MODELLING AND SIMULATION FOR FOOD ORDERING SYSTEM FOR A DIGITAL CAFETERIA

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INTRODUCTION

Here we start presenting our aim, objective and the whole work done for the project.

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OUR AIM

Nowadays, we can see the restaurant business is on its peak. So, we choose our project to,

- a digital cafeteria, where the system is under a computer program
- be more feasible
- give most comfort to the customers
- save time of the customer

OBJECTIVE

- This system of food ordering, no customer has to stay in line
- They are available with the overview of the whole menu card with which food's price
- They are being able to be conscious about the time event.
- They are also paying digitally where it is safer for the customer and also for the restaurant.

And if we see the current situation where the pandemic is preventing us from going outside and human interaction is not safe anymore, our digital restaurant or cafeteria system is a safer option for people to dine outside by avoiding crowd.

APPROACH


1
The Welcome message
2
The Presentation Event
Ordering and Billing Event
3
4
Time Event
5
The Gratitude message

APPROACH

WELCOME MESSAGE

They may arrive alone or in a group and as soon as they arrive, they will be treated with a welcome message such as “Welcome to the restaurant. Hope you are having a smile on your face”.

THE PRESENTATION EVENT

The system will show the menu card where there will be price , quantity available with the foods. The customer will also be able to see the time for preparing food. They will be able to order food as their sweet-will.

APPROACH

ORDERING AND BILLING EVENTS

System will allow the option ordering the preferable meals and also the option for modifying the order. Then according to the order, calculation and payment of bill will occur

TIME EVENT

The system will show the customer the waiting time , and inform him how much time he needs to wait for food and he can be conscious about time

THE GRATITUDE EVENT

After the payment of the order, the system will also show gratitude for receiving the food ordered by them with a message like “Thank you for ordering from us. Hope you will like your meal. Have a nice day.” This will complete the system

TECHNICAL DOCUMENTATION AND RESULT

HERE WE WILL PRESENT OUR CODE , RESULTS AND THE EXPLANATION OF THE CODES AND CONCEPTS FOR MAKING THIS PROJECT SUCCESSFUL.

AND ALSO INCLUDE THE GRAPH CHART AND ALSO THE SURVEY RESULTS

DOCUMENTATION PLAN

Our goal is present a proper working , efficient , beneficial food ordering system for a digital cafeteria

Conducted a quick survey with people to get the opinion about this system

Taking c++ language for to build the code

Identifying the problem and making a structure to solve and implement it

Codeblocks, Turbo C++ as software and some websites as references help us to reach our goal

STRUCTURE AND DESIGN

We took our project name as “FOOD ORDERING SYSTEM FOR A DIGITAL CAFETERIA”

Sort out the problem step by step and also build the solution alongside

We combine all the solutions sequentially and make it easier to understand and also make it feasible.

We try to make this system user friendly

After completing the whole code, it will be easier for the developers to understand the code to develop further if needed.

After identifying the problem, firstly we make a draft

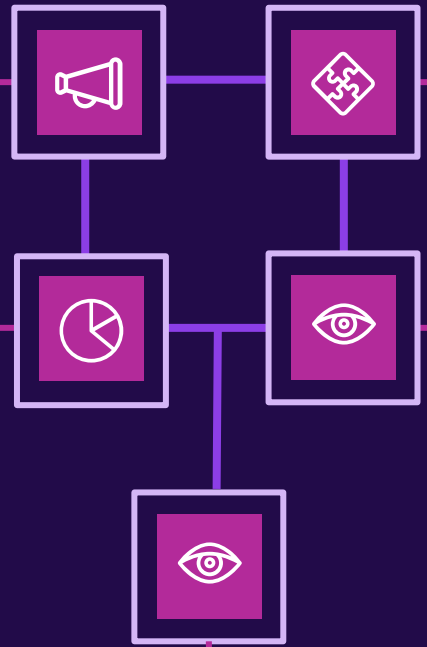
Secondly, according to the draft we made a flowchart

We took all necessary information and followed the proper steps for the accuracy of the flowchart.

Double checked the flowchart for better options

According to the flowchart, we build our code.

