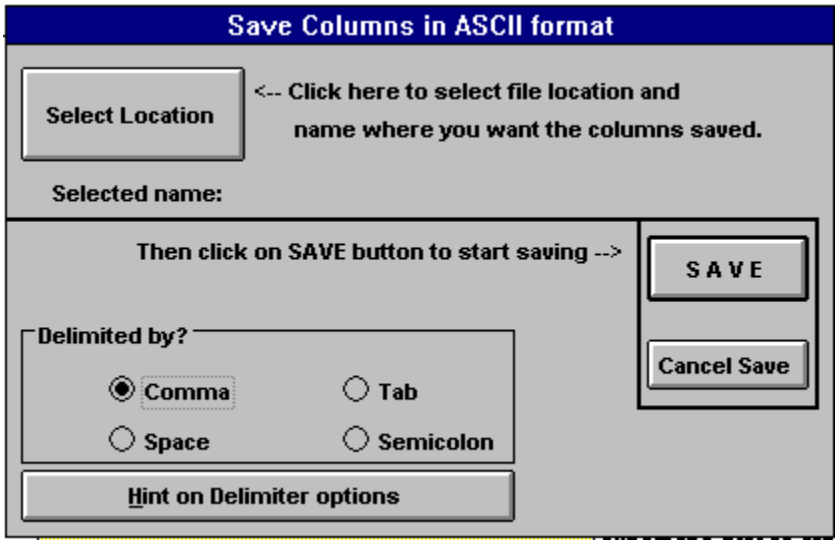
Saving Cost Columns as text

Once you have computed Cost Columns table (by choosing Analyze | Hypothesize... menu), you can also choose to save only the computed data to be either copied to Clipboard as text (so that you can paste the data into a spreadsheet for graphing), or save it in disk as a text file (so that you can import the data later into a spreadsheet/wordprocessor).

To save data in a file as text, double click on Cost Columns object (or choose Analyze | Hypothesize... menu) to bring up the following dialog.



Then check the **Save columns as text** checkbox, and click DONE.
Another dialog opens up where you choose the name of the text file and its location, the dialog is shown below:



Choose the desired delimiter (field separator) from: comma, tab, space, semicolon. A wide choice of delimiter such as this enables you to import the data accurately in virtually all applications that can import

text. Then choose the file name and location by clicking **Select Location** button. After choosing location and name, click on **Save** button. And you're done. The file is saved on the disk of your choice.

See also: Optional Analysis
Saving reports

Opening reports

INV can open any report that has been saved in inv format. However, you can save reports in both inv and text formats. The text format is supported for portability reasons. For saving options, see Saving reports.

To open a previously saved report, choose File | Open. From there you can choose to open a report from any location. If the report is already open in another copy or by another user, INV will instruct you so and will prevent opening the same file by different users simulatenously for maintaining file integrity.

If there is a report already open, INV closes the report before opening the requested report. If the currently opened report has modified since last save, INV will give you a chance to save changes before opening the requested report. You do not have to manually choose File | Close before creating a new report or opening a report, although you can.

See also: Using the Toolbar

Closing reports

To close a report, choose File | Close. INV will give you a chance to save changes before opening the requested report. When you choose File | Close, the window will be cleared and the file closed. At this point, you are ready to open or create a report.

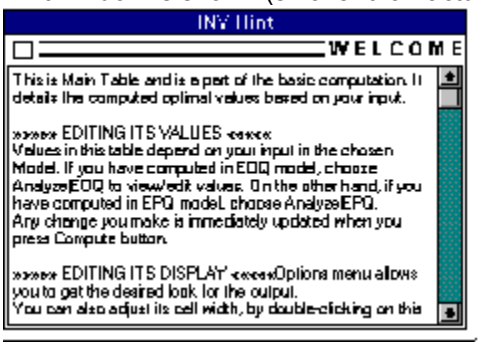
It is not necessary for you to manually close a report if you already have a report open. INV handles it for you when you choose Open or New. However, Close menu item is available to you for consistency with other applications.

See also: Opening a report , Saving a report , Using the Toolbar

Using Hint

In addition to on-line context-sensitive Help, INV also guides you with a context-sensitive Hint.

Hint window is shown (smaller than actual size) below:



The purpose of the Hint mechanism is to quickly guide you through steps, and help you identify the output objects along the way. This is very useful for new users. By default, Hint window is on, however, once you're familiar with INV program, you can choose to turn it off.
For setting Hint preferences, including the font inside the Hint window, see Customizing the program

You can explicitly invoke Hint anytime by pressing 'H' or F2 key on your keyboard. To close the Hint window anytime, click on the box located on the upper-left corner of the Hint window with your left mouse button.

