

User Manual for the Value at Risk program

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Chapter 1

Program Usage Instructions

1.1 Requirements

The Value at Risk program has been successfully tested for use on a machine running Java version 1.7.0_40. Any Java version above 1.7 should be able to run this program. No other specialist software is required to run the program.

A copy of the Java package is available at <https://www.java.com/en/download/>.

1.2 Launching the program

Please obtain the runnable jar file from the project repository at <https://svn.cs.rhul.ac.uk/personal/zvac052/Value%20at%20Risk/main/> and download the ValueAtRisk.jar file. Double-click the jar file to launch the program.

In order to use the ‘Sample Portfolio’ contained in the program upon start-up, please also download a copy of the testing folder to the same directory as the jar file.

If you have not yet obtained historical stock price data you can download it for some stocks from <http://uk.finance.yahoo.com/> and searching for a stock next to the ‘Look Up’ button. Once a stock has been found, click on ‘Historical Prices’ under the left-hand section where it is possible to define a date range to download data for. Select the date range and click ‘Get Prices’ and then scroll to the bottom of the table to find the link ‘Download to Spreadsheet’. Upon clicking this link, a Comma Separated Values (csv) file should be available to save in a location of your choice, which you can then use in the program.

Otherwise, some recent historical stock price data is available in the testing folder of the repository mentioned above.

1.3 User Manual

Upon launching the program, you will be presented with the main screen of the program, see figure 1.1. Here you are able to see the ‘VaR’ and ‘Model Testing’ tabs.

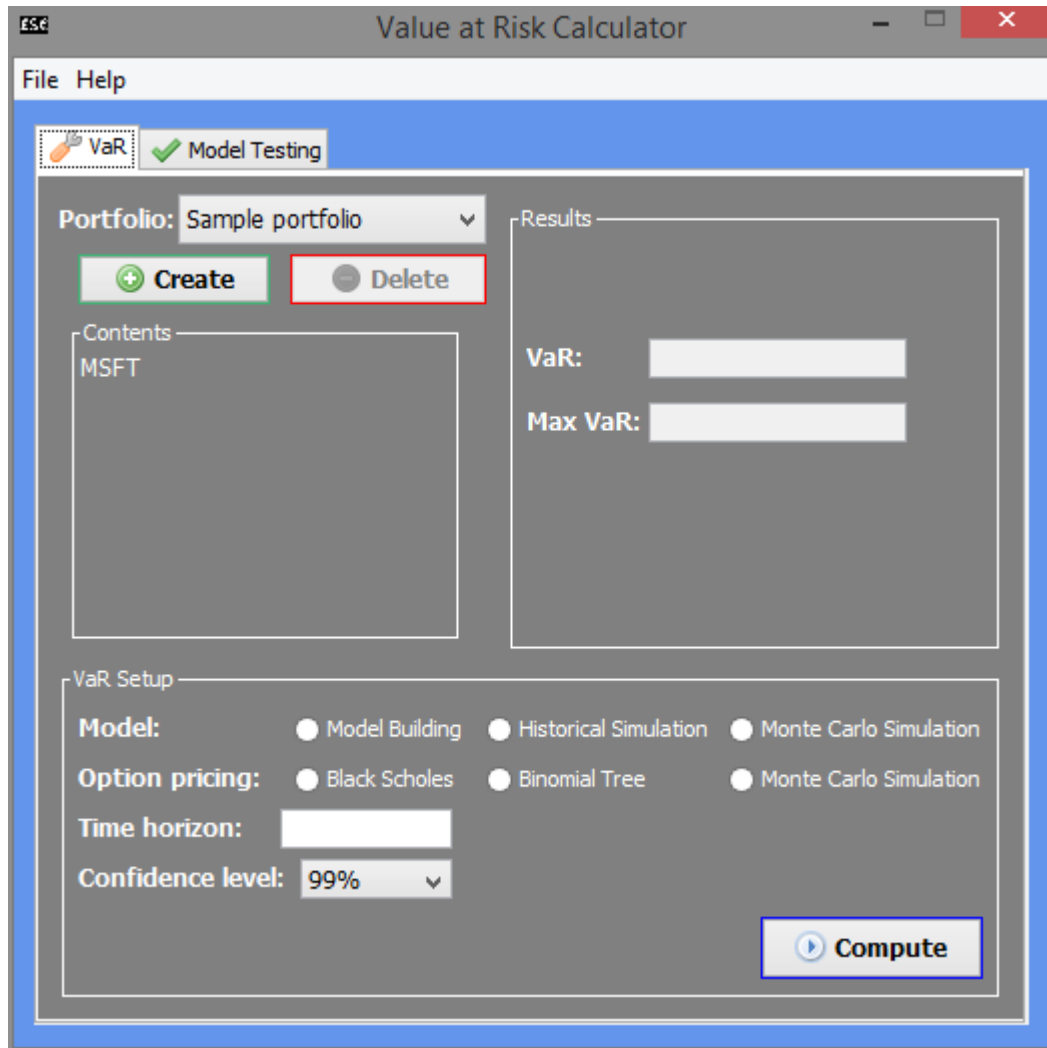


Figure 1.1: Program when launched

1.3.1 VaR

The ‘VaR’ tab has all the tools necessary for a user to compute the Value at Risk of a portfolio. It contains (anti-clockwise from top-left):

- portfolio selection drop-down menu

- button to create a new portfolio, labelled ‘Create’
- button to delete the selected portfolio, labelled ‘Delete’
- panel labelled ‘Contents’ which displays the contents of the currently selected portfolio
- panel labelled ‘VaR Setup’ to allow specification of the VaR computation for the selected portfolio
- panel labelled ‘Results’ to show the computed Value at Risk and the maximum VaR (if applicable).

1.3.2 VaR Setup panel

The VaR setup panel allows the user to specify exactly the parameters for VaR computation for the portfolio selected from the drop-down menu.

The ‘Model’ buttons represent the VaR model to be used for VaR computation.

The ‘Option pricing’ buttons represent the type of algorithm used when pricing options in the computation of VaR for the selected portfolio.

The ‘Time horizon’ text box allows the user to specify the number of days to compute VaR over, e.g. 1, 2, 5, 10 etc.

The ‘Confidence Level’ drop-down menu allows the user to specify the confidence at which to compute VaR.

The ‘Compute’ button will initiate the computation of VaR using the defined parameters for the selected portfolio and display the VaR computations ‘Results’ panel.

PLEASE NOTE: Option pricing is not available within the Model Building VaR model. The program will disable the ‘Option pricing’ buttons and inform you of this when ‘Model Building’ is selected.

1.3.3 Results panel

The ‘Results’ panel displays two types of VaR computed for the selected portfolio.

‘VaR’ is the standard VaR measure and is computed for every selected VaR model.

‘Max VaR’ is the maximum VaR experienced during the Historical Simulation and Monte Carlo Simulation calculations and, thus, it will only be available when those models are selected for VaR computation.

