Report

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Part 1: data structure

The network topology is represented with a connected, undirected graph. The edges of a graph are stored in an adjacency list. Each entry in the list is another list of pointers to edges. Nodes are not explicitly stored, and they are processed as characters in general. An edge is defined as such:

```
struct edge{
    char oneEnd;
    char anotherEnd;
    int delay;
    int capacity;
    int numRunning;
};
```

The O(N^2) look-up and insertion time is not an issue thanks to the small number of nodes and edges.

Part 2: Experiment result

	SDP	LLP	SHP
total	5884	5884	5884
rejected	1269	215	672
succeeded	4615	5669	5212
%rejected	21.57	96.35	11.42
%succeeded	78.43	3.65	88.58
avg. hop	4.53	4.81	3.44
avg. delay	210.68	298.17	213.06

Part 3: Interpretation of result

The result is as expected. SDP produces the least average delay, SHP produces the least hop distance; in the case of LLP, the hop distance and delay are both noticeably higher than the other 2 algorithms, yet it shows the highest success rate of the three.

In the case of SDP, the cost function returns the delay of the path. Dijkstra's algorithm, being the greedy algorithm that it is, returns a path of minimum delay in this case. Likewise for SHP, the algorithm decays into breadth-first search and returns a min-distance path. For LLP, because cost is taken into consideration, it avoids heavily loaded links, hence greatly increasing the chance of successfully routing through.

It is observed that SHP has a greater success rate than SDP. This is due to the fact that paths produced by SHP are shorter on average, thus reducing the overall load on the circuit and decreasing the chance of failure.

Conclusion:

All results are expected. This experiment is a success.