You have full access to all the menu, Toolbar, and commands even when Hint window is left open on screen. This way you can perform your tasks by following the instructions in the Hint window. The Hint window content changes depending on the stage you are in, for example, when there is no report generated, Hint will hint you on how to create one; and when there is one report on screen, Hint will tell you of further options. You can also use Hint to identify output objects by opening the Hint window (if it closed, press F2 to open it), then single-click on any output object. Hint window will identify the object and tell you more about it. To get overall Hint of the application, double-click on whitespace and then look at the Hint window content. You can scroll the content and even copy it to the clipboard. To copy its content to the clipboard, hilight all or part of the contents, then press Crl-C.

Getting a solution

Choose File | New menu to prepare INV for a new report (or solution).
To create a report (or generate a solution), first decide on the item you want to solve for. For example, you might want to find out how many cans of beans you need to store in inventory such that you always have the correct amount in store and thus minimizing your inventory costs. Once you've decided on the item in your mind, you "tell" INV whether the item is produced by you or only sold by you. If you manufacture the item, you need to choose EPQ model. Otherwise, choose EOQ model.

To choose EOQ model, select Analyze | EOQ: Order model menu command.
To choose EPQ model, select Analyze | EPQ: Production model menu command.

When either of the model is chosen, a dialog for the appropriate model opens up. This dialog is all you need to get the solution. Fill in the parameters on the dialog, and choose Compute. And your solution appears instantly both detailed and simplified. Detailed description on the parameters required are included on the dialog.

See also:
Understanding the output
Concepts of inventory analysis
Output objects
Sample problems

Editing a report

You can always edit parameters in any output object, or the look of your report. If you'd made mistakes, it is easy to correct them.

How you edit depends on the object, and the type of editing you want to perform. Exact steps are explained below for each object:

Editing Report Info table:
If the object is visible on the report, double-click on it to open its input dialog. On the dialog change any value you wish, and click DONE. Display is updated immediately.
If the object is not present (because it was deleted), you can create one by choosing File | **Report Info...** menu.

It can be deleted by clicking once on the object, and then hitting the Del key on your keyboard. When deleted, the report is automatically rescaled by INV. To undelete the object (before deleting another object), choose Edit | Undo Delete.
To undelete the object after other objects have been deleted, choose File | **Report Info...** menu.

Editing Main Table:
The values on this table are all computed by INV based on your input. There are 2 ways you can edit your input values: Double-click on **Input Table** object , or choose **Analyze** | EOQ or EPQ (depending on what model is current). On the dialog change any value you wish, and click DONE. Display is updated immediately.

You can adjust the width of this table manually (INV computes auto-width for you anyway), double-click on it to open a Cell Width dialog. Follow the simple instructions on the dialog.
This object cannot be deleted.

If you'd chosen the incorrect model and generated a report on an item, and later choose to change the mode, it is very easy to do so. Simply choose the right model using Analyze menu, and INV will automatically fill in your previous input! Select Compute when all parameters are entered, and you get the solution in the new model. You can switch models at ease in INV despite the vast differences in them.

Editing Policy Summary table:
If the object is visible on the report, double-click on it to open its input dialog. On the dialog change any value you wish, and click DONE. Display is updated immediately.
If the object is not present (because it was deleted), you can create one by choosing the current model from Analyze menu and just click COMPUTE button...this will cause the object to show again.

It can be deleted by clicking once on the object, and then hitting the **Del** key on your keyboard. When deleted, the report is automatically rescaled by INV. To undelete the object (before deleting another object), choose Edit | **Undo Delete**.
To undelete the object after other objects have been deleted, choose the current model from Analyze menu and choose COMPUTE.

Editing Input table:
Same steps as editing Policy Summary table above.

Editing Sensitivity table:
If the object is visible on the report, double-click on it to open its input dialog. On the dialog change any value you wish, and click DONE. Display is updated immediately.
If the object is not present (because it was deleted), you can create one by choosing **Sensitivity** from Analyze menu.

It can be deleted by clicking once on the object, and then hitting the **Del** key on your keyboard. When

deleted, the report is automatically rescaled by INV. To undelete the object (before deleting another object), choose Edit | **Undo Delete**.
To undelete the object after other objects have been deleted, choose **Sensitivity** from Analyze menu and choose COMPUTE.

Note that the width of Sensitivity table is proportional to Main Table width.

Editing Cost Columns table:
If the object is visible on the report, double-click on it to open its input dialog. On the dialog change any value you wish, and click DONE. Display is updated immediately.
If the object is not present (because it was deleted), you can create one by choosing **Hypothesize** from Analyze menu.