1.3.4 Creating a portfolio

The ‘Create’ button under the portfolio selection drop-down menu opens a new dialog to allow the user to create a new portfolio, see figure 1.2. To

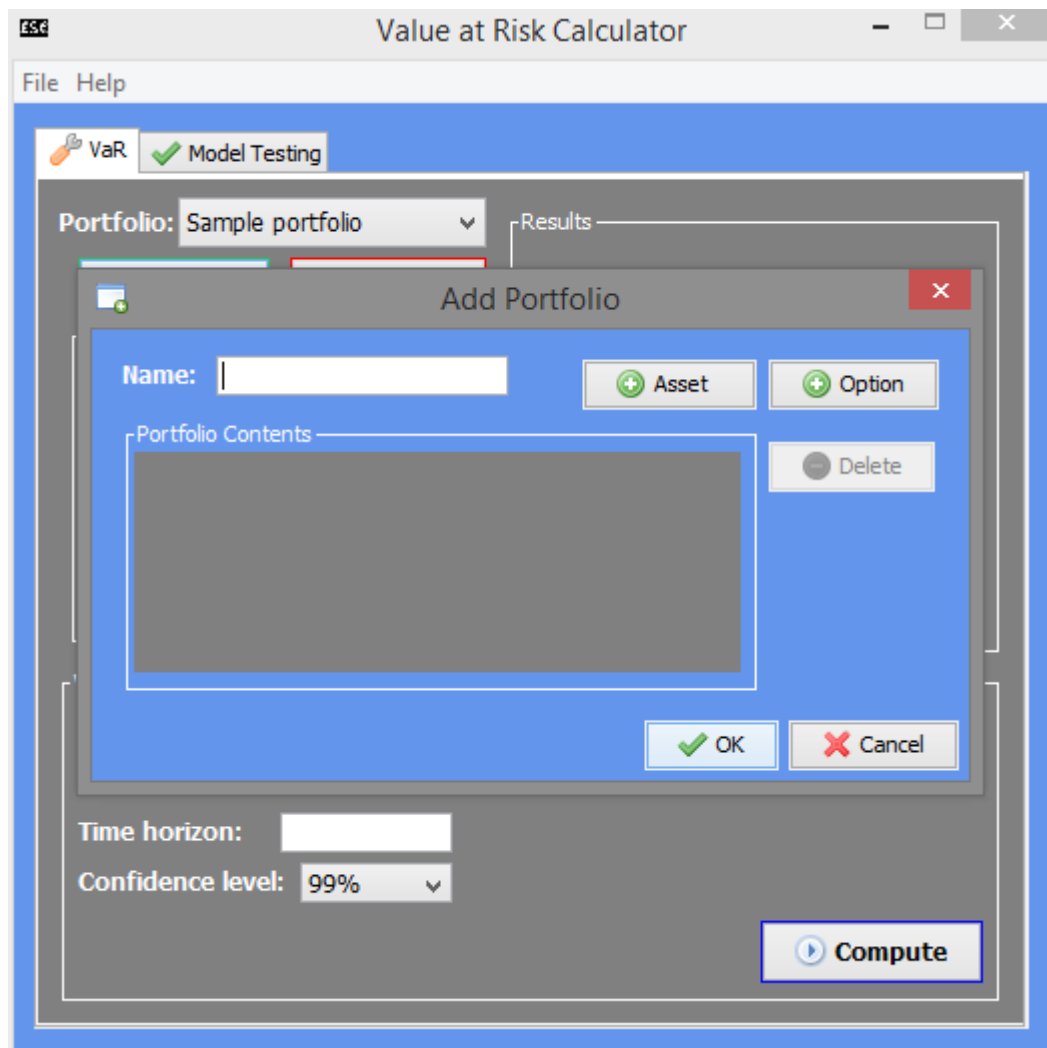


Figure 1.2: Creating a new portfolio

create a portfolio it is necessary to provide a portfolio name and at least one asset. Omission of a name or asset will result in a message being displayed to inform about missing data, see figures 1.3 and 1.4.

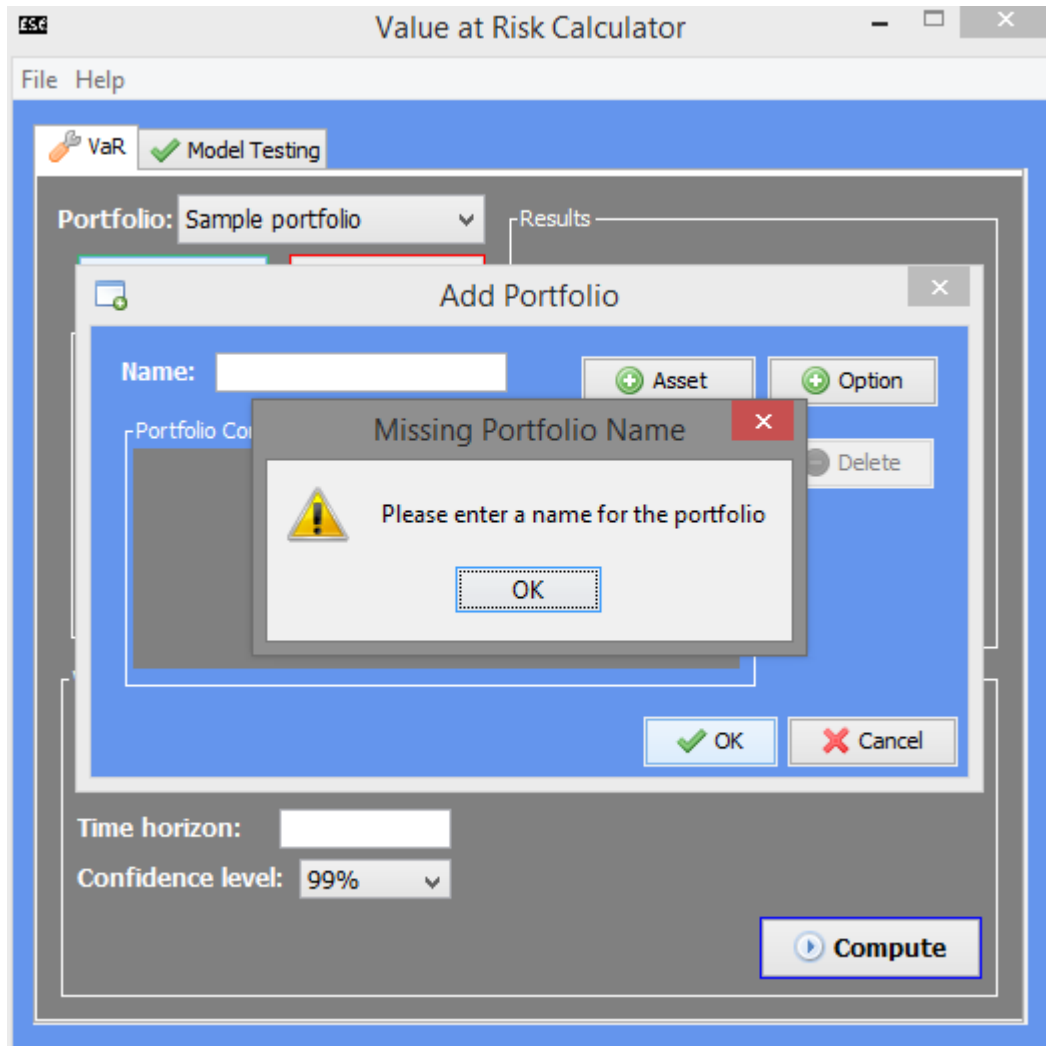


Figure 1.3: Missing portfolio name

An asset can be added to the portfolio by clicking the 'Asset' button in the dialog. This opens new dialog to allow for an asset to be configured. All fields are mandatory in the 'Add Asset' dialog, see figure 1.5.

To add historical stock price data, click on the 'Browse' button. This opens up a file browser which shows only the files of the 'Comma Separated Value' (csv) type as these are the types of the files which contain historical stock price data, see figure 1.6.

