General Idea of the project

Methodology

Firstly, we use ‘map’ function to build a map. The basic unit of the map is cell. Every cell has a coordinate. Before the other functions work, we only know two cells’ coordinates: the starting cell’s coordinate and the destination coordinate. We set the starting cell’s coordinate is (xs,ys) and the destination cell’s coordinate is (xf,yf).

The next step is using ‘surrounding’ function to calculate the 8 cells around the starting cell. The starting cell be marked “2”, which means starting cell has been put into the close-list. The cells around the starting cell will be marked “1”, which means they’re been put into open-list. Besides these, the cells being marked “0” means these cells didn’t been put into open-list. Every cell will be put into close-list if it leaves the open-list.

And program apply different reaction to cells with different characteristics. We use ‘judge_character’ function to judge every cells which characteristic it belongs to. If the cell being judged as a barrier or in the close-list, there is no calculation with the cell. If the cell is listed in the open-list, we use ‘old_G_funtion’ to calculate a new G value for it. If the new G value is smaller than the old G value, update the G value. If all the surrounding cells’ G values have been compared by ‘Comparing_G function’, update open-list and close-list. The path move forward.

As for the new cells, the same steps will be repeat till reaching the destination.If there are two or more cells have the same F value, add the cell has the smallest F value at the bottom of open-list into the close list. When reached the destination, the close-list finished, we use the Mark function to find the path through father cells.