It can be deleted by clicking once on the object, and then hitting the **Del** key on your keyboard. When deleted, the report is automatically rescaled by INV. To undelete the object (before deleting another object), choose Edit | **Undo Delete**.
To undelete the object after other objects have been deleted, choose **Hypothesize** from Analyze menu and choose COMPUTE.

To change the width of each column in this object, double-click on it, and on the dialog, set **Column width** field to desired value.

The following attributes can also be changed, and these affect all objects in the report:

Font/Fontsize:
Choose Options | **Font** to select any True Type font installed on your system.

Text Color/Screen Color:
Choose Options | **Text Color** to select the color for text.
Choose Options | **Screen Color** to select the color for your screen.
Note that screen color is not printable, however, text color is if your printer supports color.

Pen:
Choose Options | **Pen** and tick the desired choice to select the pen for drawing lines.

Table height:
Choose Options | **Table height** to select the height of tabular objects.

Decimal Precision:
Choose Options | **Decimals** to select the precision of the computed figures. Higher the number, more precise the figures will be.

Margin:
Choose Options | **Margins** to select the left margin of the current report.

Restoring a changed report:
There may be times when you have changed an opened report, but later decide to revert to its original state. To do so, choose **Edit | Restore original** menu. INV knows when your report has changed since last save, hence can dynamically disable and enable the menu as needed for maximum I/O efficiency.

Navigation:
You can scroll up, down, left, right using scroll bars or arrow keys on your keyboard.
PgUp and PgDown keys also are functional. In addition, Home and End keys work as follows: Home takes you to very top, End takes you to very end.

You can also "jump" to a specific object by choose **GoTo** menu. INV knows which objects are present and which are not, hence can dynamically disable and enable the menu as needed.

Display update:
INV is graphic-intensive, even the texts on screen are actually graphics. Whenever display needs to be updated, INV makes appropriate GDI calls to update the screen as quickly as possible. However, if you find that your hilighting of objects is lagging, you can quickly force INV to refresh screen by choosing **Edit | Refresh display** menu (alternatively, you can double-click on Whitespace).

See also: Customizing the output
Output objects
Using Toolbar
Customizing the program

Understanding the output

Understanding the ouput requires some understanding of the concepts of inventory analysis. Although the mathematics involved in arriving to the optimal solution is quite intricate, you only need to fill in some basic parameters without ever knowing the algorithms involved. The output is presented to you in a simple, yet accurate, and in an attractive format.

The output consists of 4 basic output objects: Report info table, Main Table (EOQ/EPQ), Policy summary table, and Input table.

You can delete all of these objects if you wish to except the Main Table. For porting it to other presentation programs, INV allows you to save the entire output in simple text format as well.

The most important objects are: Main Table, and Policy summary table.
Main Table shows precise solution of all imaginable factors. The Policy summary table summarizes the Main Table solution and presents to you in a brief, simple English syntax. If you follow the Policy summary and the Main Table solutions, you are mathematically guaranteed to make the best inventory decision for your firm.

To stretch it further, you should also compute Sensitivity analysis, and see relevant costs at various quantity levels. These 2 additional analyses can be computed independently of one another by choosing **Analyze | Sensitivity...** and **Analyze | Hypothesize...** menu commands. Selecting these menu commands yield respective dialog boxes where you fill in a few parameters and solutions appear instantly. Once again, details on each parameter is shown on the dialogs.

See also:
Output objects
Concepts of inventory analysis

Creating a new report

INV is always ready for creating a new report. That is, when INV is launched, you can immediately start to prepare a report. If a report is on screen, choose **File | New** menu and INV will close it, giving you the chance to save it if it has changed since last save.

See also: Getting a Solution

Troubleshooting

Problem	**Solution**
Part of highlighted frame remains on screen even after selecting another object, or deselecting all objects.	Double-click with your left mouse button on a whitespace and then select or deselect again.
Selective copy copies a different object than the one highlighted.	Double-click with your left mouse button on a whitespace and then select again.
Printer output cuts off right portion of the report.	Select a smaller font, or choose a landscape orientation to print side-ways.
Don't know how to close the hint window	Click on the small box on the upper-left corner of the hint window to close it. You can also set in the preferences.
I had previously computed a report but when I open it now, I don't anything in the window.	Your text and background colors may be same. Choose a different text or background color.
I had changed a previously saved report background colors may be same. Choose and I want to restore it to its previous state, but Restore Original menu item is disabled.	Your Autosave feature may be set to ON, and the time you've set for autosave has elapsed since your changes. Once saved to disk (manually or automatically), you cannot revert the file to older states.
When I run multiple copies, all the running copies get the same background color.	This is normal, and due to background color resource sharing. The actual (previous) color of each window is however unmodified in each file.
Everytime I run the program, I get a warning dialog stating that About dialog could not be loaded.	This is because the file INVABOUT.EXE is either missing or modified. INVABOUT file contains copyright information and should not be modified, moved, or deleted from the program directory. Reinstallation is necessary to fix this violation.
How do I copy text from Hint window, or from a field in a input dialog to the clipboard?	Hilight the text line(s) then press Ctrl-C together to copy to the clipboard. Ctrl-V pastes to an editable field or window.