Once the file containing historical stock price data is found, double-click

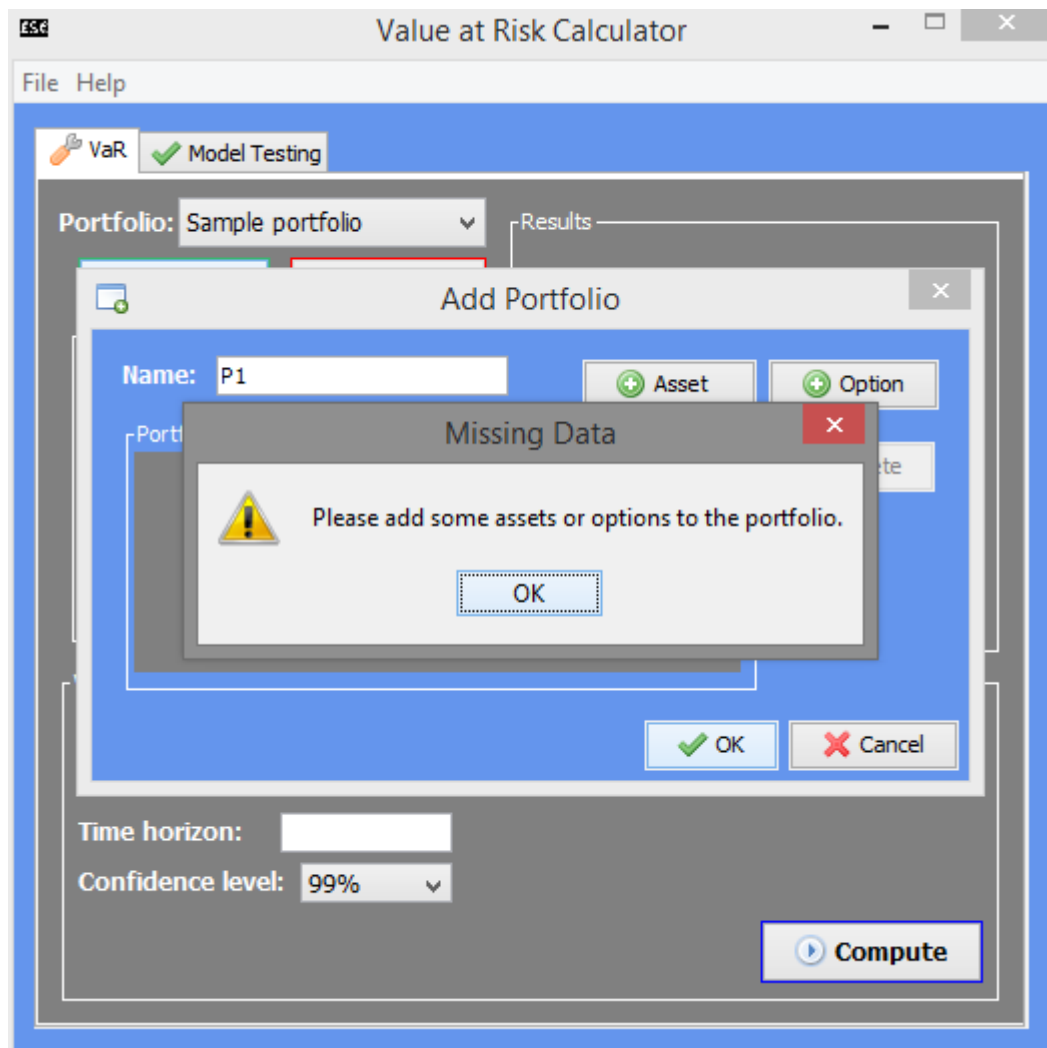


Figure 1.4: Empty portfolio

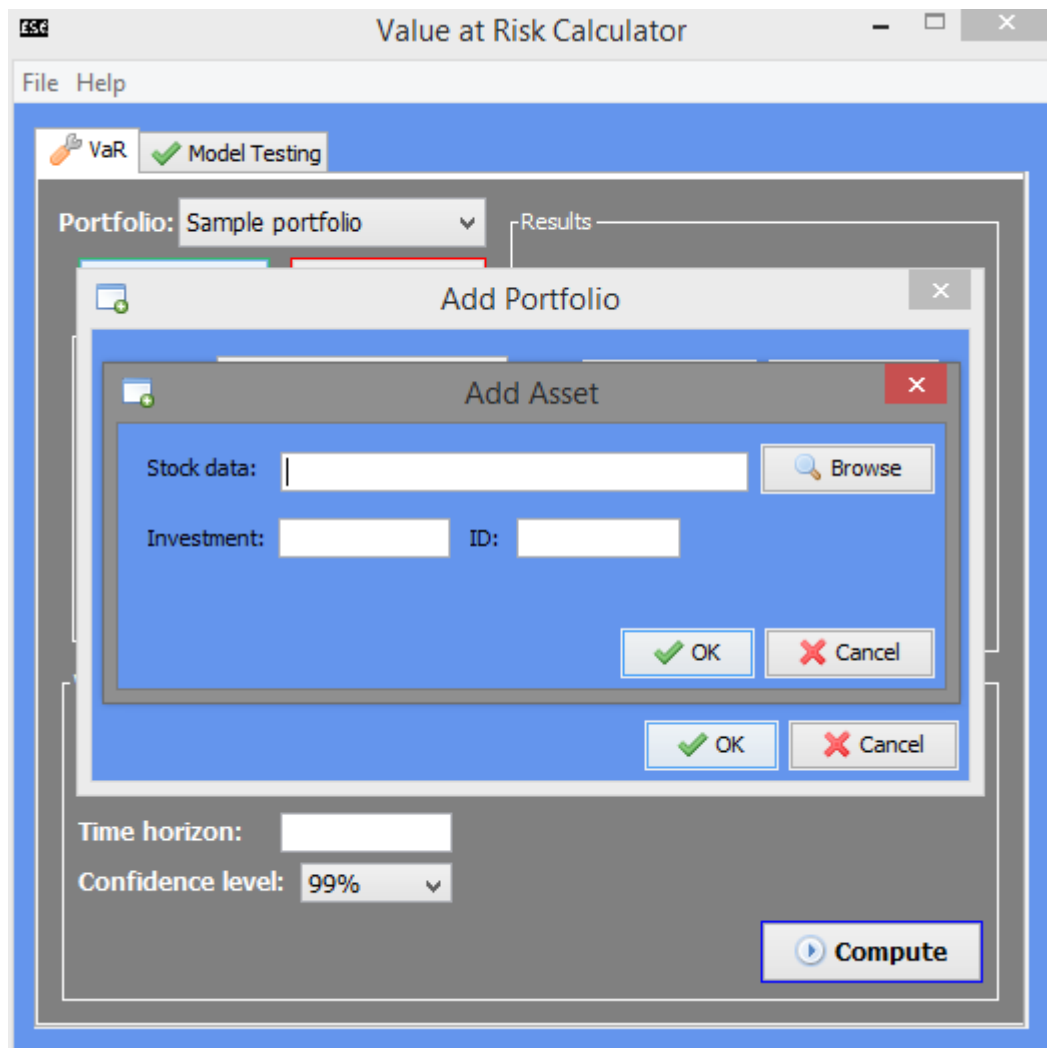


Figure 1.5: Adding asset to portfolio

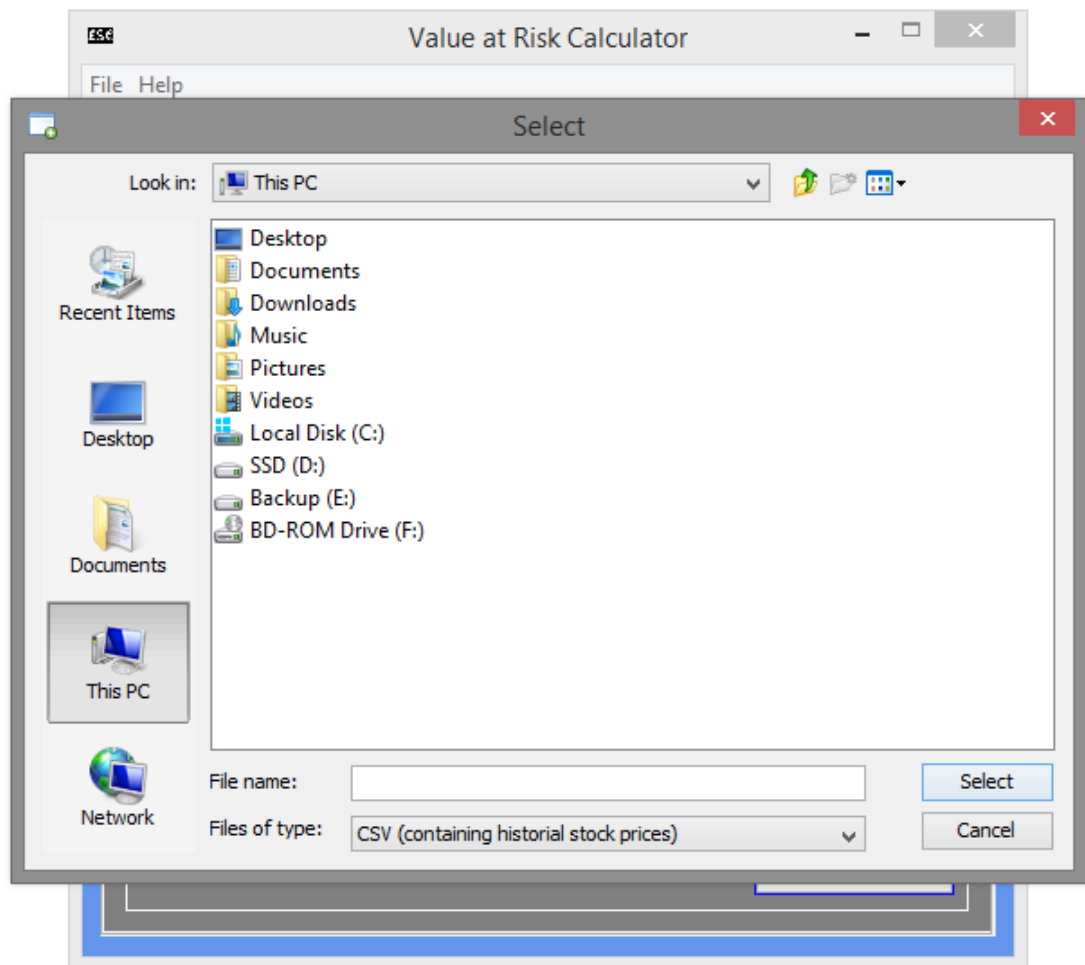


Figure 1.6: Adding historical stock price data for asset

on the file or click ‘Select’ to add it to the asset. Then, provide the investment made and an identifier (name) for the asset, see figure 1.7.. Clicking ‘OK’ will add the asset to the portfolio and the asset will be shown in the portfolio contents, see figure 1.8.

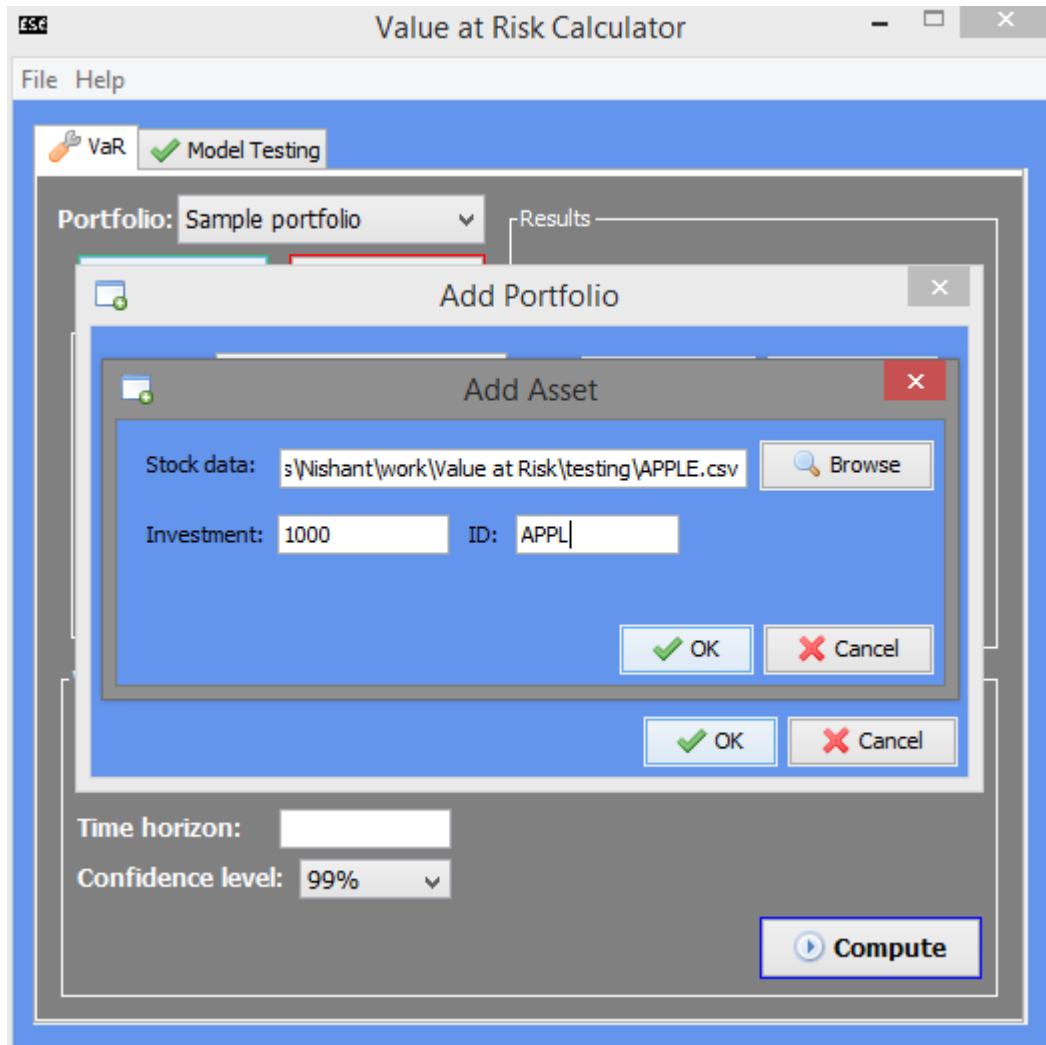


Figure 1.7: Adding asset to portfolio

Adding options to the portfolio follows a similar pattern. Clicking ‘Option’ in the ‘Add Portfolio’ dialog will bring up a dialog asking for the parameters of the option, see figure 1.9. All fields are mandatory here.

The added option will also be shown in the portfolio contents, see figure 1.10.

