For this project, we need to write the program to search a shortest path between two different on a graph. The graph will provide us the amount of points and paths. It also shows the place of each point.

Since the main purpose is to find the shortest path. We first need to save the point from the input file. I plan to build an array of node. Each node will save the name of the point and the place of it. Since the name is a number, we can use it as the index of the array. But I need to malloc a large array to save the map that have a lot of point, such as the road of CA. The point node will save the name of the node, the place of it and a visited number used in search shortest path.

After saving the point, we also need to save the path between these points. One way to do this is use another array of node. However, this node is different with the node we used to save point. It need to save the begin point and end. It will also save the length of the path. Since the point is saved by using their name as index, it is easy to find them in the array and calculate the distance. Also, because the path in undirected, I choose to save the path twice with different direction.

Finally, the work is to find out the shortest path. By follow the idea of Dijkstra's algorithm, every time we compare the node that have same begin point. Since we already get the distance, we can just compare them and get the shortest path. Then we record the length and pass to the next point. Since the path is undirected, we set the visited number in point node. If the number is not the number we set, it means it is reached and we need to choose another pass. We will repeat the work until reaching the end or run out of the map. We can finally get the length of the path.

Of course, there may have no way to the end, so we also need to set several special conditions to check them. For example, some start, or end may not exist and there are several islands on the map.