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Airline Reservation System

Software Engineering Project

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AIRLINE RESERVATION **SYSTEM**

Software Engineering Project Report

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Under the supervision of:

TutorialsDuniya.Com



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(University of Delhi)

ACKNOWLEDGEMENT

On the successful completion of our project **AIRLINE RESERVATION SYSTEM**, we would like to express our sincere gratitude to everyone who helped us in the completion of the project.

We are sincerely thankful to our project guide **TutorialsDuniya.Com** for his interest, guidance and suggestions throughout the course of the project. We feel honored and privileged to work under him. He shared his vast pool of knowledge with us that helped us steer through all the difficulties with ease. This project would not have been possible without his guidance.

CERTIFICATE

This is to certify that the project entitled “**Airline Reservation System**” submitted by **Sahil Gupta** and **Vikash Saw** has been carried out under our supervision. The project has been submitted as per the requirements in the fourth semester of B. Tech Computer Science.

Teacher-in-charge

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Problem Statement

Airline reservation system is aimed at reserving flights for people. Any such system that is operated manually consists of airline employee(s) and customers who interact face to face to reserve the required flight. A major drawback of manual airline reservation system is the need for physical presence of the user at the ticket window. It also requires the employee sitting at the reservation counter to be fast enough to deal with large number of customers, or the company will have to hire more number of employees for this purpose.

Due to the presence of these drawbacks, there is a need for ARS .This software interacts with the user to get the details of the flight that he/she wants to reserve. These details include the source and destination city along with the number of passengers, date of the flight and the class by which the user wishes to travel. After accepting these details, the software displays the list of all the available flights for the specified trip. To proceed, the user selects one of the available flights and makes the payment after selecting the seat positions. Then, the user is provided with his/her boarding pass.

Flight reservation software enables simultaneous booking of seats by allowing multiple users to access the airline's website. It allows people to use this service at any time, also eliminating the need to travel to airline offices to book their flights.

Airline reservation software is a boon not only for the customers but also for the airline companies.

1 Introduction

1.1 Purpose

The main purpose of this software is to simplify the tedious task of booking airline tickets by providing this service online in a user friendly environment. It also aims at increasing the efficiency and reducing the drawbacks of existing manual airline reservation process, thus making it more convenient for the customers to book the flights as when they require.

This project is supported by a well designed DBMS in which flight information is integrated together. A friendly UI is also provided so that the searches made by the user give correct results by accessing the information stored in the database.

1.2 Scope

This software allows the users to view the availability of various flights on different dates and time. It gives them the facility to book a ticket, enquire about the total cost, make online payments and modify or cancel a particular reservation if required.

1.3 Definitions

- ARS - Airline Reservation system
- UI - User Interface
- DBMS – Database Management System

1.4 Overview

The rest of the document deals with all the main features of this software. It not only describes various functions but also gives details about how these functions are related to each other. Apart from the data flow diagrams, the document also contains cost estimates for developing this system. Various risks associated with the system have also been mentioned along with the ways to mitigate them.

The timeline chart describing how the entire project was scheduled has been attached followed by the architectural design of the software. At the end a pseudo code for the “reservation module” has been provided. A flow graph has been generated corresponding to this module, cyclomatic complexity has been computed and test cases that were used to test the system have also been mentioned.

1.5 Process Model

We choose Waterfall model because of the following reasons:

- It's relatively simple and easier to understand approach as compared to other models.
- The requirements are well stated and understood before in hand.
- In this model we have to complete one stage before proceeding to next. So ,we have clearly defined stages and well understood milestones.
- The advancement in program does not need to be checked upon by the customer during the process. So this model does not create problem.
- The requirements are fixed and work can proceed to completion in a linear manner.
- The Waterfall Model provides a structured approach.

2 Software Requirement Specification

2.1 Overall Description

2.1.1 Product perspective

The manual airline reservation system suffers from the following drawbacks:-

- The existing system involves a lot of paper work and manual calculation. This has lead to inconsistency and inaccuracy in the maintenance of data.
- The data, which is stored on the paper only, may be lost, stolen or destroyed due to natural calamity like fire and water.
- The existing system is sluggish and time-consuming causing inconvenience to customers and the airlines staff.
- Since the number of passengers have drastically increased therefore maintaining and retrieving detailed record of passenger is extremely difficult.
- An airline has many offices around the world, an absence of a link between these offices lead to lack of coordination and communication.

Hence the airline reservation system is proposed with the following **Product**

Perspective:

- The computerization of the reservation system will reduce a lot of paperwork and hence the load on the airline administrative staff.
- The machine performs all calculations. Hence chances of error are nil.
- The passenger, reservation, cancellation list can easily be retrieved and any required addition, deletion or updation can be performed.
- The system provides for user-ID validation, hence unauthorized access is prevented.

