

## Requirements:

- ESRI ArcObjects 10.2
- Microsoft Visual Studio 2010

After installing Microsoft visual studio 2010, it is necessary to install ESRI ArcObjects 10.2.

## How to run the program in the visual studio:

To run the program start debugging in visual studio and select a case study mxd file from select file dialog as figure 1.

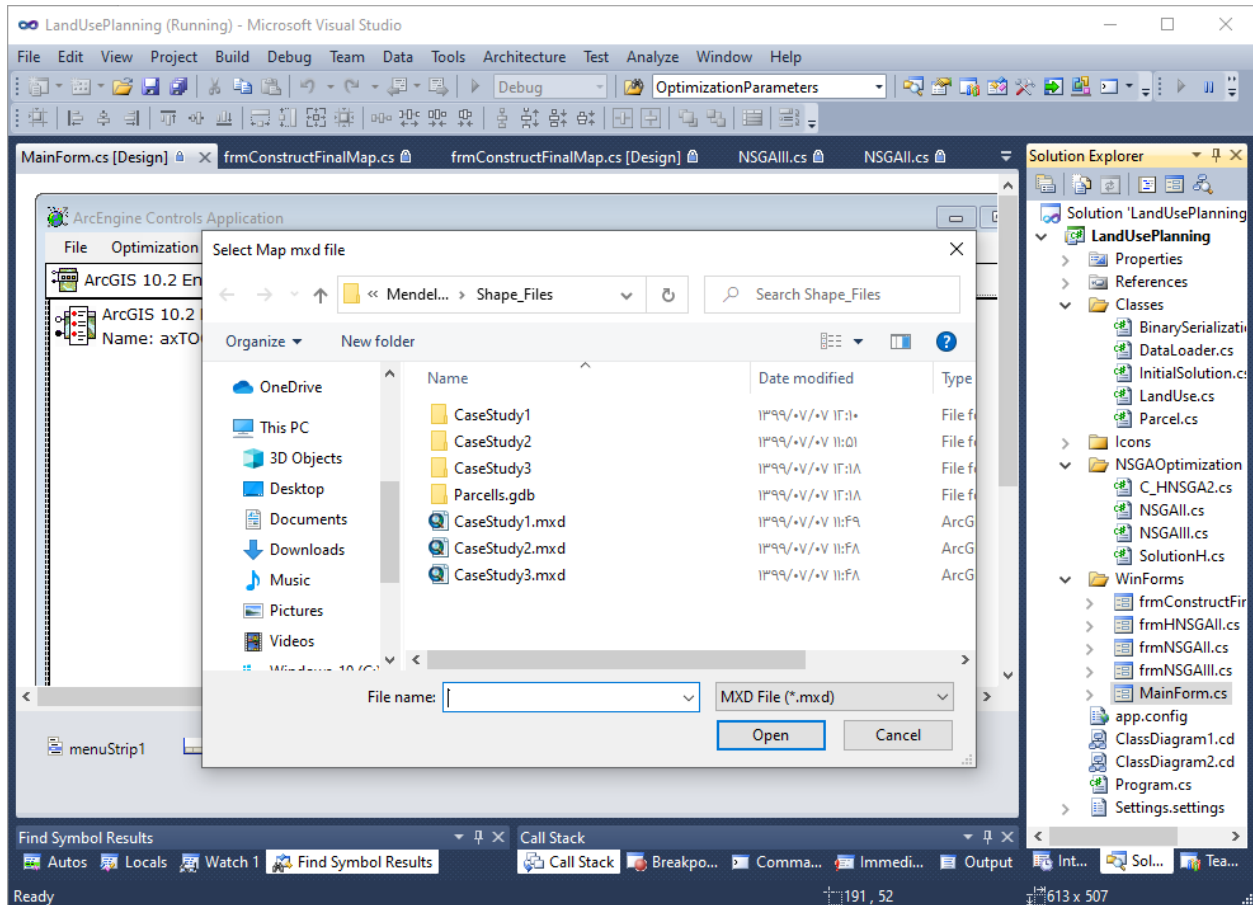
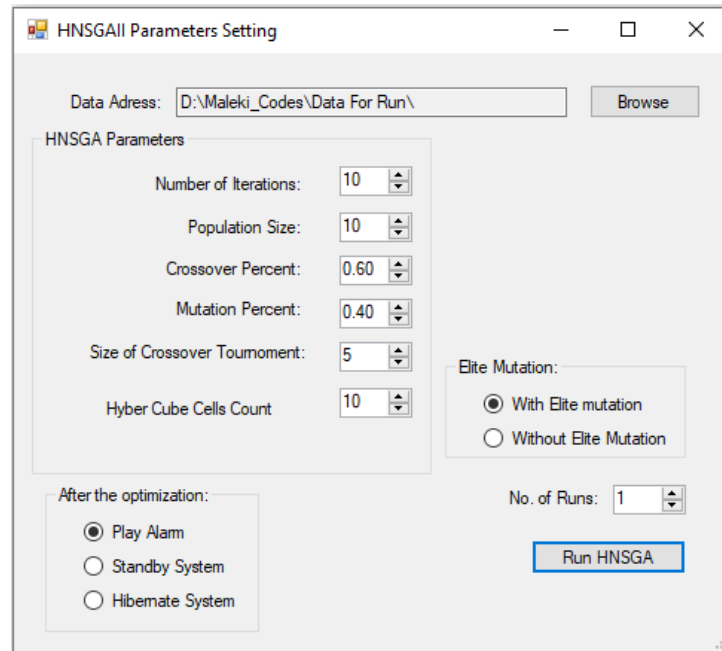


Figure 1. selecting a case study mxd file to initial the program.

