FOOD WASTE MANAGEMENT

Software Engineering

Project Report

(32341402)

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Problem Statement

Food wastage is a big problem specially in metro cities where a lot of food is wasted in restaurants, banquets, outlets, etc. The food management software will act as an interface between restaurants which can donate food & people in need of food.

Process Model

The model chosen for our project is 'Waterfall Model'. The requirements are well known i.e. it is known what all functionalities and behavior should be there .The technology is understood and well incorporated in the project. There is no ambiguity in requirements and they are met in the project .Very less customer interaction is involved during the development of the product. Once the product is ready then only it can be demoted to the end users. Thus this model suits the best for project.

1. Software Requirement Specification

This system provides free food to people who cannot afford to eat a meal on their own. This proposed system can be used by any naïve user and it does not require any educational level, experience or technical expertise in computer field but it will be of good use if user has the good knowledge of how to operate a computer.

1.1 Overall Description

The registered restaurants will just need to fill up a donation form on the software and approve the pickup after which the employees/volunteers will carry the food in food trucks to the respective nearest food booths. The registered users can then reach the food booth and eat the food and in return provide feedback about the food which will be used to provide restaurants with digital coins which they can redeem for advertisements on the website or android app.

Hence, this system will be able to reach a large number of people who cannot afford a meal and also benefit the donators (restaurants/banquets) by promoting their outlets and appreciable efforts.

1.1.1 Product Function

The food waste management app would have the following basic functions:

- Display all the categories available for login into the system on the system's main page.
- Display all the available booth locations on the home page.
- Allow the administrator to add new booths to the existing list of available booths.
- Allow the administrator to update the information about food distribution booths.
- Allow the administrator to view and edit information about each user that uses our software.

1.1.2 User Characteristics

This software consists of the following 3 types of user classes:

1.Admin

2.Donators

3.Users (in need of food)

1. Admin

The admin maintain the User details as well as the donator details in the form of databases. He is also responsible for ensuring proper pickup and distribution of food at the right places by linking restaurants and banquets with the nearest food booths and users with the nearest booths by accessing their location. He will also be responsible for providing digital coins and redeeming the same.

2. Donators

The restaurents and banquets fall under this category. They can register for donation for food by filling the donation form in their account on the software. They enter the food details and select a time for the pickup of food from their outlets. In return, they will receive digital coins everyday based on the feedback provided by the users which they can redeem in the form of advertisements for certain amount of days on the website and android app. Those who wish to donate funds also can donate money by clicking on the funds donation link on the home page of the website.

2. Users

The person who wishes to eat food at the food booth come under this category. They can register for the same through their account by filling the registration for eating at the food

booth. They will have to show the successful registration message/email to confirm their registration at the booth before eating the food. After consuming the food, they will be requested to give feedback for food they ate in the form of reviews and/or ratings. Orphanages and Old-age homes will also be provided with food if a certain amount is left after feeding all the people. They will not be required to register every day and rather be contavcted by the customer support team to check if they require food.

1.1.3 General Constraints

- Hardware Limitations: The minimum hardware requirement for the system is 128 MB of Ram and a 32-MB hard-disc drive.
- Accessibility: Initially, the software should be available as a android application for a small set of users to test.
- Others: The application should be built using PHP, Java, JavaScript, HTML and CSS and it should initially, be accessible through the xampp local server and later published on a public server when the application passes the test from small set of users.

1.1.4 Assumptions and Dependencies

- Users and the administrator would require training to use the software.
- We assume that the food will be available every day from restaurents and banquets.
- The system is dependent on the availability of an Apache Servers to run.
- We assume that software users adhere to the system's minimum software and hardware requirements.