It is also possible to remove an item from the portfolio during its creation. Selecting an item from the ‘Portfolio Contents’ list and clicking ‘Delete’

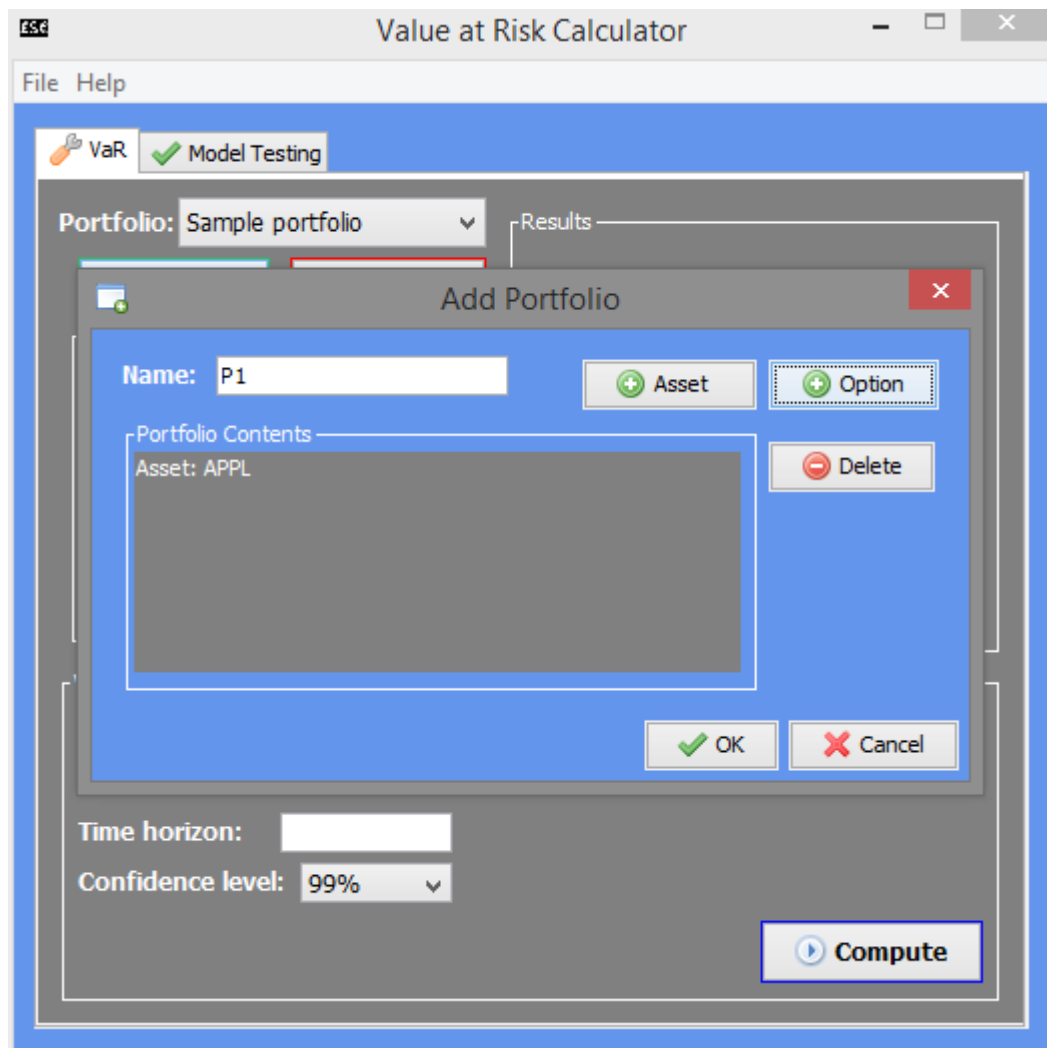


Figure 1.8: Added asset shown in portfolio contents

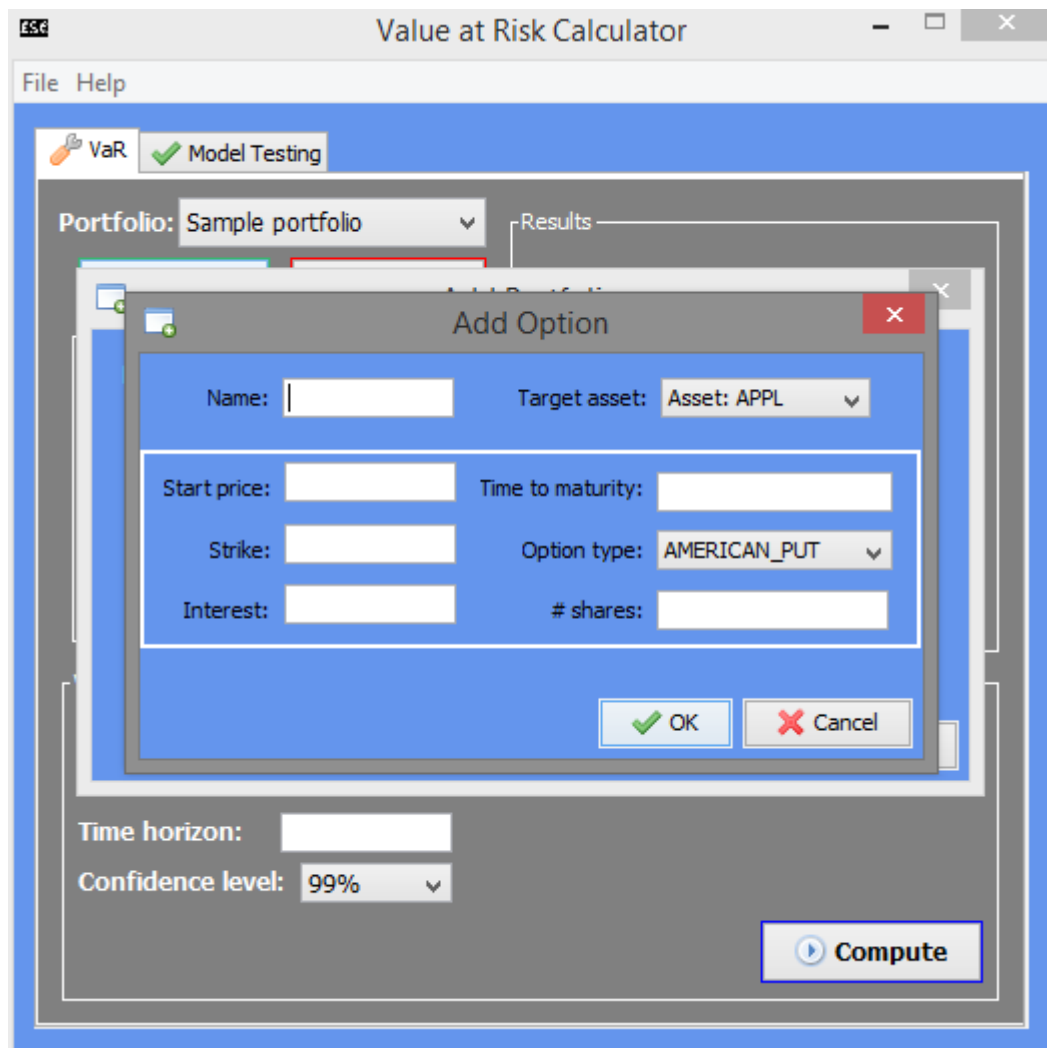


Figure 1.9: Adding option to portfolio

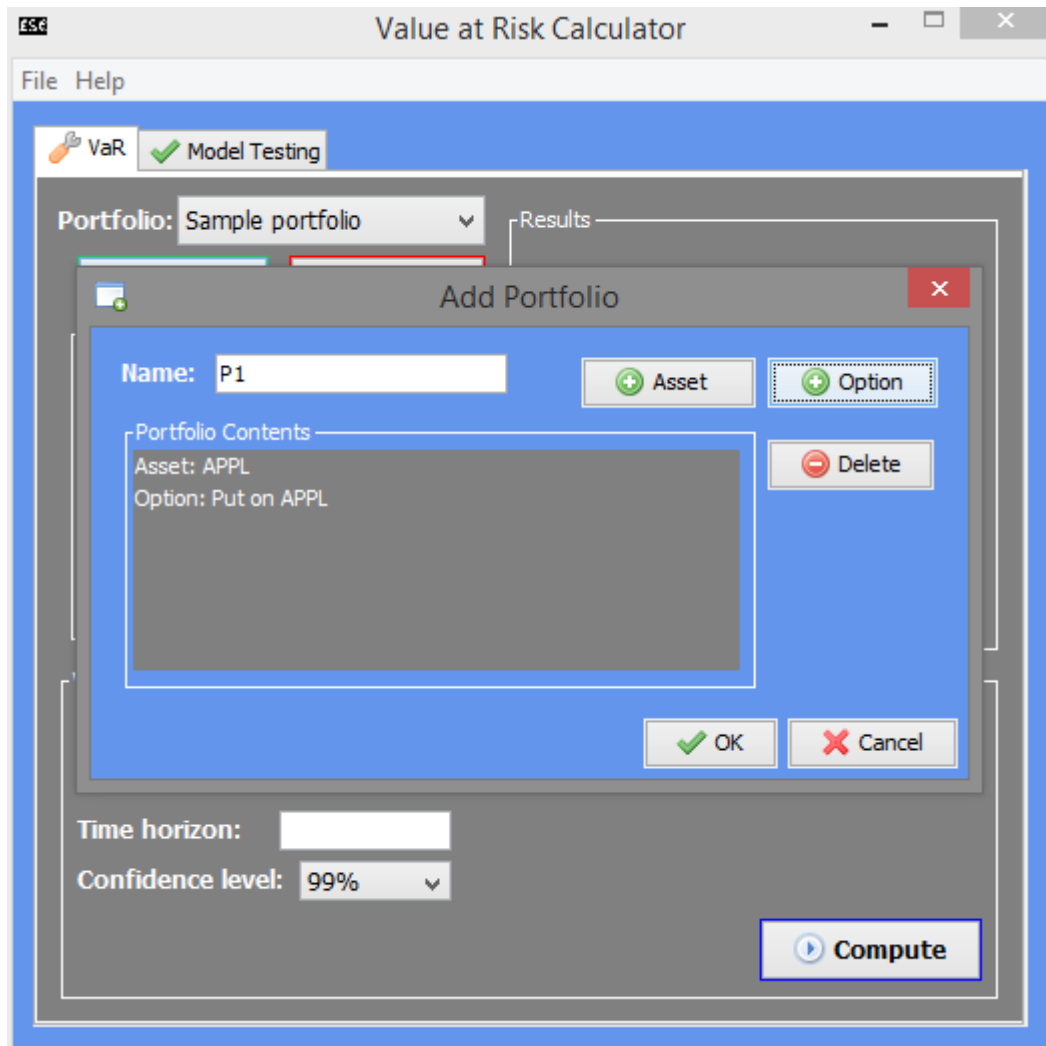


Figure 1.10: Added option shown in portfolio contents

will remove the item from the portfolio after a confirmation, as shown in figure 1.11.

