DELHI TECHNOLOGICAL UNIVERSITY

(Formerly Delhi College of Engineering)

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SUBMITTED AGAINST THE MTE COMPONENT OF THE SUBJECT

Algorithm Design and Analysis (CS262)

DEPARTMENT OF APPLIED MATHEMATICS

"FOOD DELIVERY SYSTEM"

Submitted to:

Ms Neha Punetha

Submitted by:

Kashan Akram 2K20/MC/71

<u>DECLARATION</u>

I hereby declare that this project report entitled "**FOOD DELIVERY SYSTEM**" is done by us and is our own effort and that no part has been plagiarized without citations. The matter embodied in this project work has not been submitted earlier for the award of any degree or diploma to the best of our knowledge and belief.

Kashan Akram 2K20/MC/71

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<u>ACKNOWLEDGEMENT</u>

An institutional project is a golden opportunity for learning and self-development. I consider our self very lucky and honoured to have **Ms Neha Punetha**, Professor in Applied Mathematics department, Delhi Technological University, a wonderful teacher who led us through in completion of this project.

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I choose this moment to acknowledge their contribution gratefully and offer them our sincere gratitude.

A humble "Thank you'' to you, ma'am.

Kashan Akram 2K20/MC/71

__MOTIVATION__

I have always craved for good food during the night. During a late-night study session too far from home, I need someone to bring me SOME COOKED FOOD !!, or I'd have to continue surviving on Maggi. Now, these apps primarily maintain two large segments:

- One is the process of ordering.

- The other is the process of bringing their product to the customers.

and both these are one hefty job. These require large Tech support, a big chain of food restaurants, a large amount of people working to deliver food. These provide big employment opportunities for all segments. I tried and loved creating a working project of our own with similar features.

__OBJECTIVE__

- The goal was to design an efficient food delivery system for students living in and around DTU.

- To provide best food in budget ranging from street food to an expensive restaurant.

- It also gives us a scope to expand this idea throughout the city.

- Using efficient data structures, I overcame our problem of managing food menus for different restaurants.

- I implemented our knowledge of graph theory to design a map around the college giving students a wide variety of restaurants to choose from.

EXPERIMENTAL DESIGN

1. Data Structures used:

- **Arrays and vectors:** A vector are a sequence container class that implements dynamic array, means size automatically changes when appending elements. A vector stores the elements in contiguous memory locations and allocates the memory as needed at run time.

- **HashMap:** HashMap is a Map based collection class that is used for storing Key & value pairs, in C++, a hash map is known as an unordered map <key, value>. Hash maps are implemented using hash functions, a key is processed by a hash function and the returned value gives us the index for the value.

- **Set:** Sets are a type of associative containers in which each element has to be unique, because the value of the element identifies it. A set is implemented using an AVL tree. AVL

- **Trees (Adelson, Velski & Landis):** a balancing BST (Binary Search Tree), being balanced, insertion, search and deletion operations are done in O(log n) time complexity.

- **Graphs:** Formally, a graph is a pair of sets (V, E), where V is the set of vertices and E is the set of edges, connecting the pairs of vertices. I have implemented a weighted undirected graph to denote two-way roads.

2. Algorithms and Concepts used:

- **Greedy Method:** A greedy algorithm is a simple, intuitive algorithm that is used in optimization problems. The algorithm makes the optimal choice at each step as it attempts to find the overall optimal way to solve the entire problem.

- **Dijkstra algorithm:** Given a graph and a source vertex in the graph, find shortest paths from source to all vertices in the given graph. I generate a *SPT (shortest path tree)* with given source as root. I maintain two sets, one set contains vertices included in shortest path tree, other set includes vertices not yet included in shortest path tree. At every step of the algorithm, I find a vertex which is in the other set (set of not yet included) and has a minimum distance from the source.

- **Path printing using Dijkstra algorithm:** I maintain parent node for every node, parent of a node is the node by which current node is explored in the Dijkstra algorithm.

- **Multi-source Dijkstra:** To get shortest distance of a place to multiple sources.

- **Sorting and Searching** (binary search, linear search)

- Elementary concepts like loops, pointers, pairs, recursion, memoisation

EXPLANATION

Created a data set of restaurants and their food items along with the distance from the selected destination, and created a graph with nodes as all the restaurants and the locations from the data set with weighted edges the distance between the two nodes.

Using greedy paradigm and Dijkstra algorithm the shortest path was calculated to simulate a delivery system for selected nodes.

The user may choose the location of their whereabouts and according to the location a list of top restaurants will be displayed. The user will then be asked to choose a filter to display the restaurants on the basis of the price or ETA from your location. The user may then select the restaurant and further the food items they want to order by inputting serial number and quantity afterwards there's an option to use discount coupons and all.