2.1.2 Product functions

The “ARS” software is an independent web based application. There are various user interfaces related with this software. These interfaces help the user to interact with the software and provide the necessary information for online ticket reservation.

The entire functionality of this software can be subdivided into fields/modules. The names of the fields involved in the airline reservation system are

1. FLIGHT DETAILS

2. CHECK AVAILABILITY

3. BOOK TICKET

4. CANCELLATION

MODULE 1: FLIGHT DETAILS

Using this module, the user first enters the details of his journey like source, destination, date, number of passengers and time.

• MODULE 2: CHECK AVAILABILITY

This module is used to check the availability of the flights based on the information provided by the user in module 1.

• MODULE 3:BOOK TICKET

This module is used to book the ticket after checking the availability of tickets in the flights. A ticket can be booked to a maximum of five passengers at a time.

• MODULE 4: CANCELLATION

This module is used by the customer to cancel his reservation. The customer enters the unique ID provided to him at the time reservation. Using this id, he may cancel his tickets.

Various interfaces involved in ARS have been designed and implemented using C++. All the information about flights is maintained in C++ files which act as databases for the software.

2.1.3 User characteristics

- The user of the system should be comfortable working with English language.
- The user must have a basic knowledge of computers and internet.

2.1.4 General Constraints

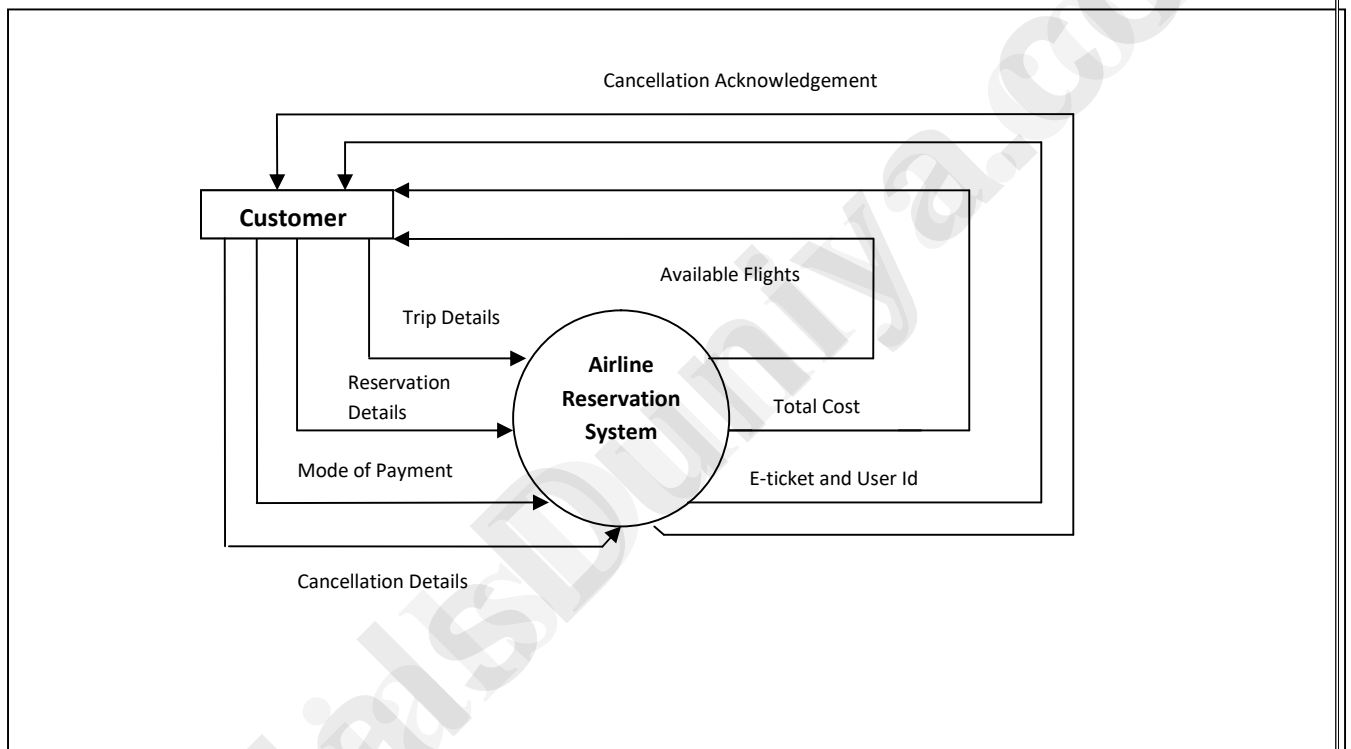
- The database of the software is not accessible to every user of the software. Making changes in the database requires permissions that have been given to certain specific individuals.