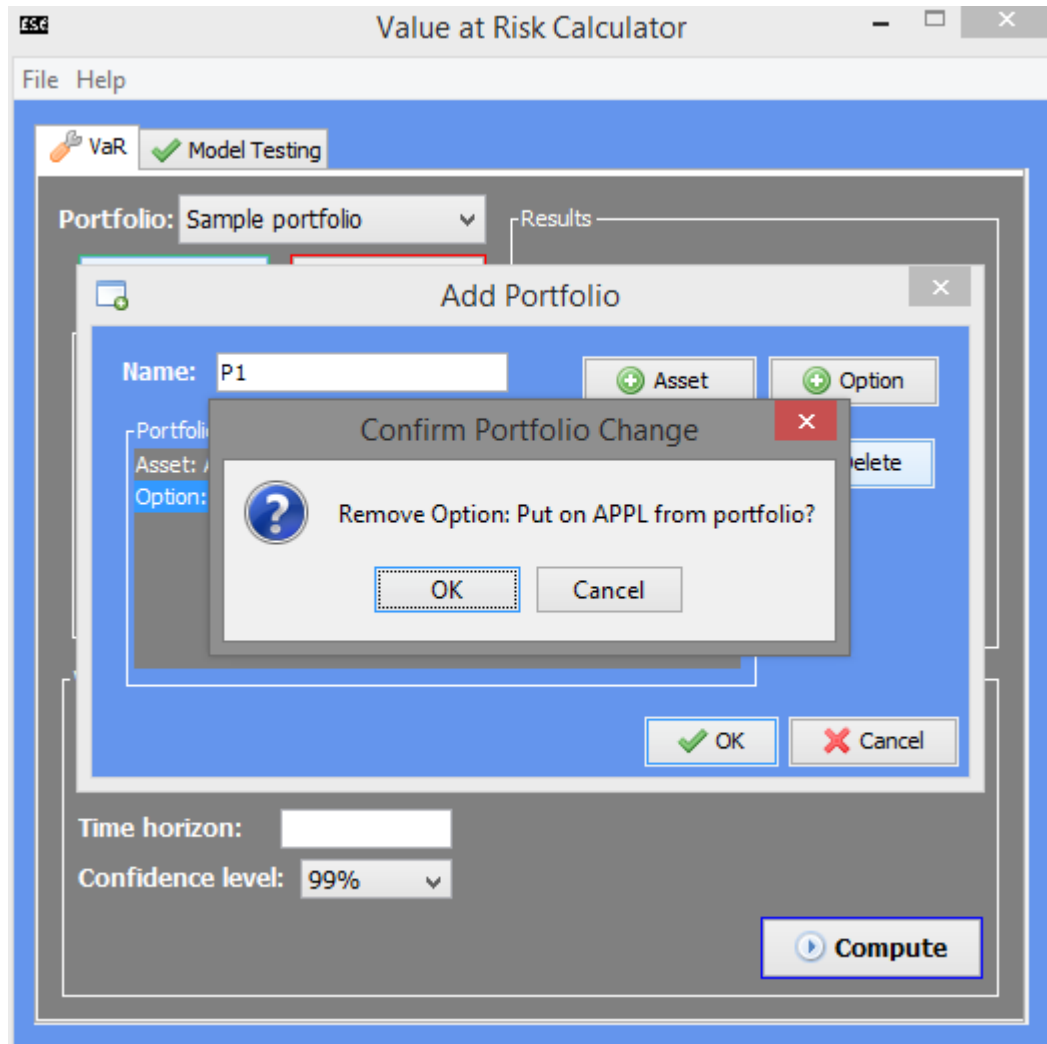


Figure 1.11: Removing item from portfolio

Once all the changes have been made to the portfolio, clicking 'OK' in the 'Add Portfolio' dialog will add the created portfolio to the list of portfolios in the 'Setup' tab, see figure 1.12.

1.3.5 Computing VaR

After selecting a created portfolio and specifying all the required parameters, VaR can be computed by clicking the 'Compute' button in the 'VaR Setup' panel. The calculated VaR will be displayed in the 'Results' panel, as shown in figure 1.13.