Registration

This is your registration form. Choose File | Print, then fill it out, and mail to the following address w/ check or money order (sorry, no Credit cards).

T. Rahman 31121 Mission Blvd. Suite 190. Hayward. CA 94544

NAME:_____COMPANY:_____
POSITION:_____
ADDRESS:_____
_____

EMAIL :_____PHONE:(optional)_____

#OF COPIES REGISTERING (N):___
REGISTRATION FEE: US$10 [For diskette version, add $3.50 for cost of disk & S/H]
TOTAL REGISTRATION FEE ENCLOSED:(REGISTRATION FEE X N) US$_____

OBTAINED THIS SOFTWARE FROM: [ ] AOL [ ] Other_____

INSTALLING IN A SYSTEM WITH FOLLOWING SPECIFICATIONS (Check all that apply)

Processor: [ ] 386 [ ] 486 [ ] Pentium [ ] Pentium Pro [ ] Other_____

Windows Version: _____

[optional section]
STRENGTHS OF THIS PROGRAM:

WEAKNESSES OF THIS PROGRAM:

COMMENTS:

Understanding the Initialization file

All INV application preferences are stored by INV inside its own Initialization file named **INV.INI** located in your **C:\INV** directory. This file is read and written to by INV during startup of the application and even during the application is running. If the file is deleted or missing, INV uses its own internal settings to ensure that all works well even without its existence, however, your preferences would be lost.

You can set almost all preferences, simply by choosing **Options | Preferences...** menu and set your choices graphically without worrying about the initialization file. It is not necessary for you to understand the parameters in INV.INI unless you want to tap into a few settings not included in the Preferences dialog.

INV gives you the ability to create your own menu items and associate your own applications with those menus. You can also set default application font, and font size. To explore these hidden powers, you need to understand the parameters of INV.INI.

INV.INI Parameters:

[PRECISION]
Decimals=2
This controls the precision factor in your report.
INV automatically writes this value according to your setting in Preferences dialog.

[MARGIN]
Left=2
This controls the margin factor in your report.
INV automatically writes this value according to your setting in Preferences dialog.

[INITIALMODEL]
Model=1
This controls the default model INV sets to whenever it is launched.
1 means EOQ, 2 means EPQ.
INV automatically writes this value according to your setting in Preferences dialog.

[TABLEHEIGHT]
Height=1
This controls the default height of each table.
INV automatically writes this value according to your setting in Preferences dialog.

[WORKINGDAYS]
Workdays=365
This controls the default number of days you (or your company) work in a given year.
INV automatically writes this value according to your setting in Preferences dialog.

[OPTIONS]
Autosave=1
This controls whether autosave is On or Off. 1 means On, 0 means Off.
INV automatically writes this value according to your setting in Preferences dialog.

HF=14
This controls the default font in Hint Window.
INV automatically writes this value according to your setting in Preferences dialog.

AF=arial
AFSZ=10

These parameters are NOT set in Preferences dialog, but you can manually type your desired values on the right side of the equation in INV.INI. Use Windows Notepad to open INV.INI, edit these parameters if you want additional control over INV.
AF value defines the default application font. You must type in a valid font name as they appear in Windows Fonts dialog. It is not case sensitive.
AFSZ value defines the default application font size. You must type in a valid range (8 to 12).
If any value is found to be invalid, INV uses its own default values.
AF and AFSZ values are read every time File | New menu is chosen, and whenever INV is launched.

[SIZE]
TOOLBAR=1
HW=0
X=0
Y=-3
WD=646
HT=486
These control the INV window size, position, and toolbar visibility.
Do NOT edit HW,X,Y,WD,and HT parameters. You can edit TOOLBAR value to either 1 or 0. 1 means it is visible when INV is launched, 0 means it disappears.
INV automatically writes this value according to your setting in Preferences dialog.

[AUTHOR]
NAME=
This controls the default author's name.
INV automatically writes this value according to your setting in Preferences dialog.

