**Assignment 11**

**NAME: SHISHU**

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1. Write a C program to implement Dijkstra’s algorithm and find the shortest paths from source (A) to all vertices in the given graph

// Dijkstra's Algorithm

#include <stdio.h>

#define INFINITY 9999

#define MAX 10

void Dijkstra(int Graph[MAX][MAX], int n, int start);

void Dijkstra(int Graph[MAX][MAX], int n, int start) {

int cost[MAX][MAX], distance[MAX], pred[MAX];

int visited[MAX], count, mindistance, nextnode, i, j;

// Creating cost matrix

for (i = 0; i < n; i++)

for (j = 0; j < n; j++)

if (Graph[i][j] == 0)

cost[i][j] = INFINITY;

else

cost[i][j] = Graph[i][j];

for (i = 0; i < n; i++) {

distance[i] = cost[start][i];

pred[i] = start;

visited[i] = 0;

}

distance[start] = 0;

visited[start] = 1;

count = 1;

while (count < n - 1) {

mindistance = INFINITY;

for (i = 0; i < n; i++)

if (distance[i] < mindistance && !visited[i]) {

mindistance = distance[i];

nextnode = i;

}

visited[nextnode] = 1;

for (i = 0; i < n; i++)

if (!visited[i])

if (mindistance + cost[nextnode][i] < distance[i]) {

distance[i] = mindistance + cost[nextnode][i];

pred[i] = nextnode;

}

count++;

}

// Printing the distance

for (i = 0; i < n; i++)

if (i != start) {

printf("\nDistance from source to %d: %d", i, distance[i]);

}

}

int main() {

int Graph[MAX][MAX], i, j, n, u;

n = 7;

Graph[0][0] = 0;

Graph[0][1] = 0;

Graph[0][2] = 1;

Graph[0][3] = 2;

Graph[0][4] = 0;

Graph[0][5] = 0;

Graph[0][6] = 0;

Graph[1][0] = 0;

Graph[1][1] = 0;

Graph[1][2] = 2;

Graph[1][3] = 0;

Graph[1][4] = 0;

Graph[1][5] = 3;

Graph[1][6] = 0;

Graph[2][0] = 1;

Graph[2][1] = 2;

Graph[2][2] = 0;

Graph[2][3] = 1;

Graph[2][4] = 3;

Graph[2][5] = 0;

Graph[2][6] = 0;

Graph[3][0] = 2;

Graph[3][1] = 0;

Graph[3][2] = 1;

Graph[3][3] = 0;

Graph[3][4] = 0;

Graph[3][5] = 0;

Graph[3][6] = 1;

Graph[4][0] = 0;

Graph[4][1] = 0;

Graph[4][2] = 3;

Graph[4][3] = 0;

Graph[4][4] = 0;

Graph[4][5] = 2;

Graph[4][6] = 0;

Graph[5][0] = 0;

Graph[5][1] = 3;

Graph[5][2] = 0;

Graph[5][3] = 0;

Graph[5][4] = 2;

Graph[5][5] = 0;

Graph[5][6] = 1;

Graph[6][0] = 0;

Graph[6][1] = 0;

Graph[6][2] = 0;

Graph[6][3] = 1;

Graph[6][4] = 0;

Graph[6][5] = 1;

Graph[6][6] = 0;