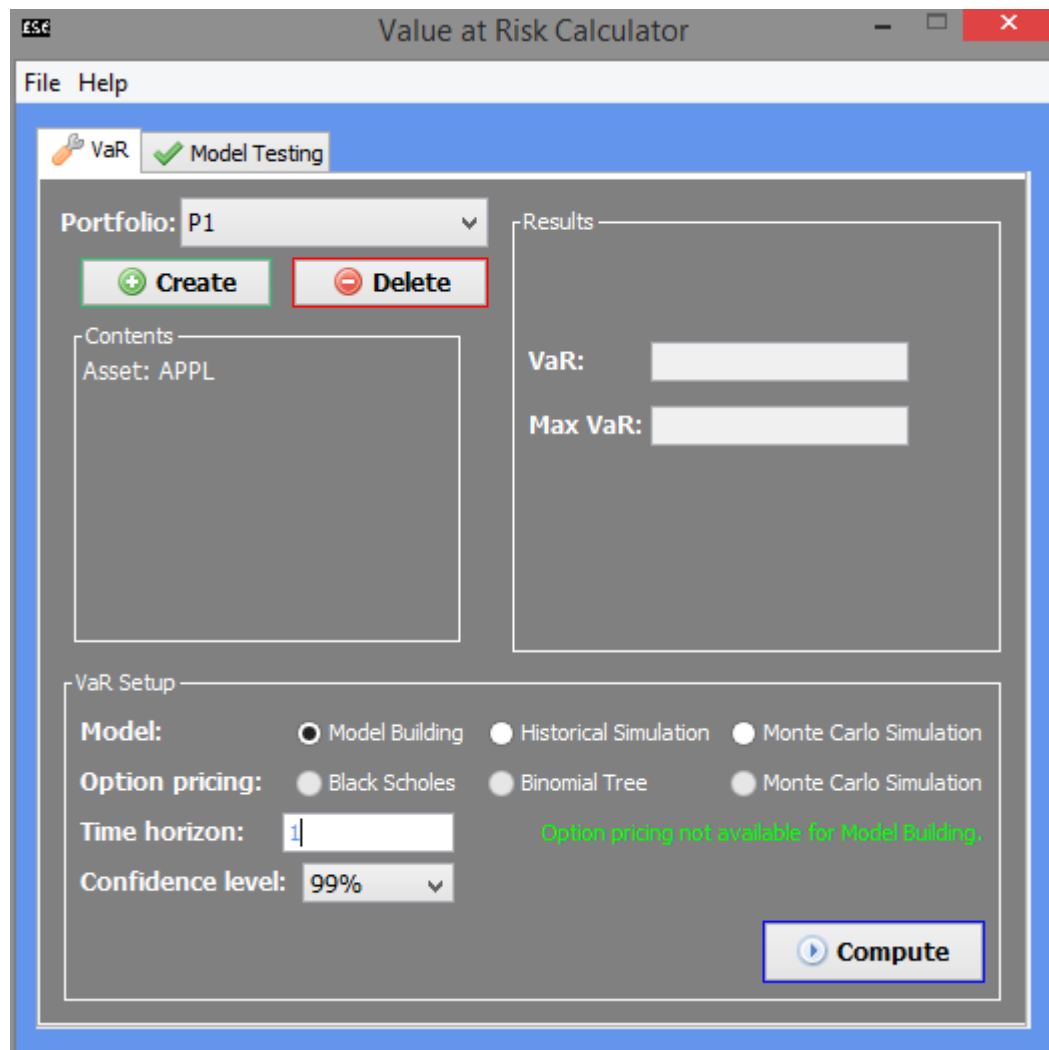


Figure 1.12: Added portfolio shown in portfolio drop-down menu

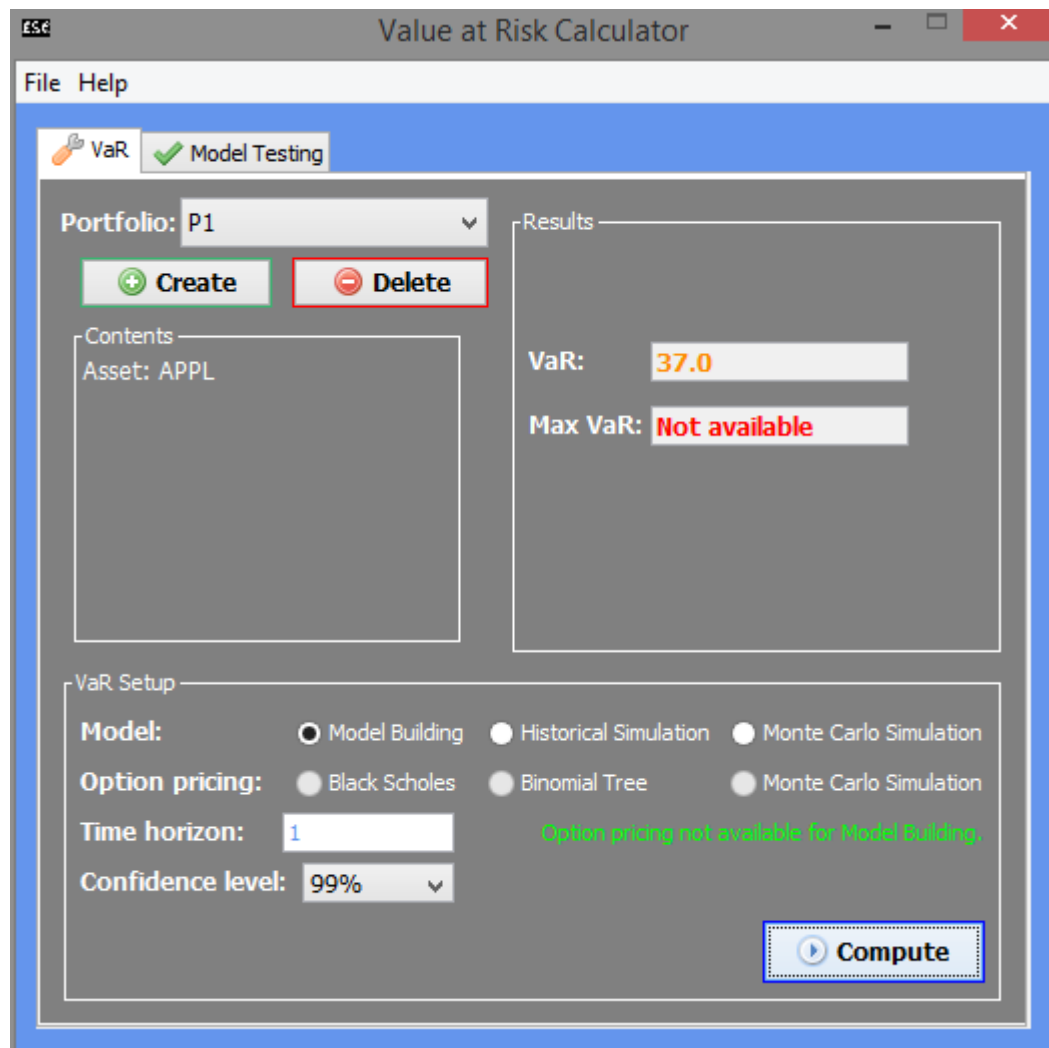


Figure 1.13: Computing VaR

1.3.6 Backtesting using portfolio

The program allows the user to conduct backtesting of the VaR models through the 'Model Testing' tab.

