Detailed description of algorithm

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Link-state routing protocol

A link-state routing protocol is one of the two main classes of routing protocols used in packet switching networks for computer communications. This protocol is performed by every switching node in the network. The basic concept of link-state routing is that every node constructs a map of the connectivity to the network, in the form of a graph, showing which nodes are connected to which other nodes. Each node then independently calculates the next best logical path from it to every possible destination in the network. The collection of best paths will then form the node's routing table.

Dijkstra algorithm, each router computes best path over complete network, is one of link-state routing protocol example.

```
int cnt = 0;   // To know the number of rows
String data [] = new String[100];    // Array which saves rows

Scanner file = new Scanner(new File(txtFile));

while(file.hasNext())
{
        String stringRead = file.nextLine();
        data[cnt] = stringRead;
        cnt = cnt + 1;
}
```

File variable reads the messages which are in text file line by line, and then data array saves the messages which read line by line.

```
for(int c = 1 ; c < n ; c++){
        Scanner parse = new Scanner(data[c]);
        parse.useDelimiter(" ");
        for(int d = 1 ; d < n ; d++){
                data2[c][d] = parse.nextInt();
        }
parse.close();
}
```

Data2 array changes 1st dimension array to 2nd dimension array by parsing.

```
for(int b = 1; b < n ; b++)
{
    for(int c = 1; c < n ; c++){
        if(data2[b][c] == -1){
            data2[b][c] = m;
        }
    }
}
```

If there is -1 value in matrix, the matrix change -1 to m(999) because of comparison between infinity value(m) and min.

```
min = m;
for(j = 1 ; j < n; j++)
{
	if(vertex[j] == 0 && distance[j] < min)
	{
		k = j;
		min = distance[j];
	}
}
```

Min variable is initialized by m, infinity number(999).

If the vertex is not visited and the distance between vertex is less than min value, k variable j variable. In other words, k variable become a vertex number. Min variable is changed by the distance.

```
for(j = 1 ; j < n; j++)
{
	if(distance[j] > distance[k] + data2[k][j])
	{
		distance[j] = distance[k] + data2[k][j];
		via[j] = k;
	}
```

This code is to find the total distance. If summation of distance and matrix which visit newly vertex is greater than previous distance, previous distance is changed and via array saves vertex number.

```
k = dest;


while(true){
	path[path_cnt++] = k;
	if(k == start)
		break;

	k = via[k];
}
```

K variable is destination. This code is to find visited paths. Path_cnt is already initialized by 1. Therefore, path[1] saves destination. In while loop, k variable is changed by via array which saves visited vertex.