The mode of payment will also be asked by the module and finally your food will be order successfully and module will show a "map" of all the points your delivery agent is going to traverse through.

These points are found using Dijkstra's algorithm according to the nodes I selected.

COMPLEXITIES OF THE ALGORITHMS USED

1. DIJKSTRA ALGORITHM:

- The Time Complexity of Dijkstra's Algorithm is $O(V^2)$
- The Space Complexity of Dijkstra's Algorithm is $O(V^2)$
- The Time Complexity of multi-source Dijkstra's Algorithm is $O(V^2)$
- The Space Complexity of multi-source Dijkstra's Algorithm is $O(V^2)$

2. GREEDY ALGORITHMS:

- The Time Complexity of Greedy Method for finding the path with maximum reward is $O(m*n)$ or more generally $O(n^2)$.
- The Space Complexity of Greedy Method for finding the path with maximum reward is $O(m*n)$ or more generally $O(n^2)$.

3. SORTING ALGORITHMS:

Sort	Best case time	Average case time	Worst case time	Space
Bubble sort	$\Omega(n)$	$\Theta(n^2)$	$O(n^2)$	$O(1)$
Selection sort	$\Omega(n^2)$	$\Theta(n^2)$	$O(n^2)$	$O(1)$
Insertion sort	$\Omega(n)$	$\Theta(n^2)$	$O(n^2)$	$O(1)$
Merge sort	$\Omega(nlogn)$	$\Theta(nlogn)$	$O(nlogn)$	$O(1)$
Heap sort	$\Omega(nlogn)$	$\Theta(nlogn)$	$O(nlogn)$	$O(1)$
Quick sort	$\Omega(nlogn)$	$\Theta(nlogn)$	$O(n^2)$	$O(nlogn)$

4. SEARCHING ALGORITHMS:

Search	Best Case time	Worst case time	Space
Linear Search	$O(1)$	$O(n)$	$O(1)$
Binary search	$O(1)$	$O(logn)$	$O(1)$