By selecting a portfolio and specifying the 'Time horizon', 'Confidence level' and a 'Model' to conduct the backtest and clicking 'Run', the program will run the backtest and show the results in the text area at the bottom of the 'Backtesting' panel. See figure 1.14

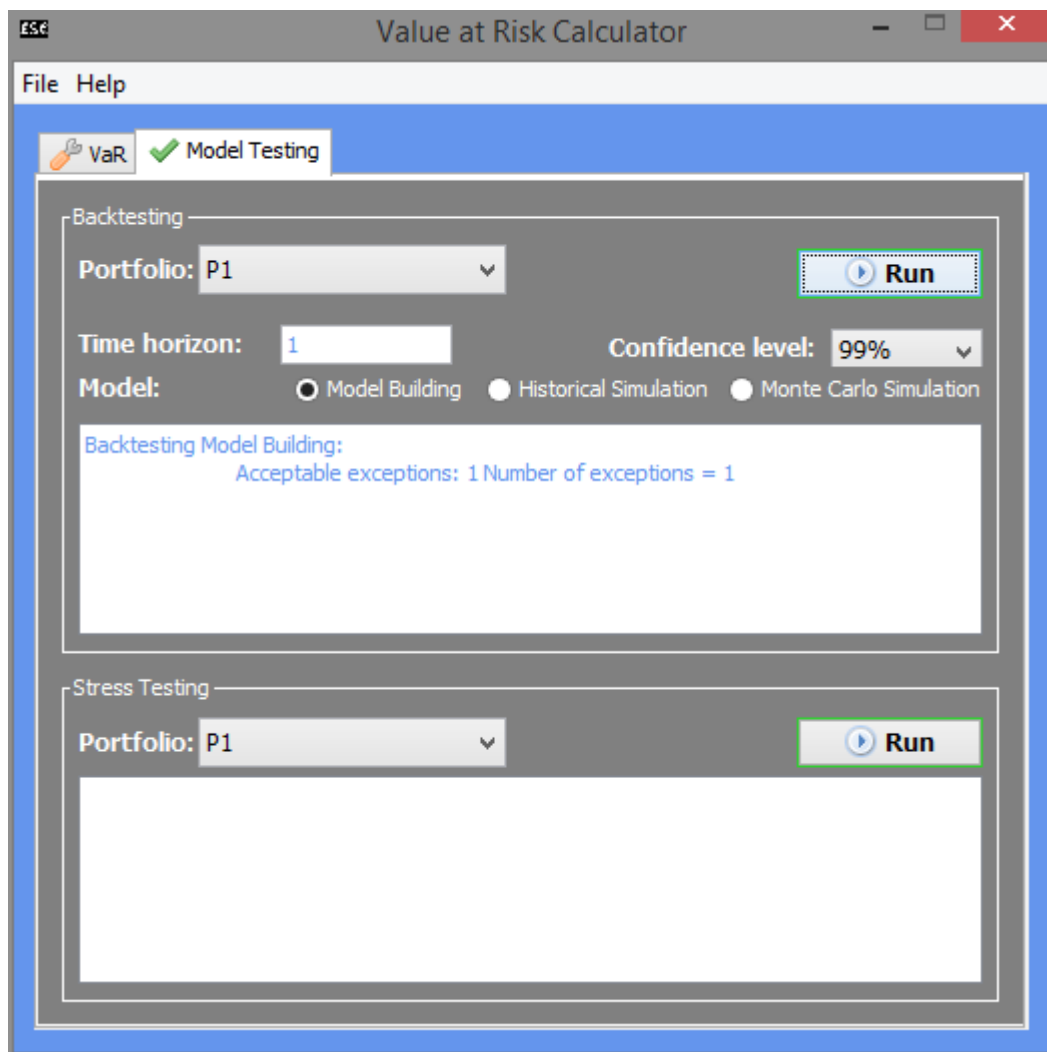


Figure 1.14: Backtesting VaR models

1.3.7 Stress testing using portfolio

The program allows the user to carry out stress tests on a portfolio to see what affect a crash in the prices of its assets would have on the value of the portfolio.

Conducting stress testing only requires the user to select a portfolio in the ‘Stress Testing’ panel and clicking ‘Run’. The program will run the stress test on the selected portfolio and show the results in the text area at the bottom of the ‘Stress Testing’ panel. See figure 1.15.

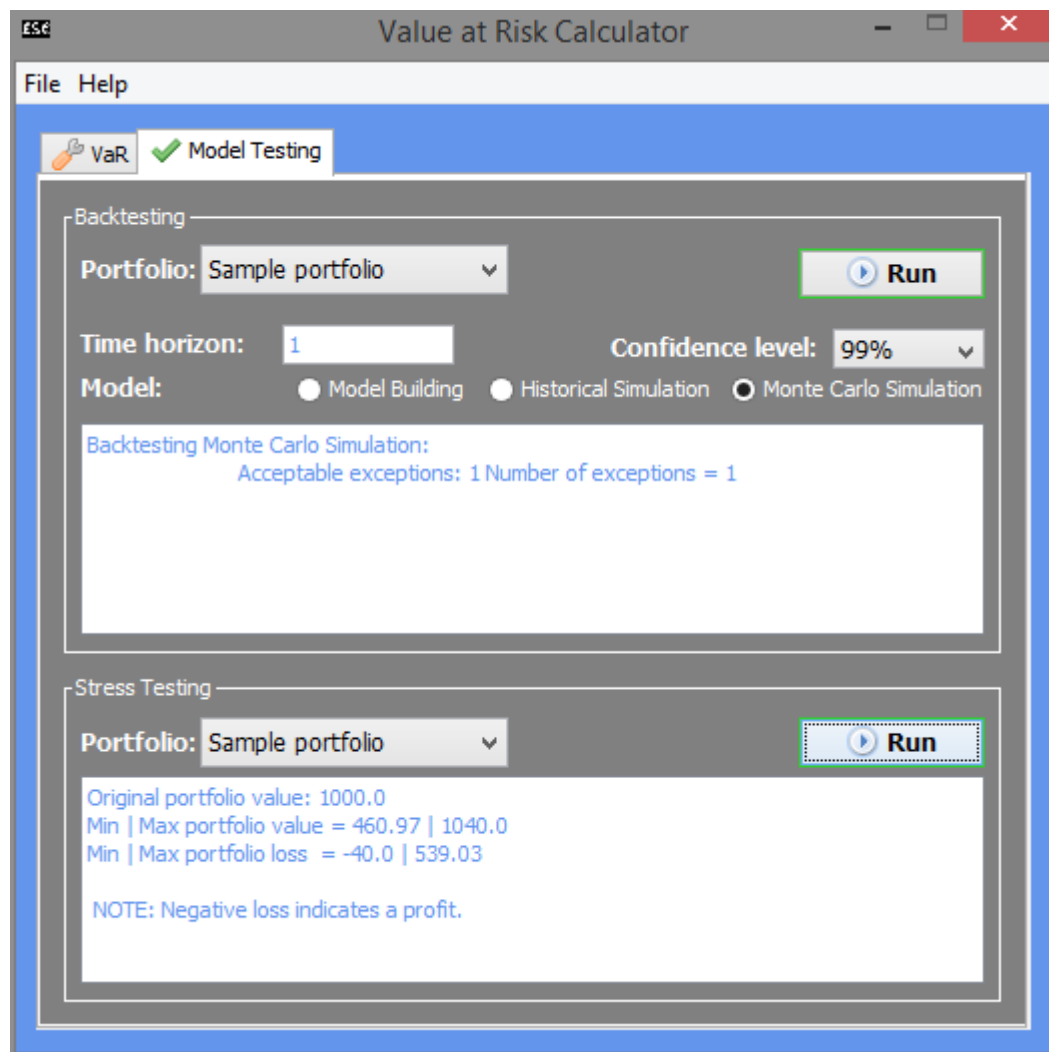


Figure 1.15: Stress testing portfolio

1.3.8 Other information

Information about the development of the program is available through the ‘Help’ menu option at the top of the program.

The program can be closed by clicking the ‘File’ menu option and selecting ‘Exit’ or simply by clicking the red cross in the top-right corner of the program window.