1.2 External Interface Requirements

1.2.1 User Interfaces :

2. The homepage on the website and android application will have a LogIn/SignUp Link, Funds Donation Link and info about the company and what it does. It will also have a FAQ link which may solve queries for visitors.
3. For the SignUp Form, the visitor will be asked whether he wants to register as User, for Donation, as a volunteer or an orphanage/old-age home from a drop down list. After selecting that he will have to enter details such as name, address, pincode, contact and

email address.

4. After SignUp, they can login to their account and select whether they want to donate or register for having food at food booth as per the type of the user. There they fill details like for restuarents it will contain type of food(veg/non-veg), quantity and select time slot for pickup. While for Users, they will have to enter details about their name, contact details, no. of persons, type of food they eat and provide access to their location so that they can be linked to the nearest food booths.
5. The restaurents account page will also have link to redeem coins for advertisement while the users will have a feedback page to rate the quality of food.
6. There will also be a contact us page from where the user can get help from our customer care team through call or email.

1.2.2 Hardware Interfaces:

1. The web application will interact with the databases and libraries to fetch the which will be used to provide food booth location, food pickup- timings, user data, restaurants data and all related files.
2. The food booths will have desktops which will be connected to the main server to verify the registration of the users for having food by accessing the above mentioned information.
3. The volunteers will also have a restaurant code which will be generated when the restaurant or banquet registers for donation. It will have the info about the timing for pickup, quantity and type of food, and the location of the restaurant.

1.2.3 Software Interfaces :

For storing the information for every day's donation and food distribution databases will be maintained which will store the following data:-

1. Login details
2. Details of restaurents
3. Details of orphanages/old-age homes
4. Details of food booths
5. Details of Employees/volunteers
6. Details of users registered for coming to eat food

1.3 Functional Requirements

FR1 :

Description : To enter into the site user has to create an account.
Input : User details.
Output : User successfully registered and confirmation email/SMS sent to user.

FR2 :

Description : The system provides login facility.
Input : Email id and password.
Output : User profile page get opened.

FR3 :

Description : Register for food donation (for restaurants).
Input : Food Details.
Output : Food collection by employee/volunteer & deliver to food booths.

FR4:

Description : Link restaurants and users to the nearest food booths.
Input : Location details.
Output : Send location of the nearest food booths to restaurants and users.

FR5 :

Description : Users register to eat.
Input : Details of person coming to eat.
Output : Successfully registration message sent to users.

FR6 :

Description : Food distribution by employee to users, old-age homes and orphanages.

FR7 :

Description : Users can provide feedback about food & restaurants.
Input : Rating in the form of star.
Output : Add coin to restaurants account based on rating.

FR8 :

Description : Restaurants can redeem coins for displaying ads.
Input : Redeem digital coins.
Output : Display ads on app, website, food booths & delivery vehicals.

FR9 :

Description : The administrator can add/delete an employee account.
Input : Employee id.
Output : Successfully added/deleted account message.

FR10 :

Description : The admin can view details of food distribution at booths.
Input : Booth id.
Output : Distribution details of food day-wise.

FR11 :

Description : People can donate fund.
Input :Donate money at payment gateway.
Output :Funds added to official organization account.

1.4 Performance Requirements

- The user will be able to submit rating of food in less than 5 seconds.

- Restaurants can redeem coins in less than 7 seconds.
- Admin can add/delete account in less than 7 seconds.
- Linking restaurants & users to nearest food booths will not take more than 10 seconds.
- Number of registered users can be no more than 250 at each food booths or not more than the quantity of food available.
- The server should be able to handle 3000request/second and around 50,000 simultaneous users.

1.5 Design Constraints

Standard Compliance: All the languages and database format must be according to the software requirements listed below.