FULL CODE

```cpp
#include<bits/stdc++.h>

using namespace std;

#define umap unordered_map

#define mpp(x,y) make_pair(x,y)

#define pb push_back

#define ff first

#define ss second

umap<int,string> places;

umap<string,int> revPlaces;

umap<int,vector<pair<int,int>>> graph;

vector<pair<int,int>> foodplaces;

umap<int,int> par;

umap<int,int> dist;

vector<int> placesOfStay;

void printPath(int rest);

void addEdges();

void markings();

void dijkstra(int rest);

void addMenus();

umap<int,set<pair<string,int>>> menus;

vector<string> coupons={"DTU_BEST","SAVE25","BAWANABOIS","HOSTEL25"};

// struct comparator

// {

// bool operator()(const pair<string,int> &a,const pair<string,int> &b)const{

// return a.ss<b.ss;

// }

// };

bool comp1(pair<pair<int,int>,int> &a,pair<pair<int,int>,int> &b)
```

```cpp
{
 return a.ff.ss<b.ff.ss;
}
bool comp2(pair<pair<int,int>,int> &a,pair<pair<int,int>,int> &b)
{
 return a.ss<b.ss;
}
#define all(x) x.begin(),x.end()
void printmenu(int rest);
int main()
{

 markings();
 addEdges();
 addMenus();
 cout<<"\t\t\t FOODinTHRIVE "<<endl;
 cout<<"\tWhere are you currently staying at?"<<endl;
 for(int i=0;i<placesOfStay.size();i++)
 {
 cout<<"\t"<<i+1<<". "<<places[placesOfStay[i]]<<endl;
 }
 cout<<endl;
 cout<<"\t";
 int r;
 cin>>r;
 r--;
 int home=placesOfStay[r];
 cout<<"\tTop Picks for you"<<endl;
 dijkstra(home);
 cout<<"\tList of Restaurants: "<<endl;
 for(int i=0;i<foodplaces.size();i++)
```

```cpp
{
cout<<"\t"<<i+1<<". "<<places[foodplaces[i].ff]<<endl;
}
cout<<endl;
int x;
cout<<"\t\tFilter according to:\n\t1. Price \n\t2. ETA from your place\n";
cout<<"\t";
cin>>x;

vector<pair<pair<int,int>,int>> v(foodplaces.size());
for(int i=0;i<foodplaces.size();i++)
{
v[i].ff.ff=foodplaces[i].ff;
v[i].ff.ss=foodplaces[i].ss;
v[i].ss=dist[foodplaces[i].ff];
}
if(x==1)
{
cout<<"\t\tSorted from Loíst to Highest Price\n\n";

sort(all(v),comp1);
for(int i=0;i<v.size();i++)
{
cout<<"\t";
cout.width(3);cout<<left<<i+1;
cout<<". ";
cout.width(50);cout<<left<<places[v[i].ff.ff]<<"\t";
cout.width(4);cout<<left<<"Rs"<<v[i].ff.ss<<"\t ";
cout.width(5);cout<<left<<v[i].ss<<"mins\n";
}
cout<<"\n\n";;
```

```
}
else
{
cout<<"\t\tSorted from Lolst to Highest ETA\n\n";

sort(all(v),comp2);
for(int i=0;i<v.size();i++)
{
cout<<"\t";
cout.width(3);cout<<left<<i+1;
cout<<". ";
cout.width(50);cout<<left<<places[v[i].ff.ff]<<"\t";
cout.width(4);cout<<left<<"Rs"<<v[i].ff.ss<<"\t ";
cout.width(5);cout<<left<<v[i].ss<<"mins\n";
}
cout<<"\n\n";
}
cout<<"\tTell us your choice of Restaurant\n";
cout<<"\t";
cin>>x;
x--;
int rest=v[x].ff.ff;

cout<<"\t\tMenu for "<<places[rest]<<endl;
printmenu(rest);
x=1;
cout<<"\t\tHow would you like to make the payment\n\n";
cout<<"\t";
cout<<x++<<". ";
cout<<"Cash\n";
cout<<"\t";
```

```
cout<<x++<<". ";
cout<<"Credit/Debit Card\n";
cout<<"\t";
cout<<x++<<". ";
cout<<"Paytm / PhonePay / GooglePay\n";
cout<<"\t";
cin>>x;
if(x==1)
{

}
else if(x==2)
{
long long int a,b;
cout<<"\t";
cout<<left<<"Enter card number and CVV\n";
cout<<"\t";
cin>>a>>b;

}
else if(x==3)
{
long long int a;
cout<<"\t";
cout<<left<<"Enter Phone number\n\n";
cout<<"\t";
cin>>a;
}

cout<<"\t";
cout<<left<<"Food is Preparing\n\n";
```

```cpp
 cout<<"\t";
 cout<<left<<"Our service will be at your doorstep in Expected Time(ETA): "<<dist
[rest]<<" minutes"<<"\n";
 cout<<"\tOur agent is coming via: \n";
 printPath(rest);


 return 0;
}
bool f(string a)
{
 for(int i=0;i<coupons.size();i++)
 if(coupons[i]==a)
 return true;
 return false;
}
void printmenu(int rest)
{
 set<pair<string,int>>s;