2.1.5 Assumptions and Dependencies

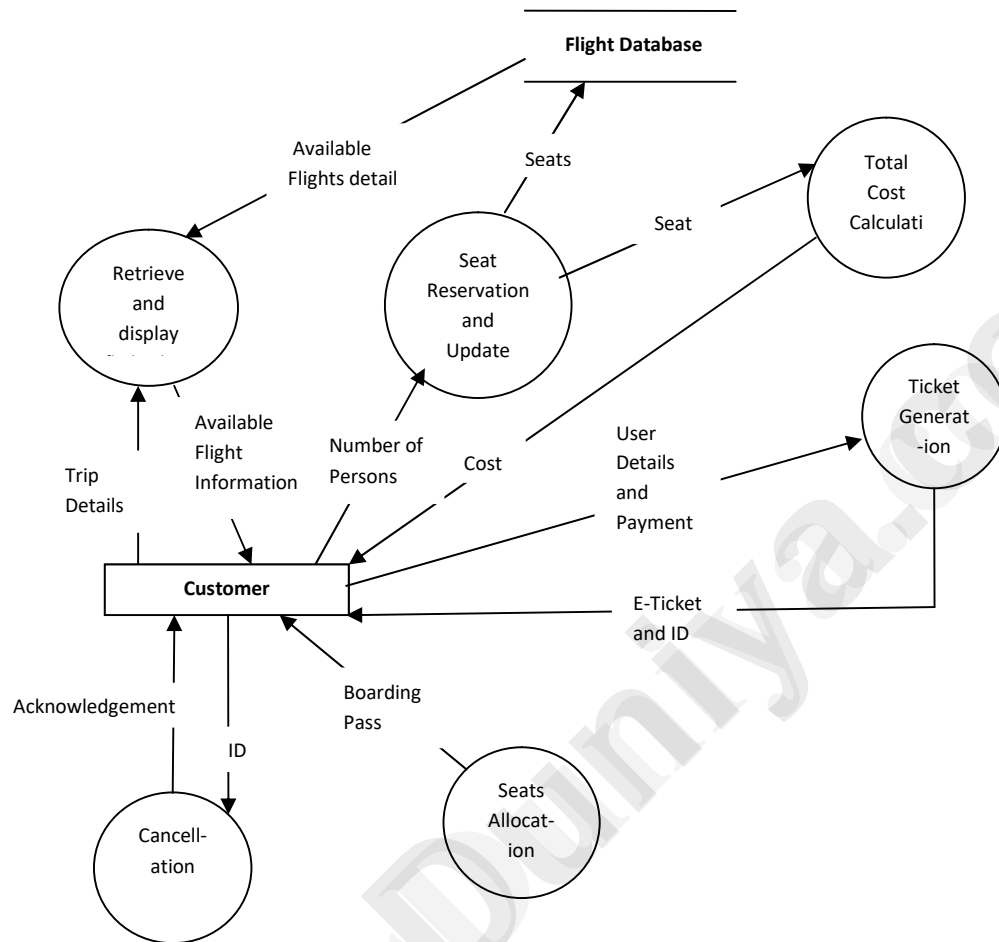
- The ARS is assumed to be compatible with the computer systems on which it has been loaded for customer use.