Hardware Requirements :

- Pentium or AMD processors with speed minimum 1GHz.
- 2GB RAM
- Accelerated Graphics Card.
- Minimum 32GB Hard Disk.
- Better performance with 82KB and above Cache Memory.
- Monitor – 15” colour monitor
- Keyboard – 122 keys

Software Requirements :

- Database: MS SQL Server2000 with Microsoft SQL Desktop Engine installed.
- Framework: NET Framework Version
- Server : Apache Tomcat Server

- Technology: ASP.Net
- Browser: Internet Explorer6.0
- Operating System :Linux
- JAVA development toolkit.
- Database JDBC Driver : MySQL Jconnector

Reliability and Fault Tolerance

- All the users must be backed up.
- The database must be updated regularly and must be properly maintained .
- Users are authenticated.
- In case of Forgot password immediately a mail must be sent with a link to reset his password.

Security

- The access to all the databases is available only to admin.
- A log of all activities must be stored.

1.7 Data Dictionary

- **Register (Restaurants) :** name+addresss+pincode+food+name_of_owner +contact_number+email_id+amount_of_food+password
- **Register (Volunteer) :** name+email_id+address+pincode+password +area_land_address+photos
- **Register (Orphanage/Old-age homes) :** name+food_type +contact_number+address+pincode+password
- **Register (User) :** names+food_type+contact_number+address+pincode +password
- **Book Slot :** names+ages

- **Login :** email_id+password

2. Estimations

2.1 Function Points

Fi	ALL THE Fi questions
5	F1. Does the system require reliable backup and recovery? Yes , the system require backup of data for further use of information.
5	F2.Are data communications required? Comm is reqd as to confirm pickup food customer supportfor user.
3	F3. Are there distributed processing functions? Not much
3	F4. Is performance critical? Average because sometimes food might not be sufficient.
3	F5. Will the system run in a existing, heavily utilized operational environment? Beside some applications,most of the application of application of software can run in an existing,heavily utilised operation environment.
5	F6. Does the system require on-line data entry? The whole software is based on online data entry that is stored in online databases
4	F7. Does the on-line data entry require the input transaction to be built over multiple screens or operations? Yes,the input will get stored at admin web, customer profile.
2	F8. Are the inputs, outputs, files or inquiries complex? Not much, most of the time.
3	F9. Is the internal processing complex? The database maintenance can be a little bit complex and operating system used also affects the internal processing.
3	F10. Is the code designed to be reusable? Not every part of the code,but some part usable like registration for rest, users, orphanage.
5	F13. Is the system designed for multiple installations in different organizations? Yes,software is operating sysytem independent.
5	F14. Is the application designed to facilitate change and ease of use by the user? Yes,the software facilitate the changes and ease of use and information modified will be kept safe & private.
46	TOTAL

MEASUREMENT PARAMETER	COUNT	SIMPLE	AVERAGE	COMPLEX	CALCULATED
EXTERNAL INPUT	8	4	5	6	32
EXTERNAL OUTPUT	8	4	5	7	32
EXTERNAL INQUIRIES	7	2	4	6	14
INTERNAL LOGICAL FILES	6	4	10	14	24
EXTERNAL INTERFACE FILES	2	5	7	10	10
COUNT TOTAL					112

FUNCTION POINT=count total *[0.65+0.01*sum(Fi)]