 s=menus[rest];
 vector<pair<string,int>> v(s.begin(),s.end());
 int i=0;
 for(auto it=s.begin();it!=s.end();it++)
 {
 cout<<"\t";
 cout.width(3);cout<<left<<++i<<". ";
 cout.width(50);cout<<left<<(*it).ff;
 cout<<" "<<(*it).ss<<"\n";
 }
 cout<<"\n\n";
```

```cpp
int price=0;
set<pair<string,int>> currentMenu;
cout<<"\tEnter the number of items you want to add\n\t";
int n,x,qty;
cout<<"\t";
cin>>n;
for(int i=0;i<n;i++)
{
cout<<"\tEnter serial number and quantity\n\t";
cin>>x>>qty;
x--;
int pr=qty * v[x].ss;
price+=pr;
currentMenu.insert(mpp(v[i].ff,pr));
}
cout<<"\t\nYour final Menu looks like: \n\n";
i=0;
for(auto it=currentMenu.begin();it!=currentMenu.end();it++)
{
cout<<"\t";
cout.width(3);cout<<left<<++i<<". ";
cout.width(50);cout<<left<<(*it).ff;
cout<<" "<<(*it).ss<<"\n";
}
cout<<"\n";
cout<<"\t ";
cout.width(53);cout<<left<<"Final Price to pay: "<<price<<"\n\n";
cout<<"\tDo you have a discount coupon\n\t";
string a;
cin>>a;
int val=4;
```

```cpp
sort(all(coupons));
while(val--){
if(f(a))
{
cout<<"\t\t\t ***CONGRATS 25% discount applied***\n";
cout.width(55);cout<<left<<"\tYour final price is: "<<(float)0.75*price<<"\n\n";
break;
}
else if(val)
{
cout<<"\tOops coupon failed,Do you want to retry?\n\t1.Retry 0.Exit?\n\t";
int ret;
cin>>ret;
if(!ret)
{
cout<<"\t\t"<<"Your final price is: "<<price<<"\n\n";
}
}
else
{
cout<<"\t\tCoupons Failed :("<<"\tYour final price is: "<<price<<"\n\n";
}
}
}
void printPath(int cur)
{
if(par[cur]==cur)
{
cout<<places[cur]<<endl;
return;
}
```

```cpp
 cout<<places[cur]<<" -> ";
 printPath(par[cur]);
}
void dijkstra(int rest)
{
 int src=rest;
 for(auto ele:places)
 {
 dist[ele.ff]=INT_MAX;
 }
 dist[src]=0;
 par[src]=src;
 set<pair<int,int>> s; // <dist,place>
 s.insert(mpp(dist[src],src));
 while(!s.empty())
 {
 auto aage=s.begin();
 int node=(*aage).ss;
 int curdist=(*aage).ff;
 // cout<<node<<endl;
 // cout<<curdist<<endl;
 s.erase(aage);

 for(auto ele:graph[node])
 {
 int nbr=ele.ff;
 int edgewt=ele.ss;
 // cout<<places[nbr]<<" "<<dist[nbr]<<endl;
 int a=dist[node]+edgewt;
 if(dist[nbr]> a)
 {
```

```cpp
 auto x=s.find(mpp(dist[nbr],nbr));
 if(x!=s.end())
 {
 s.erase(mpp(dist[nbr],nbr));
 s.insert(mpp(a,nbr));
 }
 else
 {
 s.insert(mpp(a,nbr));
 }
 dist[nbr]=a;
 par[nbr]=node;
 }
 }
 }
 // int i=0;
 // for(auto ele:dist)
 // {
 // cout<<++i;
 // cout<<setw(20)<<places[ele.ff]<<" "<<ele.ss<<endl;
 // }
 }
 void addMenus()
 {
 set<pair<string,int>> s;
 //mc donalds
 s.insert(mpp("Chicken_Kebab_Burger",85));
 s.insert(mpp("Kebab_Double_Patty_Burger",129));
 s.insert(mpp("Maharaja_Mac",215));
 s.insert(mpp("O_Fish_Double_Patty_Burger",279));
 s.insert(mpp("Filet_O_Fish Burger",153));
```

```cpp
s.insert(mpp("Grilled Schezwan Chicken Double Patty Burger",115));
s.insert(mpp("McAloo Tikki Burger",49));
s.insert(mpp("McAloo Tikki Double Patty Burger",74));
s.insert(mpp("McChicken Burger",124));
s.insert(mpp("Chicken McNuggets Piri Piri ( 20 pc)",360));
s.insert(mpp("Chicken McNuggets Piri Piri ( 6 pc)",175));
s.insert(mpp("Chicken McNuggets Piri Piri ( 9 pc)",212));
s.insert(mpp("Chicken McWings - 12 pcs",400));
s.insert(mpp("Chicken McWings - 4 pcs",140));
s.insert(mpp("Chicken McWings - 8 pcs",270));
s.insert(mpp("Fries (L)",116));
s.insert(mpp("Fries (M)",98));
s.insert(mpp("Fries (R)",60));
menus[21]=s;
s.clear();
// s=menus[21];
// int i=0;
// for(auto it=s.begin();it!=s.end();it++)
// {
// cout<<"\t";
// cout.width(3);cout<<left<<++i<<". ";
// cout.width(50);cout<<left<<(*it).ff;
// cout<<" "<<(*it).ss<<"\n";
// }
//the chef
s.insert(mpp("french fries",70));
