Use case Descriptions and User Trials

(Note: the project uses the javadocking.jar external user library which contains in the "lib" folder of the project, to implement dock and undock panels function. Please build path to the lib folder's javadocking.jar archive, thanks very much)
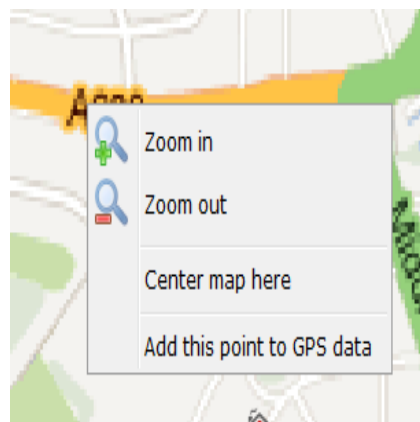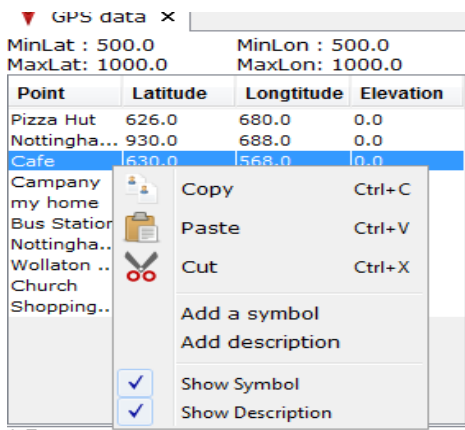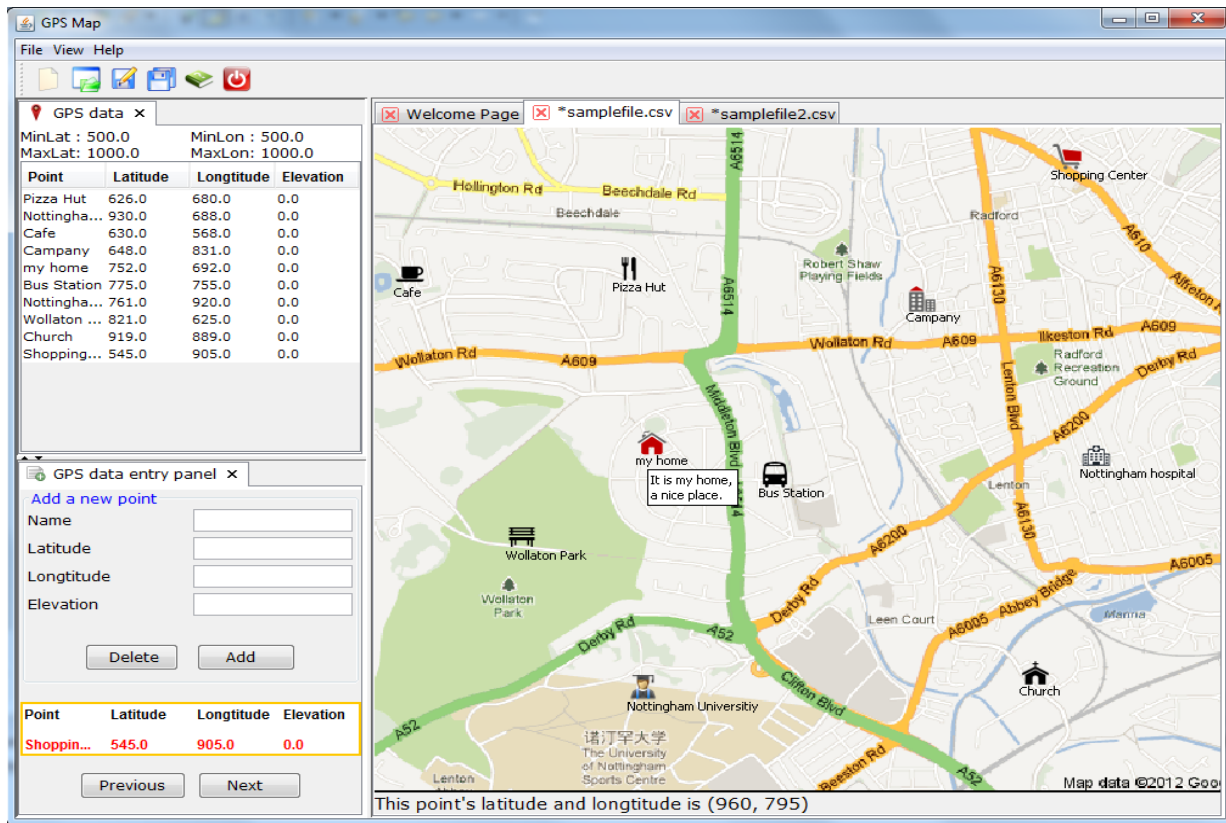
Final User Interface:

Figure 1

Fundamental functions:

Fundamental set up functions is provided in the menus. User can use file menus to perform the fundamental functions easily and clearly. User can open a file. User can create a new file. User can save a file. User can save the file as another file. User can open and close every panels and the tool bar. User can get help decriptions.