=112*[0.65+(0.01*46)]=124.32

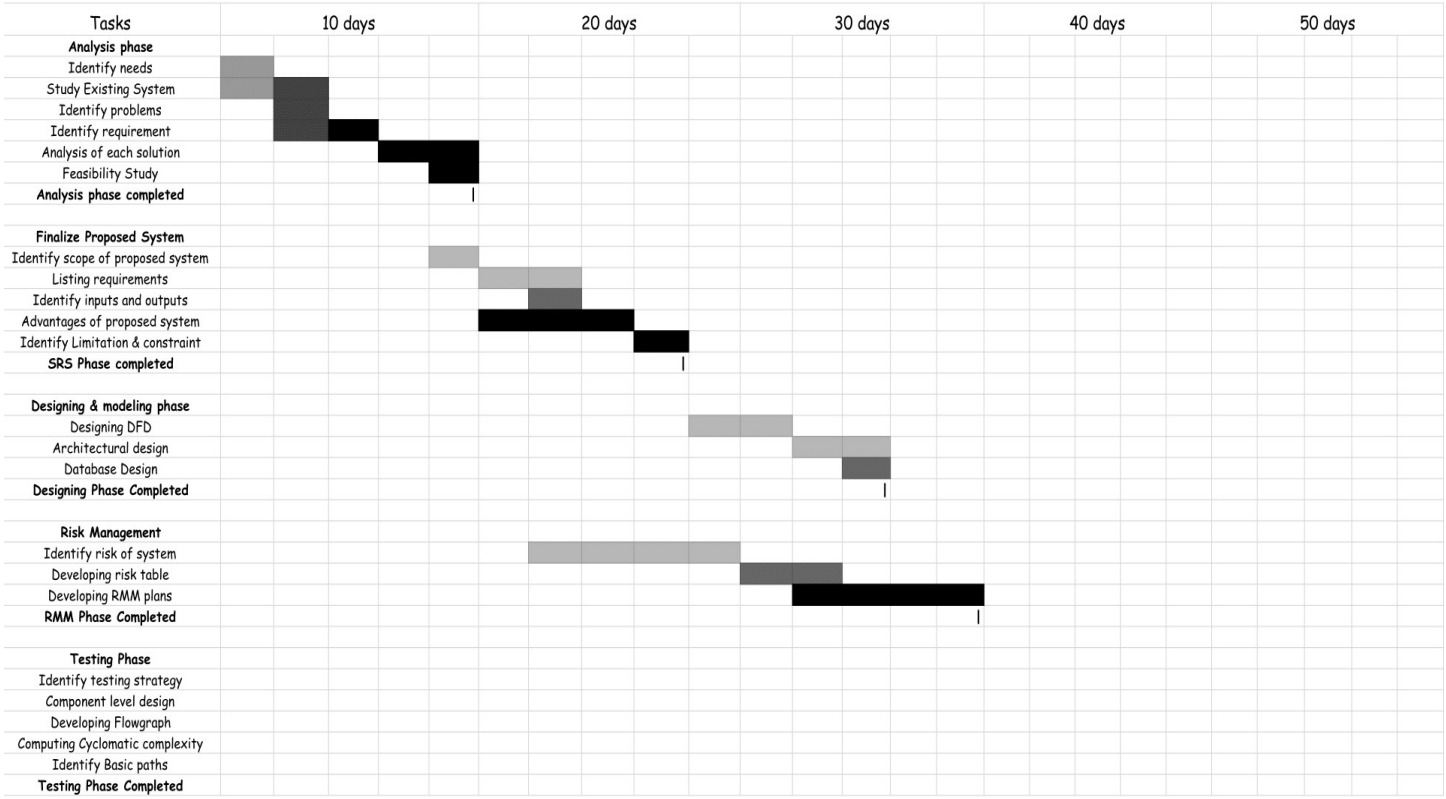
2.2 Efforts

Assume that the past data shows that the complexity for these types of systems is 6 function point per month. Assume burdened labour cost of 30,000 , the cost per fp is Rs 1100.

Estimated project cost =1100*124.32 =136,752

Estimated effort = 124.32/6 = 20.72

3.Scheduling



4 . Risk Management

Server breaks down

Due to the breakdown of server, our customers will not be able to connect to our website and this may cause our users to visit another website.
RMMM: Additionally 2 servers will be available as backup if the working server fails.

Food Unavailability

Due to some reason appropriate amount of food may be not available to our booths, it causes customer loss.

RMMM : Food will be arranged from donation funds.

Food Spoilage

Due to delay in delivery or restaurants bad food quality our food may get spoiled and not be consumable.
RMMM : Security check will be done once before picking up the food and once before distributing to people at booths.

Data loss

Sometimes, the computer may get crash due to which all our data will be lost and this is a major issue.
RMMM : Backup will be taken for every day transaction & databases of restaurants,users,volunteers, etc.