s.insert(mpp("chilly potato",100));
s.insert(mpp("paneer tikka",100));
s.insert(mpp("paneer tikka roll",120));
s.insert(mpp("chicken tikka roll",140));
s.insert(mpp("rajma",8));
```

```
s.insert(mpp("chole",70));
s.insert(mpp("shahi paneer",170));
s.insert(mpp("kadhai paneer",180));
s.insert(mpp("dal makhani",160));
menus[6]=s;
s.clear();
//Aggarwal
s.insert(mpp("Agarwal_ Laddu",50));
s.insert(mpp("Badam_Soan_Papdi",170));
s.insert(mpp("Bombay_Jalebi",135));
s.insert(mpp("Kalakand",150));
s.insert(mpp("Badam_Halwa",285 ));
s.insert(mpp("Gulab_Jamun (1 Pc)",36));
s.insert(mpp("Rasgulla (1 Pc)",36));
s.insert(mpp("Rasmalai(1 Pc)",36));
s.insert(mpp("Kaju_Katli",260));
s.insert(mpp("Samosa",22));
s.insert(mpp("Panipuri",60));
menus[11]=s;
s.clear();
//bittu_tikki
s.insert(mpp("bittu_special_tikki",95));
s.insert(mpp("raj_kachori",110));
s.insert(mpp("plain_dhokla",55));
s.insert(mpp("pani_puri",50));
s.insert(mpp("BTW_special_thali",276));
s.insert(mpp("tandoori_platter",248));
s.insert(mpp("chinese_platter",219));
s.insert(mpp("sambhar_vada",70));
s.insert(mpp("shahi_paneer",225));
s.insert(mpp("dal_makhani",225));
```

```
menus[26]=s;
//KFC

s.insert(mpp("Zinger_Burger ",150.00));
s.insert(mpp("Zinger_Burger_Combo", 229.00));
s.insert(mpp("2 x Zinger_Burgers",219.00));
s.insert(mpp("5 in 1 Zinger_Burger_Box",239.00));
s.insert(mpp("KFC_Favorites_Meal (Chicken_Zinger, 4 Hot_Wings, Large_Popcorn)",
375.00));
s.insert(mpp("Veg_Zinger_Burger", 140.00));
s.insert(mpp("8PC Hot & Crispy" ,650.00));
s.insert(mpp("6PC Hot & Crispy" ,550.00));
s.insert(mpp("4PC Hot & Crispy." , 380.00));
s.insert(mpp("2PC Hot & Crispy" ,200.00));
s.insert(mpp("8PC Smoky Grilled",650.00));
s.insert(mpp("6PC Smoky Grilled", 550.00));
s.insert(mpp("4PC Smoky Grilled", 380.00));
s.insert(mpp("Popcorn Rice Combo", 219.00));
s.insert(mpp("Popcorn Rice Duo", 199.00));
s.insert(mpp("5 in 1 Rice Box", 239.00));
s.insert(mpp("Smoky Rice Bowl", 180.00));
s.insert(mpp("Smoky Rice Bowl & Pepsi" ,215.00));
s.insert(mpp("Chicken Rice Bowl", 135.00));
s.insert(mpp("Pepsi Can", 30.00));
s.insert(mpp("Pepsi Bottle", 60.00));
s.insert(mpp("Red Bull ",140.00));
menus[22]=s;
s.clear();
//bikaner
s.insert(mpp("shahi_paneer",260));
s.insert(mpp("dal_makhani",230));
```

```
s.insert(mpp("rajma_chawal",130));
s.insert(mpp("chole_chawal",130));
s.insert(mpp("kadhi_chawal",130 ));
s.insert(mpp("Deluxe_thali",290));
s.insert(mpp("plain_naan",50));
s.insert(mpp("butter_naan",70));
s.insert(mpp("lachha_parantha",60));
s.insert(mpp("paneer_tikka",240));
menus[16]=s;
s.clear();
// biryani_shop
s.insert(mpp("Awadhi_Veg_Paneer_Biryani",135));
s.insert(mpp("Hyderabadi_Kathal_Biryani",130));
s.insert(mpp("Awadhi_Egg_Biryani",125));
s.insert(mpp("Hyderabadi_Chicken_Biryani",185));
s.insert(mpp("Awadhi_Chicken_Biryani",165));
s.insert(mpp("Muradabadi_Chicken_Biryani",135));
s.insert(mpp("Butter_Chicken",185));
s.insert(mpp("Chicken_Korma",205));
s.insert(mpp("Purvanchali_Chicken_Masala",155));
s.insert(mpp("Purvanchali_Mutton_Masala",215));
s.insert(mpp("Kathal_Do_Pyaza",255));
s.insert(mpp("Paneer_Butter_Masala",315));
s.insert(mpp("Tawa_Roti",8));
s.insert(mpp("Ghee_Tawa_Roti",12));
s.insert(mpp("Butter_Tawa_Roti",12));
menus[7]=s;
s.clear();
//vaishno_dhaba
s.insert(mpp("Chilli_Paneer_Gravy",110));
s.insert(mpp("Kaju_Paneer",115));
```

```
s.insert(mpp("Makhana_Paneer",110));
s.insert(mpp("Aloo_Masala_Dry",55));
s.insert(mpp("Paneer_Bhurji",220));
s.insert(mpp("Kadai_Paneer",99));
s.insert(mpp("Paneer_Do_Pyaza",99));