[CL]
exec=calc.exe
MENUtxt=&Calculator
These parameters are NOT set in Preferences dialog, but you can manually type your desired values on the right side of the equation in INV.INI. Use Windows Notepad to open INV.INI, edit these parameters if you want additional control over INV.
exec value defines the name of the executable file that will be launched when you choose Tools menu and the first menu item (where Calculator is by default).
By default, it is calc.exe file, but you can choose another application to be launched instead. For example, to launch Windows Calendar, type exec=calendar.exe
The executable file MUST exist. You can include full path if the file does not exist in C:\INV or your Windows directory.
MENUtxt value defines what the menu item will be shown as. By default, INV shows the first menu item as "Calculator". As you change the executable name, you will probably want to change the item text also. For instance, for Calendar, you might call the menu item "Calendar", so type
MENUtxt=&Calendar
There parameters are read when whenever INV is launched, hence to see changes, you must quit INV and relaunch it.

[CB]
exec=clipbrd.exe
MENUtxt=Clipboard &Viewer
These parameters are NOT set in Preferences dialog, but you can manually type your desired values on the right side of the equation in INV.INI. Use Windows Notepad to open INV.INI, edit these parameters if you want additional control over INV.
exec value defines the name of the executable file that will be launched when you choose Tools menu and the second menu item (where Clipboard is by default).
By default, it is clipbrd.exe file, but you can choose another application to be launched instead. For example, to launch Notepad, type exec=notepad.exe
The executable file MUST exist. You can include full path if the file does not exist in C:\INV or your Windows directory.
MENUtxt value defines what the menu item will be shown as. By default, INV shows the second menu item as "Clipboard Viewer". As you change the executable name, you will probably want to change the item text also. For instance, for Notepad, you might call the menu item "Notepad", so type
MENUtxt=&Notepad
There parameters are read when whenever INV is launched, hence to see changes, you must quit INV and relaunch it.

WARNINGS:

Note that you can change the right side of the equations (values), but not the left-side parameters or section name (that appear in [brackets]). If you change the left-side or section names, INV will ignore their values and use default values instead.
Although, INV gives you the power to launch your own choice of applications from [CB] and [CL] sections, you must be careful not to launch them multiple times as you may run out of memory. That is, if you edit the first menu item under tools ([CL] parameters) to be Notepad, and you choose the menu command a second time, a second copy of Notepad will be launched (eating up more memory)...so before you launch applications this way, make sure it is not already running, if it running, switch to that application by pressing Ctrl-Esc together and then choose SwitchTo. If you didn't edit these parameters from original INV settings, you don't have to worry about the memory factor because INV searches these applications for you to ensure multiple copies aren't inadvertently launched.

It is also important for you to know how to disable a parameter, to do so, simply place a semicolon at the beginning of the line. You can also place your comments starting with a semicolon. For example, to disable the line
exec=clipbrd.exe, you type
; exec=clipbrd.exe
It is recommended that you disable lines instead of deleting it altogether, that way, you can always refer to previous settings.

See also: Customizing the program

Overview of the program

What is it?

INV (Acronym for Inventory, pronounced I envy) is an inventory analysis program for Windows3.1+. While other inventory programs merely store inventory information, INV analyzes your inventory to save you money like no other tools. And it does so in an attractive, thoughtful user-interface that makes *you* productive.

Because of INVs ability to analyze thoroughly your inventory, it provides the best (optimal) inventory policy specifically for your organization. By implementing proven economic models, INV yields all necessary information you need in a clear, easy-to-understand, and customizable format. INV evaluates your present inventory by providing exact costs by item, and then offers you the money saving inventory policy that you should follow. It even shows exactly how much you can save by following the suggested policy.

How does it work?

Inventory analysis requires numerous calculations to provide all necessary information. Normally, it takes a consultant and many hours of number crunching to yield the results that INV can yield in minutes. The best part is you need not be an expert in this area, and you dont need much time or money to evaluate your inventory.

Just provide INV very basic information about your inventory, and INV will generate detailed information automatically without you ever having to understand or compute the calculations involved.

Once you get the basic output, INV offers additional analyses that can be incorporated with the existing report. To help you get the right look, INV gives you strong control over the report color, look, etc. And to facilitate data exchange between applications, you can also use the clipboard or ASCII file exchange.

Who should use it?

Managers of small to large companies will appreciate the usefulness of the program as it can save the organization remarkable amount of money in inventory costs. However, because of its ease of use and accuracy, economic/business students, instructors of universities will also enjoy the program and find it indispensable. Regardless of the nature of your business, whether you are in production or ordering business, INV can be successfully used to analyze your inventory.