2.2 Data Flow Diagram

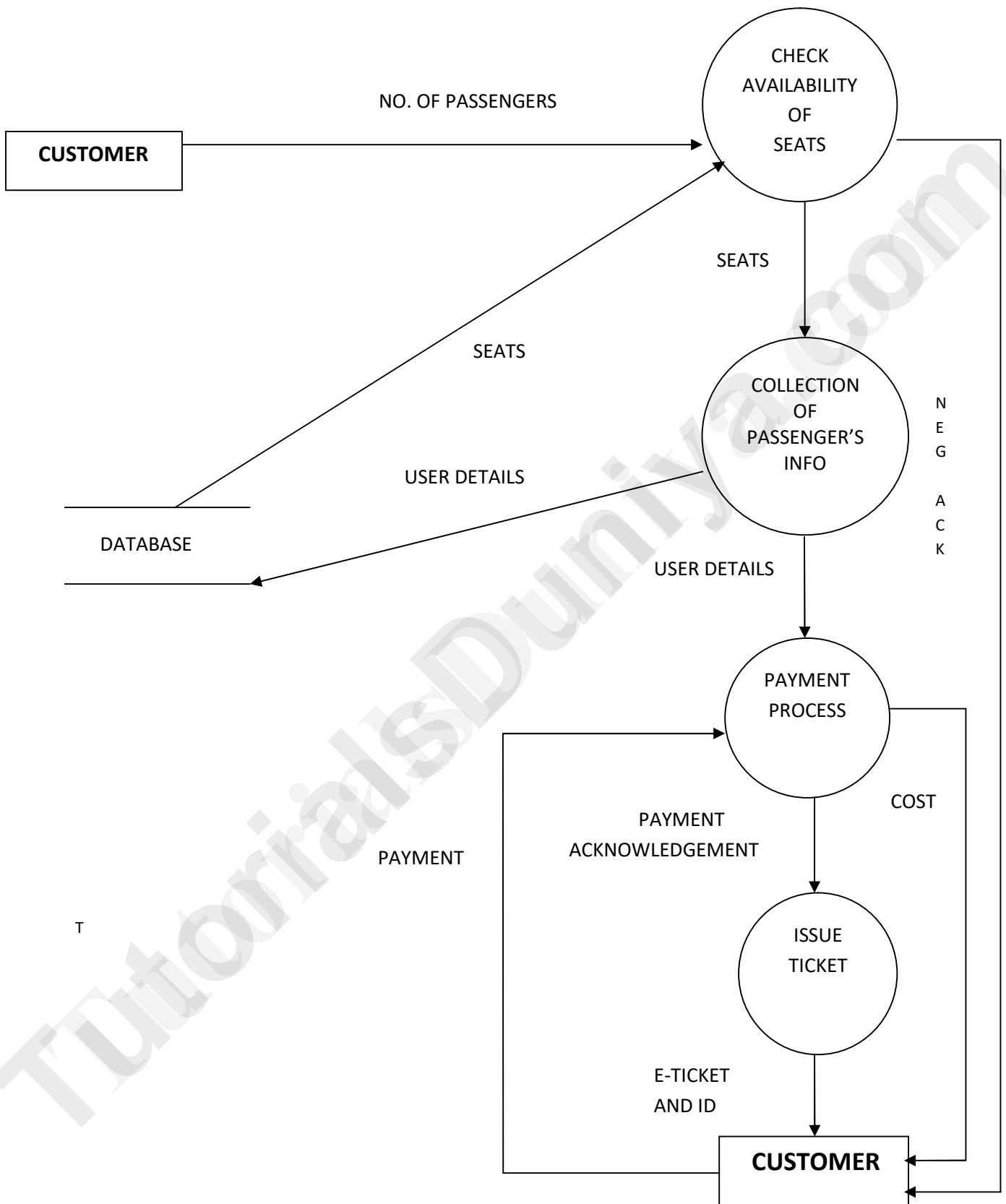
2.2.1 DFD Level 0



2.2.2 DFD Level 1



2.2.3 DFD Level 2 : Reservation Module



2.2.4 Data Dictionary

Data	Description
Journey details	[departure city+ arrival city + Date + no_of_passengers]
Flight Selection	[Flight_no. + departure_time + arrival time + Departure_city + arrival_city + basefare] + [Names_of_passengers]*
Flight details	[flightno + departure_time + arrival_time + basefare]
Cost	[basefare + fuel Surcharge + CUTE + UDF + Stax]
Payment details	[Cardno + name + cvv + expirydate]
Itinerary	[Departure_city + arrival_city + Date + no_of_passengers + flight_no + departure_time + arrival_time + [Names of passengers]*+TOTAL FARE]
Flight Status	[Arrival_city + departure_city + date + time]
Confirmation details	[PNR + flightno + flightpassenger_name + DATE]
Confirmation	[Payment_confirmation + Journey details + Flight Details]

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3 Project Management

3.1 Cost Estimations

3.1.1 Functional Point Estimation

		GRADE VALUE
1	Does the system require reliable backup and recovery?	5
2	Are specialized data communications required to transfer information to or from the application?	3
3	Are there distributed processing functions?	4
4	Is performance critical?	0
5	Will the system run in an existing, heavily utilized operational environment?	5
6	Does the system require on-line data entry?	5
7	Does the on-line data entry require the input transaction to be built over multiple screens or operations?	4
8	Are the ILFs updated online?	5
9	Are the inputs, outputs, files, or inquiries complex?	2
10	Is the internal processing complex?	2
11	Is the code designed to be reusable?	2
12	Are conversions and installations included in the design?	0
13	Is the system designed for multiple installations in different organizations?	5
14	Is the application design to facilitate change and for ease of use by the user?	5