To run algorithms, click on the optimization bottom in the menu bar and select an algorithm.

Set the parameters in the parameters setting window as figure 2.

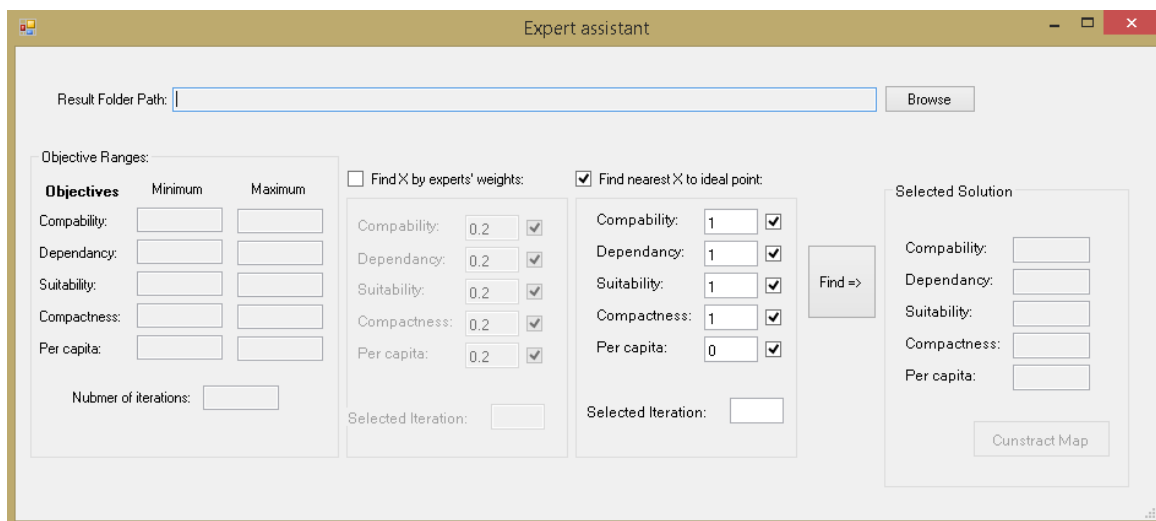


The window is titled "HNSGAI Parameters Setting". It contains a "Data Address" field with the path "D:\Maleki\_Codes\Data For Run\" and a "Browse" button. Below this is a section for "HNSGA Parameters" with several spinners: "Number of Iterations" (10), "Population Size" (10), "Crossover Percent" (0.60), "Mutation Percent" (0.40), "Size of Crossover Tournament" (5), and "Hyber Cube Cells Count" (10). To the right of these is an "Elite Mutation" section with two radio buttons: "With Elite mutation" (selected) and "Without Elite Mutation". Below the HNSGA parameters is an "After the optimization:" section with three radio buttons: "Play Alarm" (selected), "Standby System", and "Hibernate System". To the right of this is a "No. of Runs" spinner set to 1 and a "Run HNSGA" button.

Figure 2. parameters setting widow

After running the algorithm, the results are saved in the results folder in the selected address.

To construct a map from the generated results, click on “Export Result” bottom in the menu bar and select “Construct map”. In this section a simple tool is designed for using by the human expert to select the final solution(s). In this tool, two methods can be used to select the final solution(s). In the first method, using the expert assigned weights to each objective, the best solution is identified by comparing the weighted-sum aggregations of objective for each solutions in pareto front. In the second method, an ideal point must first be considered. After that, the tool starts searching for the closest solution to the ideal point and the closest solution is considered as a best one. The user interface of the expert assistant tool in finding the appropriate solution is shown in Figure 3.”



The window is titled "Expert assistant". It features a "Result Folder Path:" field with a "Browse" button. Below this is a section for "Objective Ranges:" with a table of objectives and their minimum/maximum values. To the right of this table are two checkboxes: "Find X by experts' weights:" (unchecked) and "Find nearest X to ideal point:" (checked). Below these checkboxes are two columns of input fields for weights or ideal points, each with a "Selected Iteration:" field. A "Find =>" button is located between these two columns. To the right of the "Find =>" button is a "Selected Solution" section with input fields for each objective and a "Construct Map" button.

Objectives	Minimum	Maximum
Compability:		
Dependancy:		
Suitability:		
Compactness:		
Per capita:		

Figure 3. Construct map window

In the construct map window, you can select the result path by browse bottom. After selecting an appropriate results path, the upper and lower bounds of objective appear in the objective ranges box.

You can select and appropriate solution base on the nearness to ideal points for each objective.

Finally, you can generate the result map of the selected solution by clicking on" Construct Map" bottom.