Program Features:

Here are some (not all) of the features included

* Mathematically proven inventory analysis methods
* Smart hint (context-sensitive guide to get anyone started)
* Supports both order and production models
* Complex math made easy with minimum input and an user-friendly interface
* Highly customizable to suit your needs
* WYSIWYG (and color) technology implemented
* Autosave feature
* Scalable output objects
* Floating resizable toolbar with access to powerful functions via graphical buttons
* Versatile look-and-feel for each report
* Several data exchange options (clipboard, ASCII exchange)
* Selective clipboard copying of graphical objects
* Super fast execution
* Tiny size of saved reports (regardless of number of colors, output sizes, objects)
---each report takes just735 bytes!
* Extensive context-sensitive Windows help with illustrations and pop-up definitions

* Handles huge numbers for both input and output without overflow
* Presentation quality reports ready to be saved and printed
* Requires very little computer resources
    - 1MB available RAM is adequate
    - Windows 3.1 or higher
    - Printer optional (recommended)
    - Sound card/driver optional
    - Color optional (recommended)
    - 386 or higher processor

See also: Concepts of Inventory Analysis

Concepts of Inventory Analysis

INV does not attempt to teach the concepts of inventory analysis, however, it simplifies greatly the efforts required to optimize your inventory. A brief overview of the theories and concepts behind the inventory analysis is presented here as they're the foundation of this program's calculations.

Every business, big or small, maintains inventories of one kind or another. Inventory is a stock of some goods stored and maintained by a business in the hope of meeting high demands in the future. The company may be manufacturing the goods or only selling the goods manufactured by another company. At either scenario, inventory is maintained, and costs are incurred due to it.

There is a strong correlation between Inventory levels of businesses and overall general economic trend, as healthier economy leads to higher inventory (as demands increase), and poor health leads to reduction in inventory. It has been evident from statistics that numerous companies fail to recognize the financial impact of inventory and thus ignore to monitor it periodically. Most companies only calculate inventory on-hand at year end, and does very little to manage or realize its costs. As inventory increases (company grows), it becomes humanly impossible to keep track of all inventory costs, consequently costs become quickly unmanageable and even undetectable. The proper approach is to devise a discipline inventory tracking system that not just counts inventory, but can compute how many items need to be stocked, when, and how much it is costing the business. The savings from inventory can be quite significant and with the help of mathematics and economics, a flexible solution can be devised that can address varying demands, ordering schemes, business sizes, inventory size and space, and different types of businesses. In short, every company, big or small, must perform a formal inventory analysis periodically, if they can afford it.

High levels of inventory makes production planning easy, it protects a business from anticipated production facility shutdown, malfunction, and slowdown. However, the higher the inventory, the higher the costs. Money tied up in inventory cannot be used anywhere else (opportunity cost). Besides, high inventory will eventually cause its products to be priced higher. On the other side of the coin, too little inventory leads to production delay, delivery delay, and consequently lost sales.

Therefore, the challenge is to find the level of inventory that is optimal---not too much, not too little. Only by reaching the optimal level can a business ensure that its inventory cost is kept to a minimum while meeting the demands comfortably.

For further reading on this subject, refer to these books:

Greene, J. H. *Production and Inventory Control Handbook*
Starr, M. K. and D. W. Miller. *Inventory Control: Theory and Practice*
Lawrence L. Lapin, *Quantitative Methods for Business Decisions*
Weiss, H. J. and Gershon, M.E. *Production and Operations Management*

Sample problems

Here are a few sample problems to exemplify how real-life problems can be entered into INV to obtain the optimal solutions. Remember that with incorrect input values, the output will also be incorrect.

EOQ Example 1:
Happy Cavern sells 200 bottles of wine per day, at a price of $8.99 per bottle. The store's holding cost is $1 per bottle per month. The order cost is $35 every order. Happy Cavern works 255 days per year.

Wanted:
Find the number of bottles Happy Cavern should order such that it keeps up with the demand, and yet minimizes its inventory costs.

Solution:
Choose EOQ from Analyze menu.
In the input dialog, enter the following:

Procurement cost: 8.99 Per: 1
Order cost: 35
Holding cost: 12 per year
Notice here, that Holding cost must be expressed in yearly figure, and since there are 12 months in a year, we multiply $1 by 12 to get yearly value of $12.

Set the radio control Holding cost to : Fixed
Demand: 200 Per: Day
Working Days: 255
Lead Time: 1 (default)
Allow Backorder: No (default)
and click Compute...and you're done!
INV solves everything for you and shows the following (among other values):

```
SUGGESTED POLICY TO MINIMIZE YOUR COSTS:
 (1) Order 545 units at every batch order.
 (2) Place order when inventory level reaches 200 units.
      Or, every 3 work days whichever occurs first.
 Presently, your Yearly Relevant costs= $10125.000
 It can be reduced by 35.356% (or $3579.773) if above policy is followed.
```

So, in this example, we have the potential of cutting inventory costs by 35%!!