s.insert(mpp("Paneer_Butter_Masala",99));
s.insert(mpp("Shahi_Paneer",99));
s.insert(mpp("Chole_Paneer",99));
s.insert(mpp("Veg_Kofta",55));
s.insert(mpp("Chole_Masala",55));
s.insert(mpp("Rajma_Masala",55));
s.insert(mpp("Dal_Makhani",60));
s.insert(mpp("Arhar_Dal_Makhani_Fry",55));
s.insert(mpp("Jeera_Rice",50));
s.insert(mpp("Sada_Chawal",45));
s.insert(mpp("Paneer_Fried_Rice",55));
s.insert(mpp("Tawa_Roti_Makhan_Se",12));
s.insert(mpp("Dahi_Vada",30));
s.insert(mpp("Boondi_Raita",20));
s.insert(mpp("Chole_Chawal",120));
s.insert(mpp("Rajma_Chawal",120));
s.insert(mpp("Dal_Chawal",120));
s.insert(mpp("Kadhi_Chawal",120));
s.insert(mpp("Kheer",35));
menus[12]=s;
s.clear();
//Apsara
s.insert(mpp("Rajma_Chawal",110));
s.insert(mpp("Chole_Chawal" ,110));
s.insert(mpp("Special_Thali",180));
s.insert(mpp("Deluxe_Thali",230));
```

```
s.insert(mpp("Veg_Cutlet",70));
s.insert(mpp("Veg_Spring_Roll",110));
s.insert(mpp("Chaap_Nuggets",90));
s.insert(mpp("French_Fries",80));
s.insert(mpp("Peri_Peri_Spicy_Fries",100));
s.insert(mpp("Gol_Gappe",25));
s.insert(mpp("Dahi_Bhalla",80));
s.insert(mpp("Raj_Kachori",100));
s.insert(mpp("Rajma",160));
s.insert(mpp("Mixed_Vegetable",160));
s.insert(mpp("Chana_Masala",160));
s.insert(mpp("Mattar_Paneer",170));
s.insert(mpp("Shahi_Paneer",180));
s.insert(mpp("Malai_Kofta",180));
s.insert(mpp("Kadai_Paneer",190));
s.insert(mpp("Paneer_Butter_Masala",190));
s.insert(mpp("Veg_Manchurian_Gravy",90));
s.insert(mpp("Dal_Makhani",160));
s.insert(mpp("Veg_Biryani",180));
s.insert(mpp("Veg_Rice",80));
s.insert(mpp("Butter_Jeera_Rice",110));
s.insert(mpp("Roti",14));
s.insert(mpp("Butter_Roti",18));
s.insert(mpp("Rumali_Roti",12));
s.insert(mpp("Missi_Roti",30));
s.insert(mpp("Plain_Naan",27));
s.insert(mpp("Butter_Naan",35));
s.insert(mpp("Stuffed_Paratha",50));
s.insert(mpp("Lassi",50));
menus[15]=s;
s.clear();
```

```
//al_Qureshi
s.insert(mpp("Tandoori_Chicken",140));
s.insert(mpp("Afghani_Chicken",155));
s.insert(mpp("Chicken_Fry",115));
s.insert(mpp("Chicken_Lollipop",130));
s.insert(mpp("Tawa_Chicken",220));
s.insert(mpp("Butter_Chicken",220));
s.insert(mpp("Chicken_Tikka(6 Pcs)",215));
s.insert(mpp("Malai_Tikka(6 Pcs)",220));
s.insert(mpp("Chicken_Seekh_Kebab(6 Pcs)",155));
s.insert(mpp("Boneless_Tawa_Chicken",250));
s.insert(mpp("Boneless_Butter_Chicken",250));
s.insert(mpp("Paneer_Tikka",155));
s.insert(mpp("Chicken_Tikka_Roll",150));
s.insert(mpp("Chicken_Kebab_Roll",130));
s.insert(mpp("Rumali_Roti",10));
s.insert(mpp("Tandoori_Roti",15));
s.insert(mpp("Butter_Naan",40));
s.insert(mpp("Plain_Naan",25));
menus[18]=s;
s.clear();
}
void markings()
{
places[1]="DTU";
places[2]="DEVTA_PG";
places[3]="B3_15";
places[4]="GARG_PG";
places[5]="FUTURE_POINT";
places[6]="THE_CHEF";
places[7]="BIRYANI_SHOP";
```

```
places[8]="TRIKHA_INSTITUTE";
places[9]="BAREJA_CHEMIST";
places[10]="DIGITAL_ZONE";
places[11]="AGGARWAL_SIETS";
places[12]="VAISHO_DHABA";
places[13]="DELHI_JAL_BOARD";
places[14]="PCR";
places[15]="APSARA_RESTAURANT";
places[16]="BIKANER";
places[17]="G3S";
places[18]="AL_QURESHI";
places[19]="MARUTI_TRUE_VALUE";
places[20]="SSCBS";
places[21]="MC_DONALDS";
places[22]="KFC_SEC12_MALL";
places[23]="ISHAAN_HOSPITAL";
places[24]="AMAR_COLONY";
places[25]="MASJID_UMAR";
places[26]="BITTU_TIKKI";
places[27]="SAMAYPUR_BADLI";
places[28]="HYUNDAI_CENTRE";
for(auto ele:places)
{
revPlaces[ele.ss]=ele.ff;
}
placesOfStay.push_back(1);
placesOfStay.push_back(2);
placesOfStay.push_back(3);
placesOfStay.push_back(4);
placesOfStay.push_back(27);
foodplaces.push_back(mpp(6,350));
```

