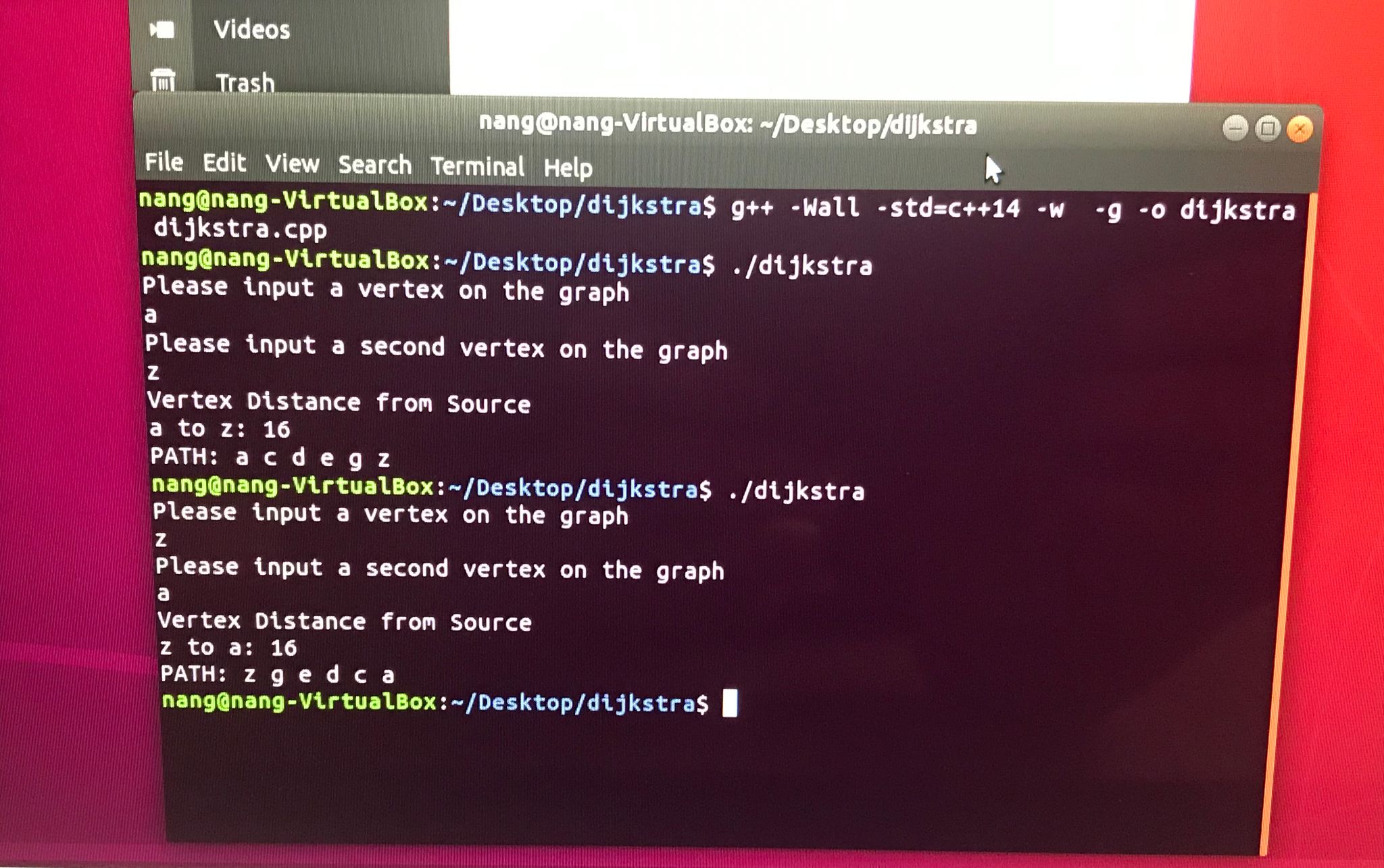
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CS365

Project 1

1.

Output of code - selecting vertices a and z



2.

Dijkstra’s Algorithm solves the problem and finds the shortest path from one vertex to another. It starts with a given vertex and an endpoint vertex. Since the algorithm is given a starting node, the first node adds 0 to the length of the path and considers the first node as visited. If a node is considered visited, then the node would not be visited again and the length of the edge is added to the shortest path distance. This happens until every node is visited and a shortest path to each node is found. The starting node visiting itself is always 0.

I have four functions in my code. The minDistance function finds the minimum distance from a node to an adjacent, unvisited node. It picks which node has the smallest distance to where it wants to go and returns the index of the node. The printSol function just prints out the source node to the target node and the distance of the shortest path between them. The printPath function recursively prints out the path that is traveled from the source and the target nodes. The dijkstra function solves the shortest path problem, finds the shortest path from the source node to each, and prints out the shortest path from the source to the target by calling the printSol function. In my code, I also let the user input which vertex to start from and which vertex to end at.

Dijkstra's Algorithm solves the problem and finds that the shortest distance from a to z is 16. The path of the traversal starts with a then goes to c to d to e to g to z. The algorithm first starts at vertex a. Then it compares the distances of the adjacent vertices and adds it to the total distance. Then it checks the adjacent vertices of the adjacent vertices until it reaches the end vertex. For example, from a to b or a to c is 4 and 3 respectively. Dijkstra’s algorithm would select to go to vertex c since it is the smallest path. From c, it would have the option to go to b or d or e. Since b to c is weighted 2 and b to d is weighted 5,to get from c to b to d would be a traversal of 7. This is more than going straight from c to d as it only would traverse 3. Then it would travel from d to e since 1 is less than 5. Then it would travel from e to g as that is the only path forward and gets closer to z. From g, it moves to z for a cost of 4. The shortest path is found from 3+3+1+5+4 which is equal to 16.