GPS Data Entry Panel is in the bottom-left corner, which is for entrying and adding the data to the data model, or deleting from it. User can view the data in the display panel below, and control it with previous and next button. User uses this panel to input the data to the file. If user wants to remove some bad waypoints, just use previous or next button to find the points and then click the "delete" is ok to remove it.

GPS data panel is in the top-left corner, which shows the bounds and displays the stored data in the scroll pane. The table rows can be selected but not be cell editable. Using table to display store the data can make user see the stored data more clearly. User can scroll it the find and look into the stored data. If user clicks the right mouse button, a pop up menu appears. User can copy, and paste waypoint data between different GPS files. User can also cut a waypoint data. User can select a symbol to represent a waypoint on the map. User can add a description to a waypoint. User can select whether a waypoint shows symbol or description on the map.

Map Tab panes is in the right part, which appears as a new file created. Its name is the same as the opened file. User can open many files, and the corresponding map tab pane appears. If user wants to close the file, just click the close icon, then it will be closed. Using tab pane to display files can make multiple files open concurrently, if user want to edit one file of them, just click the tab is ok.

Extensive Functions (task 7):

1. If user changed the data in the file (add or delete), but not save, there will be a "*" mark before the file name in the tab pane title. After user saved it, the star disappears.

   Reason : "*" mark is for reminding user the file is changed but not saved, which can make user know about the file editing more clearly.

2. If user wants to close the file, just click the close icon, then it will be closed.

   Reason: Closable tab pane can make user close the file if he or she wants to leave it.

3. User can drag and move the map tabs between each other.

   Reason: It is convenient for user to find the tab they are looking for when multiple tabs open.

4. The GPS data panel and GPS data entry panel is dockable which can make user dock and un dock the panel

   Reason: It is convenient for user to edit their file or set the panel for their preference.

5. The GPS data panel and GPS data entry panel can be closed by clicking the close button can show by set the view menus.

   Reason: It can make user open and close panel in different ways, it is convenient for them.

6. User can zoom in or zoom out by pop menu or mouse wheel, moreover meanwhile it centers with the mouse. So user can use mouse to control where to zoom.

   Reason: It seems necessary for a map tool.

7. When user zoom in or zoom out the map, four red rectangle arcs will show around the zoom area (Figure 2).

   Figure 2

   Reason: It helps user to see where to zoom clearly.

8. User can drag the map to move to the area where he or she wants to look at.
   Reason: It is easy to control, and helps user to find the right place easily.

9. There is a label below the map, it shows the mouse location (latitude, longitude). When mouse moves, it changes (Figure 3).
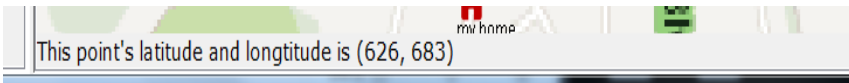

   This point's latitude and longtitude is (626, 683)

   Figure 3

   Reason: It makes knows about every points' location and it is also convenient for a user to find or add a GPS waypoint.

10. User can add a point in the map to the GPS data directly by clicking right mouse button and then click "Add this point to GPS data".

    Reason: It is remarkably convenient and easy for the user to add a waypoint to GPS data model. Every point in the map can be added with this method.

11. User can center the map on the mouse position.

    Reason: It is convenient to center the map for their preferences.

User Trials

1. For original version:

Five not CS persons were selected to be tested as user for the project's original version. There is a table below represent the tasks they did and success.

Task	Success number
Open a file	5
Create a new file	5
Save a file	5
Add a waypoint	5
Delete a waypoint	5
Zoom in a map	5
Zoom out a map	5
Close a panel	2
Add a symbol	5
Add a description	5
Display a symbol	5
Display a description	5
Add a certain point in the map to GPS data table	0
Copy a waypoint data	5
Paste a data	5

Figure 4

After a user used the software, a survey was given to be filled in. The table below is the users' evaluation statistics:

1 = Strongly agree 3 = neural 5 = Strongly disagree	
1.0	It is easy to open a file
1.0	It is easy to create a new file
1.0	It is easy to save a file
2.2	The add a waypoint function is good
4	It is convenient to delete a waypoint
2	The zoom in and zoom out is easy and convenient to use
3	It is easy to move the view area of the map
1.0	It is easy and convenient to add a symbol
1.0	It is easy and convenient to add a description
1.2	It is easy and convenient to display a symbol
1.2	It is easy and convenient to display a description
2.0	The overall function and GUI of the software is good

Figure 5

2. Enhancement and its evidences:

Evidences	Enhancements
Some users are not successful in closing a panel. And some users said it is inconvenient to close a panel.	Closable and dockable functions are added to the GPS data panel and GPS data entry panel.
Some users said that it is inconvenient to find a location position if he or she doesn't not want to add the point in the GPS data, and just wants to see where it is.	Location label was added. It shows the mouse location (latitude, longitude). When mouse moves, it changes to the corresponding mouse location.
No one is successful to add a certain point in the map to GPS data table	A new function was added, which is that user can add a point in the map to the GPS data directly by clicking right mouse button and then click "Add this point to GPS data".
Some users said that it is inconvenient to remember which files were changed.	A new function was added, which is that if is a GPS file was changed but not saved, there will be a "*" mark before the file name in the tab pane title. After user saved it, the star disappears.