CONCEPT USED



Single Server Queue

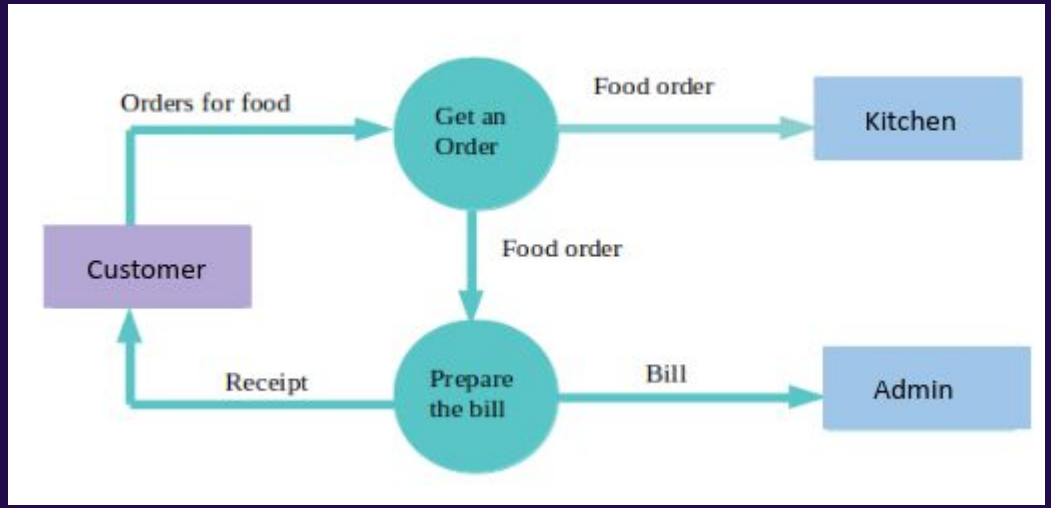
Discrete System

Multiple server Queue

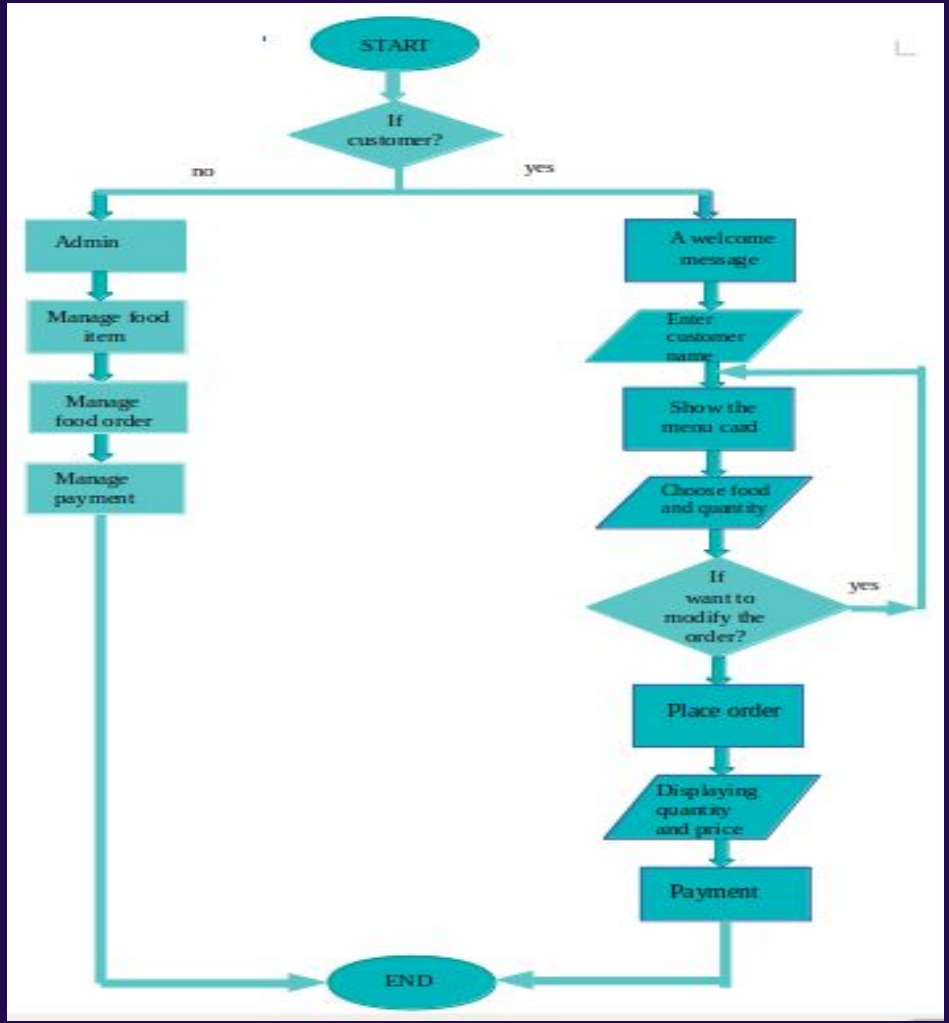
Time Advance Mechanism

Concepts Of C++ Programming

DATA FLOW DIAGRAM



FLOWCHART



IMPLEMENTATION OF QUEUEING SYSTEM

HERE, WE ARE SHOWING A DRAFT WHERE WE TOOK PEAK HOURS AS 12pm, TAKING 7 CUSTOMERS IN 10 MINUTES AND IMPLEMENTED FOR OUR SYSTEM

CUSTOMER	ARRIVAL TIME OF CUSTOMER	SERVICE TIME BEGINS	DURING SERVICE TIME	SERVICE TIME ENDS	WAITING TIME OF CUSTOMER	IDLE TIME OF THE SYSTEM
01	00	00	02	02	00	00
02	01	02	01	03	01	00
03	04	04	01	05	00	**01**
04	05	05	01	06	00	00
05	06	06	01	07	00	00
06	09	09	02	11	00	**02**
07	10	11	02	13	**01**	00

Table For Bar CHART

EVENTS	CUSTOMER NUMBER	CLOCK TIME
ARRIVAL	01	00
ARRIVAL	02	01
DEPARTURE	01	02
DEPARARTURE	02	03
ARRIVAL	04	04
DEPARTURE	03	05
ARRIVAL	04	05

EVENTS	CUSTOMER NUMBER	CLOCK TIME
DEPARTURE	04	06
ARRIVAL	05	06
DEPARTURE	05	07