27

```
 foodplaces.push_back(mpp(7,300));
 foodplaces.push_back(mpp(11,200));
 foodplaces.push_back(mpp(12,250));
 foodplaces.push_back(mpp(15,400));
 foodplaces.push_back(mpp(16,450));
 foodplaces.push_back(mpp(18,500));
 foodplaces.push_back(mpp(21,220));
 foodplaces.push_back(mpp(22,280));
 foodplaces.push_back(mpp(26,230));
}
void help(int a,int b,int wt)
{
 graph[a].push_back(mpp(b,wt));
 graph[b].push_back(mpp(a,wt));
}
void addEdges()
{
 help(1,2,1);
 help(5,2,2);
 help(5,6,1);
 help(1,6,2);
 help(1,5,1);
 help(1,7,5);
 help(6,7,2);
 help(7,8,3);
 help(8,9,4);
 help(10,6,2);
 help(9,4,3);
 help(10,4,2);
 help(9,11,2);
 help(4,11,1);
```

```
help(11,12,4);
help(11,13,1);
help(14,13,2);
help(3,14,0);
help(13,15,4);
help(13,16,3);
help(16,15,6);
help(15,17,4);
help(16,17,4);
help(18,16,1);
help(8,9,4);
help(19,16,7);
help(20,17,6);
help(20,21,4);
help(20,22,3);
help(22,23,2);
help(21,23,2);
help(24,21,1);
help(23,25,2);
help(20,26,2);
help(25,19,10);
help(26,27,11);
help(27,28,3);
help(25,28,6);

}
```