VALUE ADJUSTMENT FACTORS, $\Sigma f_i = 47$

INFORMATION DOMAIN VALUE	EST. COUNT	WEIGHING FACTOR	WEIGHING COUNT
1. EXTERNAL INPUT	3	4	12
2. EXTERNAL OUTPUT	4	5	20
3. EXTERNAL INQUIRIES	1	5	5
4. NUMBER OF LOGICAL FILES	1	10	10
5. EXTERNAL INTERFACE FILES	1	7	7
TOTAL	54		

COMPUTING FUNCTION POINTS:

$$FP = \text{COUNT TOTAL} * (0.65 + 0.01 * \Sigma f_i)$$

$$= 54 * (0.65 + 0.01 * 47)$$

$$= 60.48$$

3.1.2 Efforts

The average productivity for this kind of system =6.5 FP/pm

Considering the labour rate=\$8000

Cost per FP = \$1230

Total efforts = FP (calculated) / average productivity

$$= 60.48 / 6.5$$

$$= 9.304 \text{ person months}$$

Total cost for the project = Total efforts * labour rate

$$= 9.304 * 8000$$

$$= \$74432$$

3.2 Risk Table

Risks	Category	Probability	Impact	Mitigation
Lack of skill	ST	40%	2	External resources might help
Quality not maintained	DE	60%	3	Take up steps to maintain quality at each stage of development.
Building the wrong product	CU	30%	1	Early and continuous validation is critically important. You need to establish a clear vision and solid justification for the product.
Size estimates may be low	PS	50%	2	Past experiences must be considered and a similar task on a smaller scale may be attempted
Requirements not properly documented and understood	CU	50%	1	Regular interaction with the customer and getting the requirements verified before finalising them
Delivery deadline will be tightened	BU	40%	2	Review the progress from time to time and take appropriate steps to keep up with the schedule