ARRIVAL	06	09
ARRIVAL	07	10
DEPARTURE	06	11
DEPARTURE	07	13

BAR CHART

- Average waiting time 0.28
- Probability of idle time 0.06

A DRAFT IMPLEMENTATION OF SINGLE SERVER QUEUE

TIME BETWEEN ARRIVAL	PROBABILITY	CUMULATIVE PROBABILITY	RANDOM DIGITS
01	0.07	0.07	0-07
02	0.07	0.14	08-14
03	0.07	0.21	15-21
04	0.07	0.28	22-28
05	0.07	0.35	29-35
06	0.07	0.42	36-42
07	0.07	0.49	43-49
08	0.07	0.56	50-56
09	0.07	0.63	57-63
10	0.07	0.70	64-70

DISTRIBUTION TABLE OF SERVICE TIME:

Order time / service time	PROBABILITY	CUMULATIVE PROBABILITY	RANDOM DIGITS
01	0.30	0.30	0-30
02	0.25	0.55	31-55
03	0.2	0.75	56-75
04	0.1	0.85	76-85
05	0.1	0.95	86-95
06	0.03	0.980	96-98
07	0.02	1.00	98-100

RANDOM VALUES ARE: 15,25,30,40,35,55,44,60

DETERMINING THE TIME BETWEEN ARRIVAL:

CUSTOMER	RANDOM DIGIT	TIME BETWEEN ARRIVAL
01	0	0
02	15	3
03	25	4
04	30	5
05	40	6
06	35	5
07	55	9

RANDOM VALUES ARE: 11,25,35,38,60,98.96.44.65

DETERMINING THE TIME BETWEEN SERVICE:

CUSTOMER	RANDOM DIGIT	TIME BETWEEN SERVICE
01	11	1
02	25	1
03	35	2
04	38	2
05	60	4
06	98	7
07	96	6

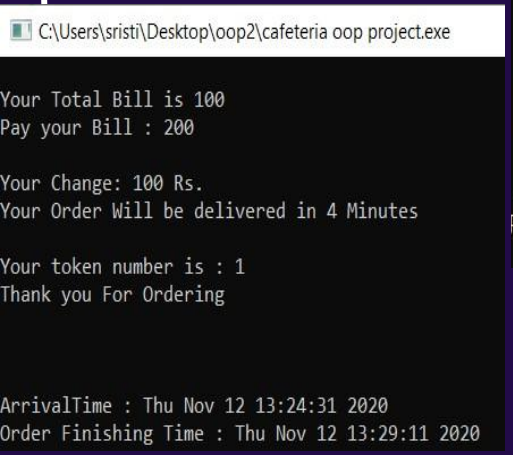
SINGLE SERVER QUEUEING SYSTEM

CUSTOMER	INTER ARRIVAL TIME	ARRIVAL TIME	SERVICE TIME	TIME SERVICE START	WAITING TIME OF CUSTOMER	TIME SPEND ENDS	TIME SPEND IN SYSTEM	IDLE TIME
1	0	0	1	0	0	1	1	0
2	3	3	1	3	0	4	1	2
3	4	7	4	7	0	11	4	3
4	5	12	2	12	0	14	2	3
5	6	18	6	18	0	24	6	4
6	5	23	7	24	1	31	7	0
7	9	32	6	32	0	38	6	1
TOTAL=			27		1		27	13

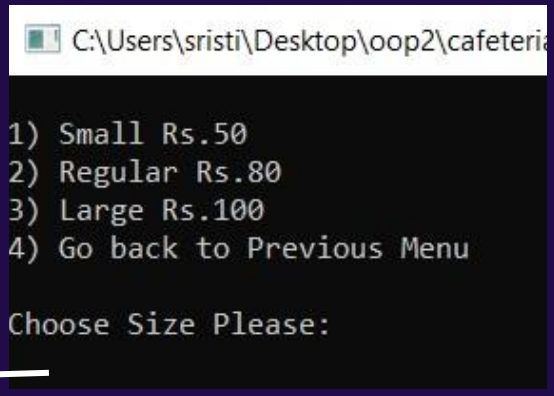
- Average Waiting time : 0.14 minute
- Probability of idle time of system : 0.34 . That means 34%