MODULE DETAILS

```
                    FOODinTHRIVE
Where are you currently staying at?
1. DTU
2. DEVTA_PG
3. B3_15
4. GARG_PG
5. SAMAYPUR_BADLI


1
```

```
        Top Picks for you
        List of Restaurants:
        1. THE_CHEF
        2. BIRYANI_SHOP
        3. AGGARWAL_SWEETS
        4. VAISHO_DHABA
        5. APSARA_RESTAURANT
        6. BIKANER
        7. AL_QURESHI
        8. MC_DONALDS
        9. KFC_SEC12_MALL
        10. BITTU_TIKKI
```

```
        Filter according to:
    1. Price
    2. ETA from your place
    2
```

```
        Filter according to:
    1. Price
    2. ETA from your place
    2
        Sorted from Lowest to Highest ETA

    1  . THE_CHEF                      Rs  350   2   mins
    2  . BIRYANI_SHOP                  Rs  300   4   mins
    3  . AGGARWAL_SWEETS               Rs  200   7   mins
    4  . VAISHO_DHABA                  Rs  250   11  mins
    5  . BIKANER                       Rs  450   11  mins
    6  . APSARA_RESTAURANT             Rs  400   12  mins
    7  . AL_QURESHI                    Rs  500   12  mins
    8  . BITTU_TIKKI                   Rs  230   23  mins
    9  . KFC_SEC12_MALL                Rs  280   24  mins
    10 . MC_DONALDS                    Rs  220   25  mins
```

```
            Menu for AL_QURESHI
    1  . Afghani_Chicken                        155
    2  . Boneless_Butter_Chicken                250
    3  . Boneless_Tawa_Chicken                  250
    4  . Butter_Chicken                         220
    5  . Butter_Naan                            40
    6  . Chicken_Fry                            115
    7  . Chicken_Kebab_Roll                     130
    8  . Chicken_Lollipop                       130
    9  . Chicken_Seekh_Kebab(6 Pcs)             155
    10 . Chicken_Tikka(6 Pcs)                   215
    11 . Chicken_Tikka_Roll                     150
    12 . Malai_Tikka(6 Pcs)                     220
    13 . Paneer_Tikka                           155
    14 . Plain_Naan                             25
    15 . Rumali_Roti                            10
    16 . Tandoori_Chicken                       140
    17 . Tandoori_Roti                          15
    18 . Tawa_Chicken                           220
```

```
    Enter the number of items you want to add
          5
Enter serial number and quantity
4 2
Enter serial number and quantity
18 1
Enter serial number and quantity
14 2
Enter serial number and quantity
14 1
Enter serial number and quantity
5 1
```

```
Your final Menu looks like:

    1  . Afghani_Chicken                        440
    2  . Boneless_Butter_Chicken                220
    3  . Boneless_Tawa_Chicken                  50
    4  . Butter_Chicken                         25
    5  . Butter_Naan                            40

    Final Price to pay:                         775
```

```
Do you have a discount coupon
SUMEDHA_MAM_BEST
                ***CONGRATS 25%  discount applied***
Your final price is:                      581.25

        How would you like to make the payment

1. Cash
2. Credit/Debit Card
3. Paytm / PhonePay / GooglePay
2
Enter card number and CVV
746274828472 385
Food is Preparing

Our service will be at your doorstep in Expected Time(ETA): 12 minutes
Our agent is coming via:
AL_QURESHI -> BIKANER -> DELHI_JAL_BOARD -> AGGARWAL_SWEETS -> GARG_PG -> DIGITAL_ZONE -> THE_CHEF -> DTU
PS C:\Users\kunj5\Desktop\programs> █
```
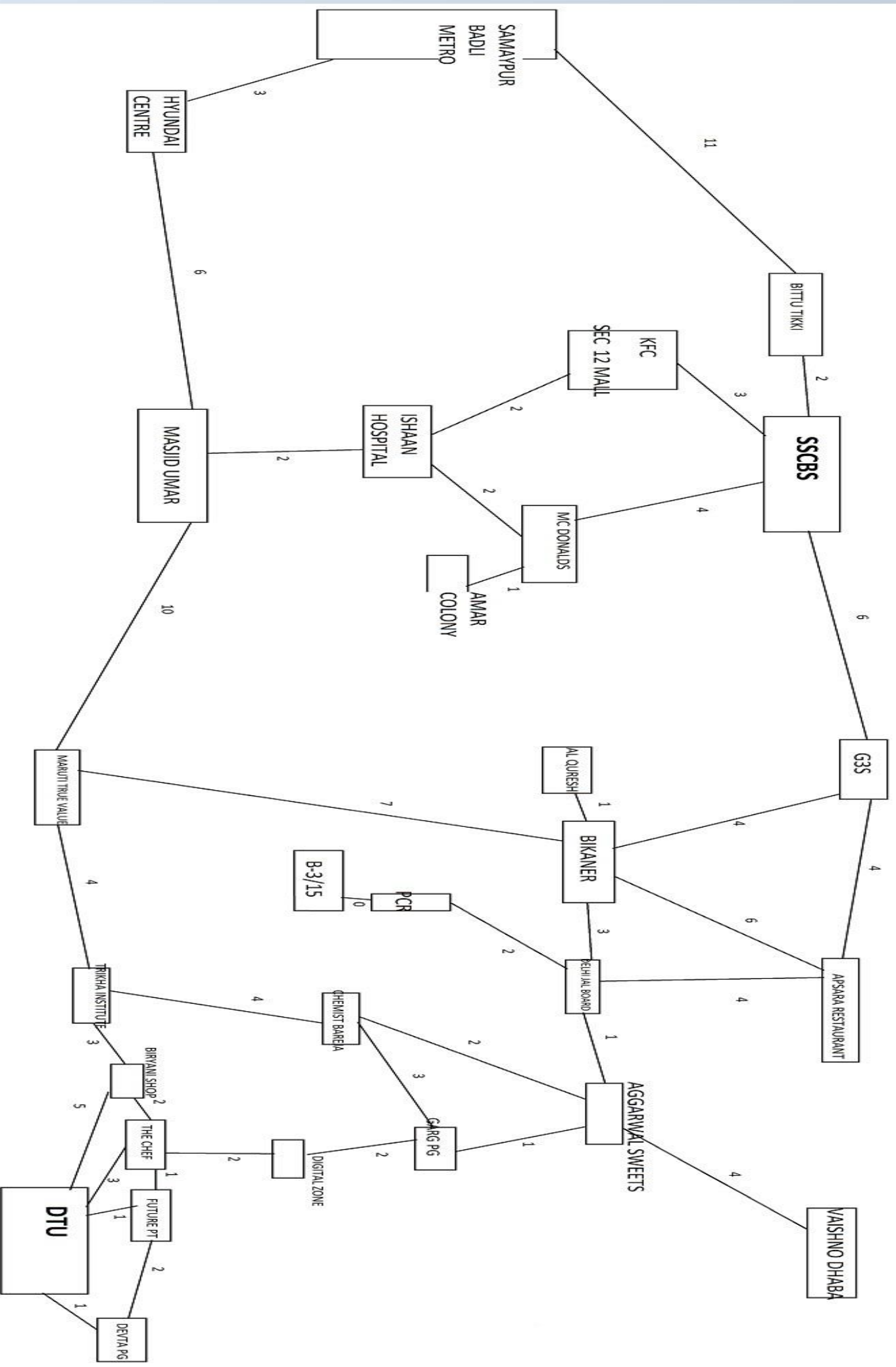
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<u>CONCLUSIONS AND FUTURE WORK</u>

- I successfully made a working food delivery project.
- For future planning, I would like to expand our project throughout the city and even beyond that.
- I have included several street restaurants and stalls, though their number is very high, I would like to expand it throughout.
- I learnt several new SSSP algorithms other than Dijkstra, which including bellman ford, learnt about multi-source Dijkstra, and how to print path using it.

<u>REFERENCES</u>

- https://cp-algorithms.com/
- https://codingblocks.com/
- https://www.geeksforgeeks.org/