RISK TABLE

IMPACT	PROBABILITY	CATEGORY	RISKS
1	70%	Project Risk	Data loss
1	10%	Technical Issue	Server breaks down
1	30%	Business Risk	Food Unavailability
2	20%	Business Risk	Food Spoilage

RISK MITIGATION, MONITORING AND MANAGEMENT

Mitigation

The cost associated with a computer crash resulting in a loss of data is crucial. A computer crash itself is not crucial, but rather the loss of data. A loss of data will result in not being able to deliver the product to the customer. As a result, the organisation is taking steps to make multiple back-up copies of the software in development and all documentation associated with it, in multiple locations.

Monitoring

When working on the product or documentation, we should always be aware of the stability of

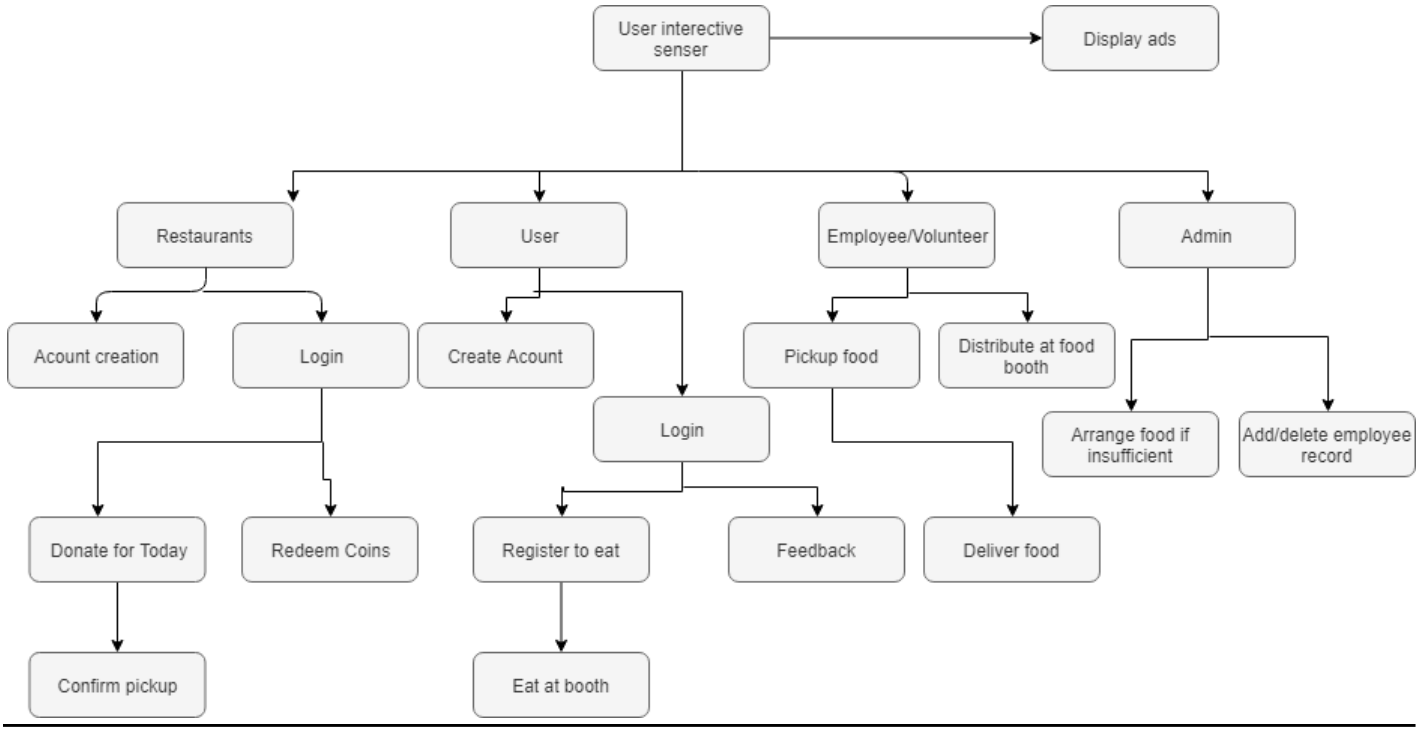
the computing environment they are working in. Any changes in the stability of the environment should be recognized and taken seriously.