Some users said that use pop menu to zoom the map is inconvenient	Mouse wheel listener was add to zoom the map with mouse wheel.
Some users said that it is not clear about which area to zoom.	A red rectangle arc was drawn around the zoom point when use zoom function.
Some users said that it is inconvenient to delete a point with GPS data entry panel.	A cut function was added to GPS data panel to delete a waypoint.
Some users said that it is inconvenient to move the view area.	A user can use mouse to drag the map to change the view area instead of scroll bar.

Figure 6

3. For final version:

After enhancement, another five not CS persons was selected to be tested.

The tasks and success table can evaluation table shows below.

Final version statistics:

Task	Success number
Open a file	5
Create a new file	5
Save a file	5
Add a waypoint	5
Delete a waypoint	5
Zoom in a map	5
Zoom out a map	5
Close a panel	5
Add a symbol	5
Add a description	5
Display a symbol	5
Display a description	5
Add a certain point in the map to GPS data table	5
Copy a waypoint data	5
Paste a data	5

Figure 7

Final version evaluation table:

1 = Strongly agree 3 = neural 5 = Strongly disagree	
1.0	It is easy to open a file
1.0	It is easy to create a new file
1.0	It is easy to save a file
1.0	The add a waypoint function is good
1.0	It is convenient to delete a waypoint
1.0	The zoom in and zoom out is easy and convenient to use
1.0	It is easy to move the view area of the map
1.0	It is easy and convenient to add a symbol
1.0	It is easy and convenient to add a description
1.0	It is easy and convenient to display a symbol
1.0	It is easy and convenient to display a description
1.5	The overall function and GUI of the software is good

Figure 8

The final version user test almost need no help of me, the user can do all the functions by themselves. As these two above statistics table shows, the enhancement is very useful and the overall good GUI was achieved.

Unit Test (Use case for Model)

1. A new model should have bounds
    Precondition: model exists
    Postcondition: bounds are not null

2. A new model can be construct with a file
    Precondition: valid gps file
    Steps: open the file
    Postcondition: constructed model has file name, bounds and waypoint list.

3. File name can be set
    Precondition: model exists
    Steps: set the file name
    Postcondition: model's file name equals the set file name.

4. Waypoint list can be set
    Precondition: model exists
    Steps: set the waypoint list
    Postcondition: model's waypoint list equals the set waypoint list.

5. ActionListener list can be set
    Precondition: model exists
    Steps: set the actionListener list
    Postcondition: model's file name equal the actionListener list

6. A new waypoint can be construct with a string and three double number
    Precondition: valid string and three double number
    Steps: create a new waypoint
    Postcondition: constructed waypoint has a name, a latitude, a longitude and a elevation.

7. A waypoint have name, latitude, longitude, elevation, description, symbol, showDescription, showSymbol
    Precondition: Waypoint exists
    Steps: set the name
    Postcondition: waypoint's name, latitude, longitude, elevation, description, symbol, showDescription, showSymbol don't equal to null.

8. Waypoint name can be set
    Precondition: Waypoint exists
    Steps: set the name

Postcondition: waypoint's name equals the set name.

9. Waypoint latitude can be set
   Precondition: Waypoint exists
   Steps: set the latitude
   Postcondition: waypoint's latitude equals the set latitude.

10. Waypoint longitude can be set
    Precondition: Waypoint exists
    Steps: set the longitude
    Postcondition: waypoint's longitude equals the set longitude.

11. Waypoint elevation can be set
    Precondition: Waypoint exists
    Steps: set the elevation
    Postcondition: waypoint's elevation equals the set elevation.

12. Waypoint description can be set
    Precondition: Waypoint exists
    Steps: set the description
    Postcondition: waypoint's description equals the set description

13. Waypoint symbol can be set
    Precondition: Waypoint exists
    Steps: set the symbol
    Postcondition: waypoint's symbol equals the set symbol.

14. Waypoint showDescription can be set
    Precondition: Waypoint exists
    Steps: set the showDescription
    Postcondition: waypoint's description equals the set showDescription

15. Waypoint showSymbol can be set
    Precondition: Waypoint exists
    Steps: set the showSymbol
    Postcondition: waypoint's symbol equals the set showSymbol.