1-Catastrophic

2-Critical

3-Marginal

4-Negligible

PD-Process Definition

ST-Staff-size and experience

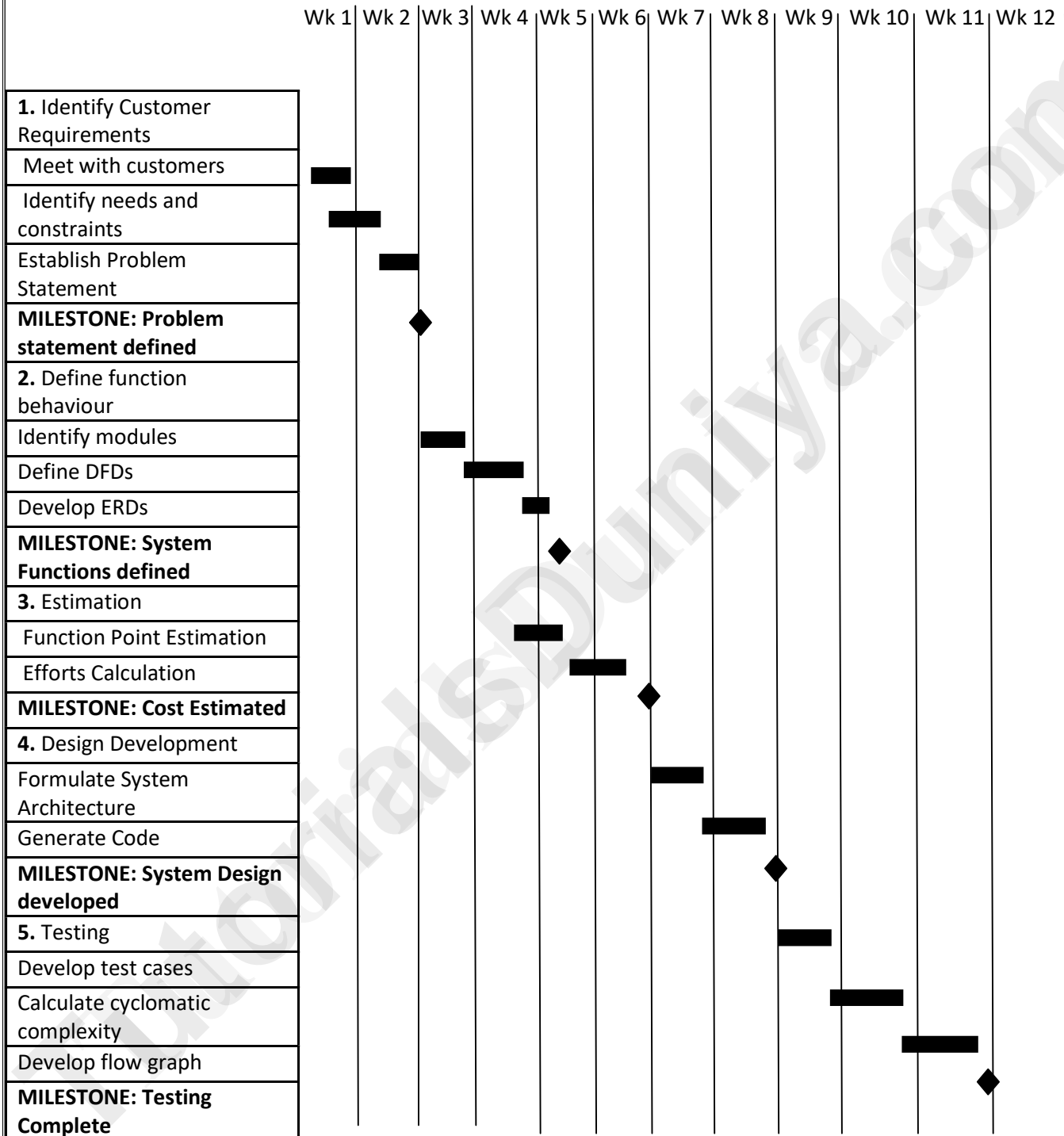
DE-Development Environment

CU-Customer Characteristics

BU-Business Impact

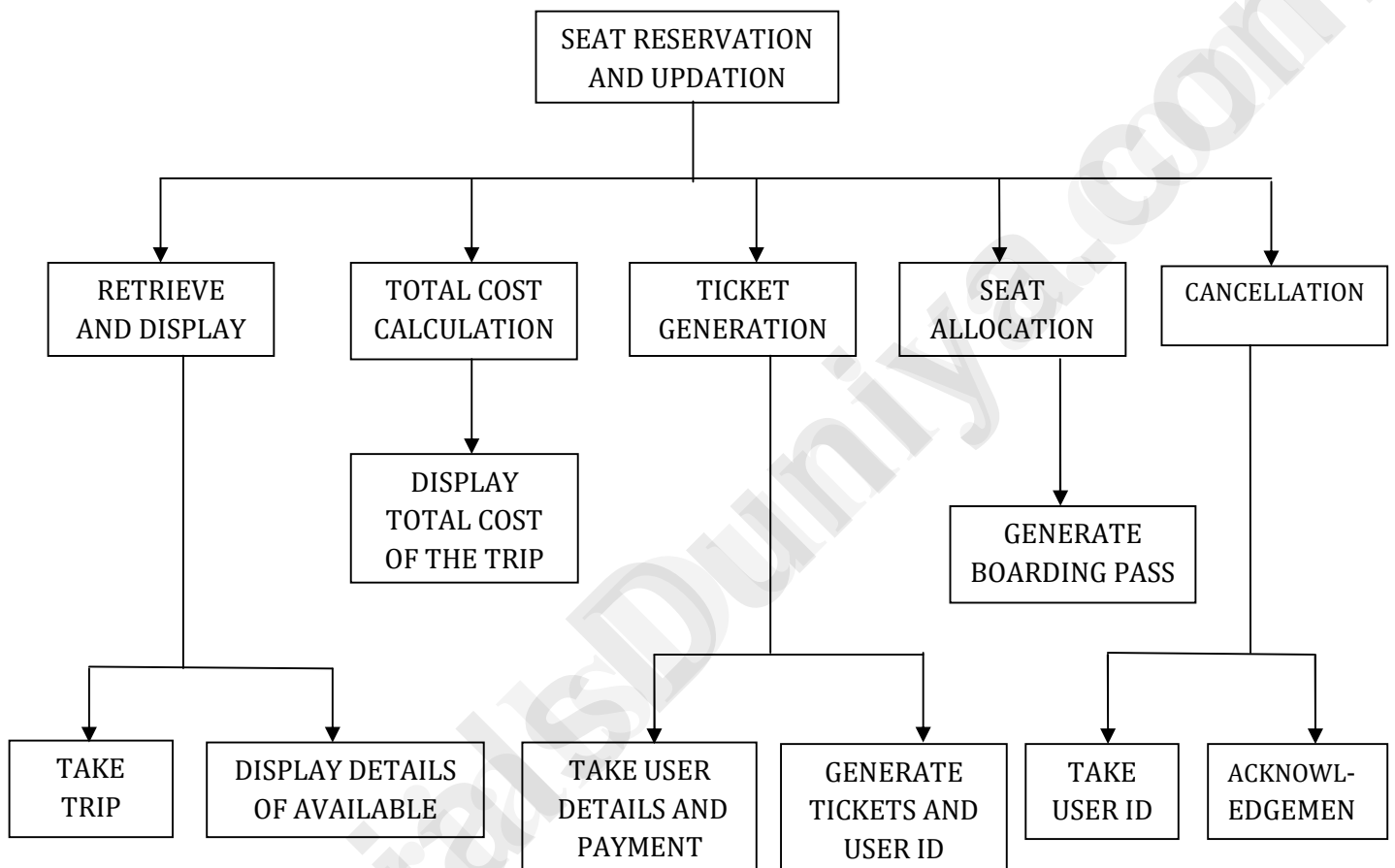
PS-Product Size

3.3 Timeline



4 Design Engineering

4.1 Architectural Design



4.2 Data Design

TRIP DETAILS

SOURCE	VARCHAR(30)
DESTINATION	VARCHAR(30)
DATE	INT
NUMBER OF SEATS	INT
CATEGORY	CHAR
PLANE NUMBER	INT

TICKET

NAME	VARCHAR(30)
SOURCE	VARCHAR(30)
DESTINATION	VARCHAR(30)
DATE	INT
FLIGHT NUMBER	INT
ID	INT

CUSTOMER

NAME	VARCHAR(30)
AGE	INT
E-MAIL	VARCHAR(30)
PHONE	LONG
GENDER	CHAR

ADDRESS	VARCHAR(30)
CREDIT CARD NUMBER	LONG

BOARDING PASS

ID	INT
SEAT NUMBER	INT

4.3 Component Level Design

PSEUDOCODE

```

1  { int mode, plno;
    char pname[10], source[20], dest [20],arr[20],dep[20],ch[250];
2  reserve()

3  { cout<<"\nEnter details of the passenger: ";
    cout<<"\nName      - ";
    cin.getline(name,20);
    cout<<"\nAddress : ";
    cin.getline(addr,20);
    cout<<"\nE-Mail ID : ";
    cin.getline(email,20);
    cout<<"\nTelephone no : ";
    cin>>phone;
    cout<<"\nEnter the date of travelling : ";
    cin>>date;
  }

```

```

4         while(r)
5     {
6         r.getline(ch,250);
7         cout<<ch<<endl;
8
9         end of while
10        cout<<"\n\t1:Domestic\n\t2:International\nEnter the mode:";