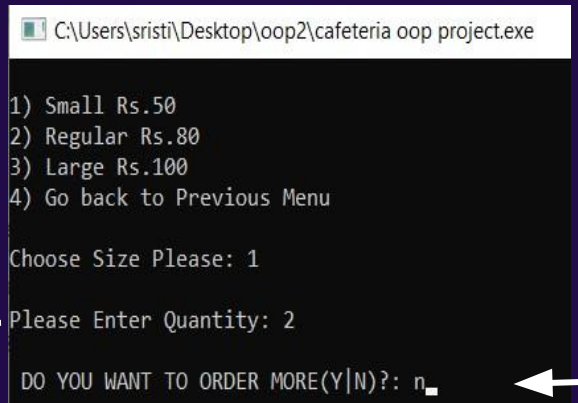
OUTPUT

END START



FOR CUSTOMER

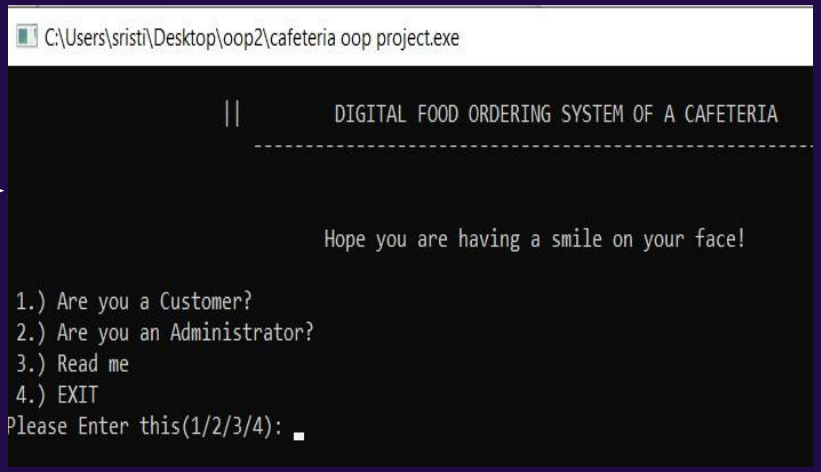


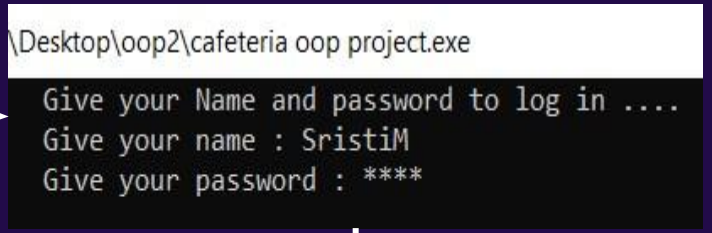


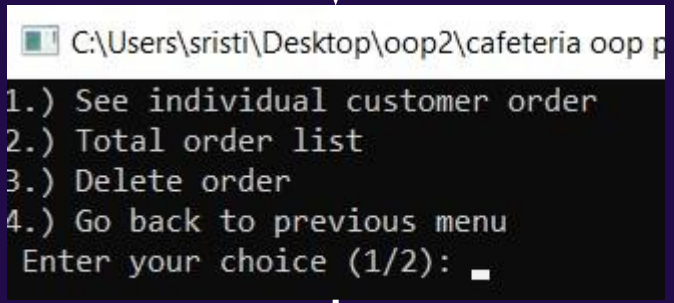
OUTPUT

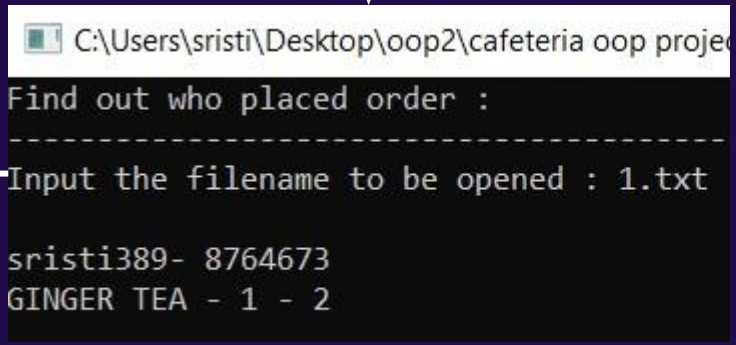
START

END

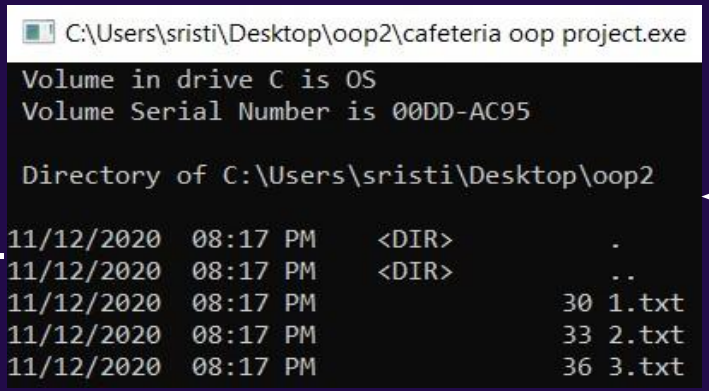


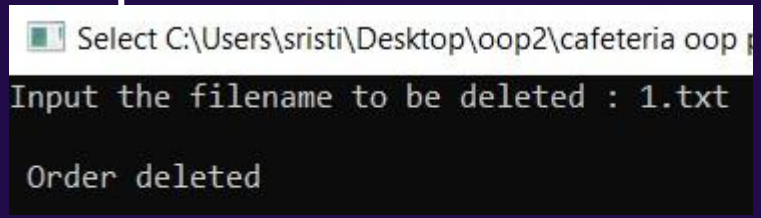






For Administration Side





CONCLUSION

The visualization of customer and counters utilization combined with statistical data can be used by expert to redefine digital cafeteria. Possible transformations of the schedule are also visible.
This model provides “what if” analysis for further improvement of the schedule generated with heuristic algorithms. The system constructed by us will be server friendly. It is also useful for cafeteria schedule adjustment for unexpected changes of input data and parameters, when heuristics are excessive for regeneration of a new schedule.
By the respective project, we are showing a fully digitalized cafeteria which will be efficient and beneficial for both the customer and our system.

THANKING YOU

Does anyone have any questions ?

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