EOQ Example 2:
This is an extension of the above example.
In the previous example, we have assumed that the shop will be selling 200 bottles. That is we have made an educated guess (based on past and current data) on future demand, which can often be off the mark. With this token, it is equally important to quantify what our inventory costs would be if we guess demand incorrectly and consequently order the 'wrong' quantity.

Wanted:
We want to evaluate inventory costs when we make an ordering mistake and overorder by 30% (relative to solution found above).

Solution:
Choose Sensitivity from Analyze menu.
Click on Overorder. Then type 30 next to Overorder by:
Next, tell INV that 30 is to be interpreted as a percent (as opposed to units), so click on Percent (%).
Click DONE...and you're done!!

The following results are generated in a table by the program:

```
SENSITIVITY TABLE:
 Effects of Ordering 709 units (OVERORDER):
                       Ratio (new costs/optimal costs) 1.035
                    Additional Costs over optimal (%) 3.462
  Yrly Relevant Cost at new qty [fixed costs only] ($) 6771.793
```

As you can see, 30% overordering (i.e. (545 * 0.30) + 545=709 units) adds 3.46% to your inventory costs. Which translates to $6771.793 in yearly relevant costs.

Exercise:
Do costs go up or down if you had underordered (instead of overorder) by 30%?

EOQ Example 3:
This is an extension of the above example.
Here we want to accomodate the fact that customers can place backorders on wine. That is, customers can place an order for wine bottles even though the store might not have it on hand at the time of the order. This is referred to as Backorder.
When Backorder is taken into account, a Service Level is required to compute cost of being an item short due to lost sales, goodwill (also called annual Shortage Penalty).
Suppose Happy Cavern aims for meeting about 85% of the customers demand immediately, and the remaining 15% can place backorders, then its Service Level is 85.

NOTE: Convenience products cannot be backordered. Backorder is applicable only in EOQ model.

Wanted:
We want to recompute all inventory costs and find the optimal solution taking Backorder and Service Level into account.

Solution:
Choose Analyze | EOQ menu to bring up input dialog.
Click on Yes under Allow Backorder? group. And type 85 in Service Level field.
Click Compute.

The new solution is immediately computed and your report is updated by INV.

Exercise:
How are costs affected by different Service Levels?

EOQ Example 4:
This is a continuation of the above example.
In this example, we take into the length of time it takes for Happy Cavern to receive its order from its wine supplier. So far, we have computed solution using Lead Time=1; however, we want to get accurate results when it takes longer to receive the shipment.

Wanted:
We want to recompute all inventory costs and find the optimal solution taking Lead Time into account suppose Lead Time = 3 days.

Solution:
Choose Analyze | EOQ menu to bring up input dialog.
Type 3 in Lead Time field.
Click Compute.

The new solution is immediately computed and your report is updated by INV.

EPQ Example 1:

StrungOut produces electric-guitar strings. It has the capacity to produce at the rate of 125,000 units per year. Annually, StrungOut supplies (to the resellers, and others) 85,000 units. Each production run costs $1000 to set up, and the variable cost of each unit is 50 cents. The company has decided that its Holding cost is 15% of the variable cost per item. Assume 252 working days.

Wanted:
Since the company is in manufacturing business, we will use EPQ model.
All EPQ relevant costs and information based on the above data.

Solution:
The capacity to produce is its Production Rate. (=125,000/yr)
The annual number of units supplied is its Demand. (=85,000/yr)
The cost of each production run is its Setup Cost. (=$1,000/production)
The variable cost per unit is Procurement cost. ($0.50/item)
Holding cost is 15 %.
Working Days=252

Select Analyze | EPQ...
Type 0.5 in Procurement cost field. And type 1 in Per (because it is per item).
Type 1000 in Setup Cost field.
Type 15 in Holding Cost field. And click on % of Procurement cost radio control.
Type 125000 in Production Rate field. And set Per field to Year from the list.
Type 85000 in Demand field. And set Per field to Year from the list.
Type 252 in Working Days field.
Click Compute.

Several tables are generated by INV, only the main table is shown below:

```
MAIN TABLE: >> EPQ MODEL SOLUTION <<
ALL VALUES IN THIS TABLE ARE *OPTIMAL*

                      Quantity to produce (units) 84162.541
             Number of production runs (per year) 1.010
      Time between production runs (in work. days) 249.517
                   Maximum inventory level (units) 26932.013
                   Average inventory level (units) 13466.007
                   Days in pure consumption (days) 79.845
                    Days in pure production (days) 169.672
             Pct. of time in pure consumption (%) 32.000
              Pct. of time in pure production (%) 68.000
       Yearly Relevant Cost [fixed costs only] ($) 2019.901
      Yearly Total Cost [fixed+variable costs] ($) 44519.901
```

EPQ Example 2:
This is a continuation of the previous example.
Now that we have the optimal solution, we want to know all costs (Holding, Setup, Relevant costs) at various quantity levels. This will help us understand the scenario better.