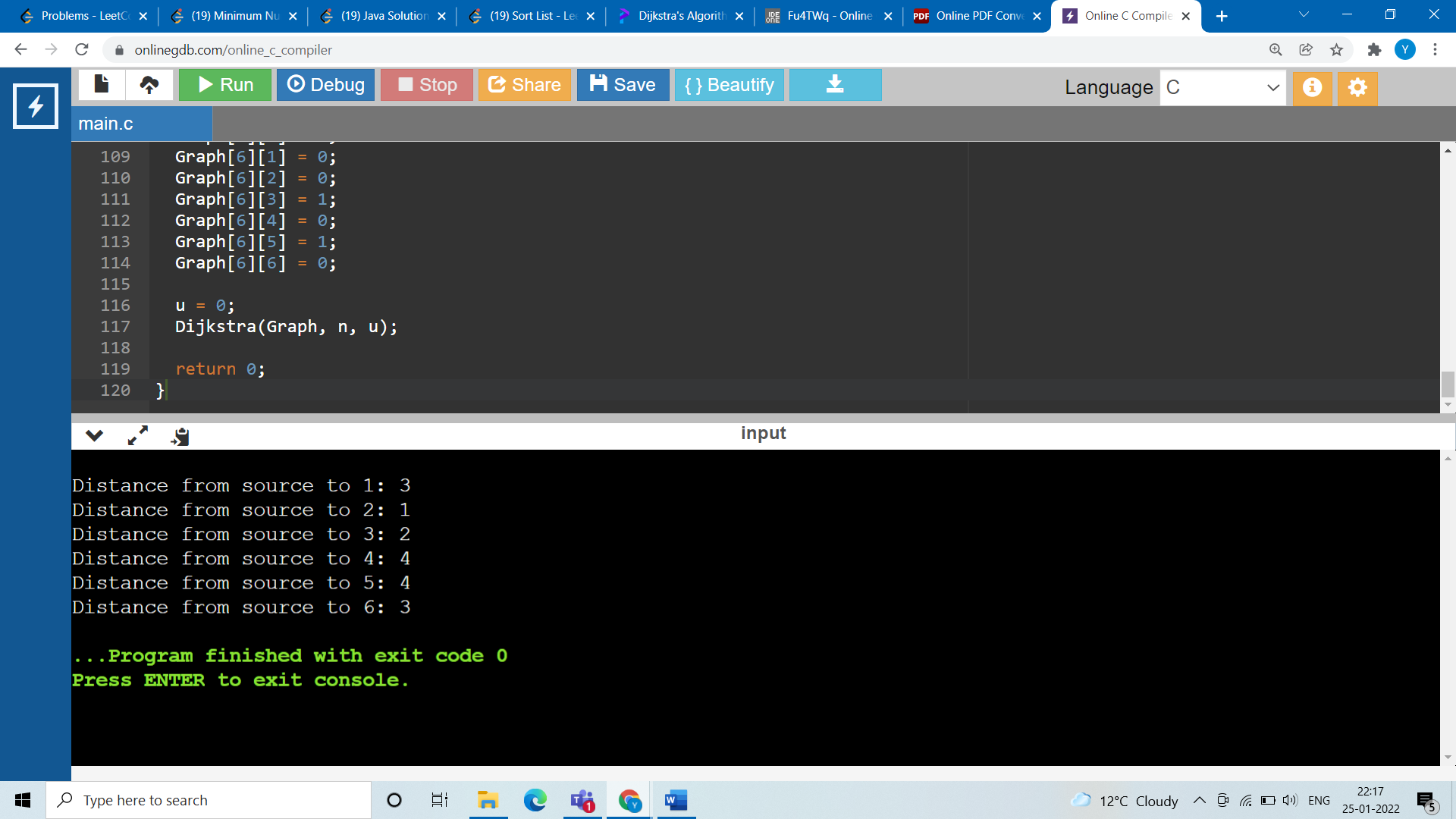
u = 0;

Dijkstra(Graph, n, u);

return 0;

}

**Output**



1. Write a C program to implement coin problem (find minimum number of coin) using greedy approach.

#include<stdio.h>

#define max 100

//arr - will have list of needed coins

int ans[max];

int findMinCoins(int coins[], int size, int value)

{

int i, count = 0;

for(i = 0; i < size; i++)

{

//take as much from coins[i]

while(value >= coins[i])

{

//after taking the coin, reduce the value.

value -= coins[i];

ans[count] = coins[i];

count++;

}

if(value == 0)

break;

}

return count;

}

int main()

{

int coins[] = {25,20,10,5};

int value = 105, i;

//find the size of the coins array

int size = sizeof(coins)/sizeof(coins[0]);

int MinCount = findMinCoins(coins,size,value);

printf("Total Coins Needed = %d\n",MinCount);

printf("Coins are:\t");

for(i = 0; i < MinCount; i++)

printf("%d ", ans[i]);

return 0;

}

**Output**