11        cin>>mode;
12
13        if(mode==1)
14        {
15            cout<<"\nEnter the plane 1 or 2 or 3 : ";
16            cin>>plno;
17            switch(plno)
18            {
19                case 1: strcpy(pname,"D1");
20                    strcpy(source,"Delhi");
21                    strcpy(dest,"Mumbai");
22                    strcpy(dep,"10:00");
23                    strcpy(arrv,"11:00");
24                    break;
25                case 2: strcpy(pname,"D2");
26                    strcpy(source,"Mumbai");
27                    strcpy(dest,"Kolkata");
28                    strcpy(dep,"12:00");
29                    strcpy(arrv,"13:15");
30                    break;
31            }
32        }
33        else if(mode==2)
34        {
35            cout<<"\nEnter the plane 1 or 2 or 3 : ";
36            cin>>plno;
37            switch(plno)
38            {
39                case 1: strcpy(pname,"I1");

```

15

```
strcpy(source,"Mumbai");
```

```
strcpy(dest,"London");
```

```
strcpy(dep,"00:30");
```

```
strcpy(arrv,"10:30");
```

```
break;
```

16

```
case 2: strcpy(pname,"I2");
```

```
strcpy(source,"Delhi");
```

```
strcpy(dest,"Paris");
```

```
strcpy(dep,"03:20");
```

```
strcpy(arrv,"13:20");
```

```
break;
```

17

```
randomize();
```

```
pword=random(100);
```

```
cout<<"\nYour reservation number is:\t"<<pword;
```