Wanted:
Find all costs at quantity levels 8000, 8200, 8400, 8600, 8800.

Solution:
Choose Analyze | Hypothesize menu command.
Type 8000 in Starting From field.
Type 200 in Increment value field.
Set How many Qty levels to: 5 by clicking on the up and down arrows next to the field.
Click DONE.

The solution is placed at the end of your report instantly by INV, the output is referred to as Cost Columns table (see below). Note that Relevant cost is the fixed part of the inventory cost regardless of procurement cost.

Qty	Holding($)	Setup($)	Relevant($)
8000	96.000	10625.000	53221.000
8200	98.400	10365.854	52964.254
8400	100.800	10119.048	52719.848
8600	103.200	9883.721	52486.921
8800	105.600	9659.091	52264.691

Exercise:
What is relationship between Holding cost and Setup cost (proportional or inverse)?

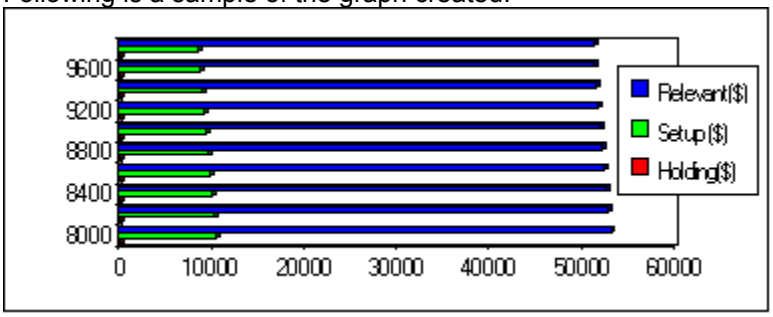
EPQ Example 3:
This example illustrates data interexchange.

Wanted:
Here want to graph the Cost Columns table data generated by INV (previous example) using Microsoft Excel (for Windows).

Solution:
Double-click on Cost Columns table on INV report to bring up its dialog.
Check On Save as text option on the dialog (not the menu)...another dialog pops up.
On the second dialog, click Select location, and give it the name C:\INV\COSTS.TXT
and hit ENTER.
Now click Save to actually save the column data into the above named file.

Then start Excel (you can quit INV if you like at this point).
From Excel's File menu, choose Open. On the open dialog, click on Text button.
Select Column delimiter to Comma (or whatever you'd set in the INV program). Click OK.
Choose C:\INV\COSTS.TXT file (you may need to change the List of File Types to *.*) and click OK.
Excel opens a new worksheet with the data columns appropriately arranged.
To graph it, hilight all the imported data and click on Graph Wizard button and choose Category (X) Axis Labels. Refer to Excel documentation on exact steps to create an Excel graph.

Following is a sample of the graph created:



Report Info

This is Report info table. Generated by File | **Report Info....** command.

EOQ Main Table

This is Main table generated via EOQ model solution. It contains computed solution for the item.

EPQ Main Table

This is Main table generated via EPQ model solution. It contains computed solution for the item.

Policy Summary Table

This is a summary of the policy generated via either EOQ or EPQ model solution. It contains solution and explanation for the item and what policy you need to follow in order to achieve the optimal savings.

Input Table

This is Input table showing the parameter values that the solution is based upon. It shows how your input has been interpreted by INV.

Sensitivity Table

This is Sensitivity table generated with Analyze | **Sensitivity...**command.
It shows you how sensitive your inventory costs are to "mistakes". By "mistakes", we mean either ordering too many units or too little (if in EOQ) as compared to computed optimal units; or producing too many units or too little (if in EPQ). Its implication is important since often demand is unknown or unpredictable.

Cost Columns Table

This is Cost Columns object and is a part of advanced computation.
This object is generated through Analyze|**Hypothesize** menu command.
It shows you all costs at any quantity level or at a series of quantity levels helping you determine inventory costs at contemplated quantities.
Each row represents a hypothesized quantity (to produce or order depending on the model) and columns represent different inventory costs at each quantity. This layout is suitable for plotting a graph, or detecting the rising/falling tendencies of costs with varying quantity levels.

In addition to copying this table to the table, you can also save its data into a text file with different delimiter choices for later use.

Disclaimer

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For technical support or questions on other software, email to: TANMAN1129@aol.com

Thank You.

See Registration