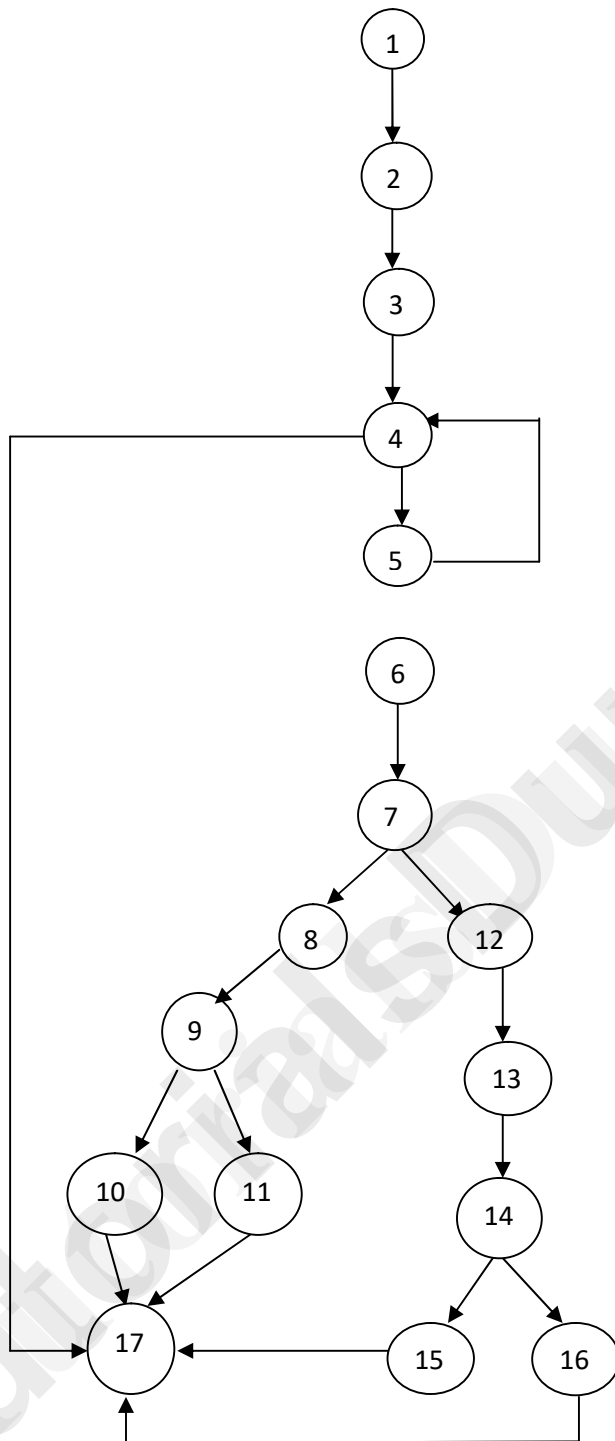
5 Testing

TEST CASES

TEST CASE	NAME	ADDRESS	EMAIL ID	PHONE NUMBER	DATE	MODE	PLANE	PASSWORD	EXPECTED ERROR
1	sahil	100, west_enclave delhi	id1@yahoo.co.in	1111111	3	1	1	131	---
2	vikash	16,umanroad,haryana	id2@yahoo.co.in	11156711	6	1	2	145	---
3	Aditya	D-45/34,sector6,delhi	id3@yahoo.co.in	7894691	4	1	3	94	---
4	Nikhil	B220,vivek_vihar	id4@yahoo.co.in	11168999	9	2	1	153	---
5	Varun	paharganj,uttar_pradesh	id5@yahoo.co.in	19873361	8	2	2	48	---
6	rashika	Andhra_pradesh	id6@yahoo.co.in	19078531	6	2	3	67	---
7	abc	100,umanroad,chandigarh	id7@yahoo.co.in	13478549	9	4			Mode can be either 1 or 2

8	Omn	56,umanr oad,himac hal	jdabc@yahoo.co.in	1117890	1	7			Plane number should be either 1 or 2 or 3
9	suhas	80,umanr oad,ch-17	isfghkljhgfdddsabc@yahoo.co.in	1111111	2				Email id cannot be greater than 30 character
10	Ankit	100,uman, Chennai, Tamil Nadu	ida23c@yahoo.co.in	2345678					Address must be less than 30 character and should not have white spaces.
11	Abc	Gaziabad, u.p	jdabc@yahoo.co.in	11111112 22222222 22444445 555555					Phone number cannot be greater than 30 character
12	Kmn	100,uman road,ch- 17	ida0c@yahoo.co.in	1111111					Name cannot be greater than 30 character
13	Xyz	tamil_nad u,india	jdab@yahoo.co.in	33341111	3/4/ 12				Exclude month and year from date

FLOW GRAPH



CALCULATING CYCLOMETIC COMPLEXITY

$$P = 4$$

$$E = 20$$

$$N = 17$$

$$R = 5$$

WHERE P = NO OF PREDICATE NODES

E = NO. OF EDGES

N = NO. OF NODES

R = NO. OF REGIONS

$$\text{CYCLOMATIC COMPLEXITY} = E - N + 2$$

$$= 20 - 17 + 2$$

$$= 5$$

OR

$$\text{CYCLOMATIC COMPLEXITY} = P + 1$$

$$= 4 + 1$$

$$= 5$$

OR

$$\text{CYCLOMATIC COMPLEXITY} = R$$

$$= 5$$

6 References

- <https://www.tutorialsduniya.com>
- Software Engineering: A Practitioner's Approach by Roger S. Pressman
- An Integrated Approach to Software Engineering by P. Jalote
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