Management

The lack of stable-computing environment is extremely hazardous to a software development team. In the event that the computing environment is found unstable, the development team should cease the work on that system until the environment is made stable again, or should move to a system that is stable to use and continue working there.

5. DESIGN

5.1 Architectural Design



5.2 Data Design

RESTAURANTS DATABASE

CONSTRAINT	DATA_TYPE	ATTRIBUTES
PRIMARY KEY AUTO INCREMENT	INT	ID
NOT NULL	STRING	NAME
NOT NULL	VARCHAR	ADDRESS
FOREIGN KEY(REFERENCES PINCODE OF FOOD BOOTH	INT	PINCODE

DATABASE)		
NOT NULL	STRING	FOOD
NOT NULL	STRING	NAME OF OWNER
NOT NULL	INT	CONTACT NUMBER
----------	VARCHAR	EMAIL ID
NOT NULL	VARCHAR	AMOUNT OF FOOD
NOT NULL	VARCHAR	PASSWORD

FOOD BOOTH DATABASE

CONSTRAINTS	DATA_TYPE	ATTRIBUTES
PRIMARY KEY AUTO INCREMENT	INT	ID
NOT NULL	INT	PINCODE
NOT NULL	VARCHAR	ADDRESS

EMPLOYEE DATABASE

CONSTRAINTS	DATA_TYPE	ATTRIBUTES
PRIMARY KEY AUTO INCREMENT	INT	ID
NOT NULL	STRING	NAME
NOT NULL	DATE	DATE OF JOINING
NOT NULL	STRING	DEPARTMENT
NOT NULL	VARCHAR	ADDRESS

ORPHANAGE/OLD-AGE HOME DATABASE

CONSTRAINTS	DATA_TYPE	ATTRIBUTES
PRIMARY KEY AUTO INCREMENT	INT	ID
NOT NULL	STRING	NAME
NOT NULL	VARCHAR	FOOD TYPE
NOT NULL	INT	CONTACT NUMBER
NOT NULL	VARCHAR	ADDRESS
NOT NULL	VARCHAR	PASSWORD

USER DATABASE

CONSTRAINTS	DATA TYPES	ATTRIBUTES

PRIMARY KEY NOT NULL	STRING	NAMES
NOT NULL	STRING	FOOD TYPE
NOT NULL	INT	CONTACT NUMBER
NOT NULL	VARCHAR	ADDRESS
NOT NULL	VARCHAR	PASSWORD

EATERS DATABASE

FEEDBACK	BOOTH DETAILS	EATERS NAME	EATERS ID

TEMPORARY DATABSE

RESTAURANTS NAME	EMPLOYEE ID	EATERS ID

FUNDS DATABASE

AMOUNT	ADDRESS	CONTACT DETAILS	NAME

6. Coding

```
{
  1. switch(login) {
   case 1 : Login as restaurent
            login_rest();
            break;
     case 2 : Login as User
            login_user();
            break;
     case 3 : Employee Login
```

```
            login_emp();
            break;
    case 4 : Donate Funds
            donate_funds();
            break;

}
login_rest()
{
    Enter login credentials

    if(login_id==userid & password==userpassword)
    {
        Login Successful
        link_to_nearest_food_booth
        switch(action)
        {
            case 1 : Donate Food Today
                    donate_food();
                    break;
            case 2 : Redeem Coins
                    redeem();
                    break;
        }
```

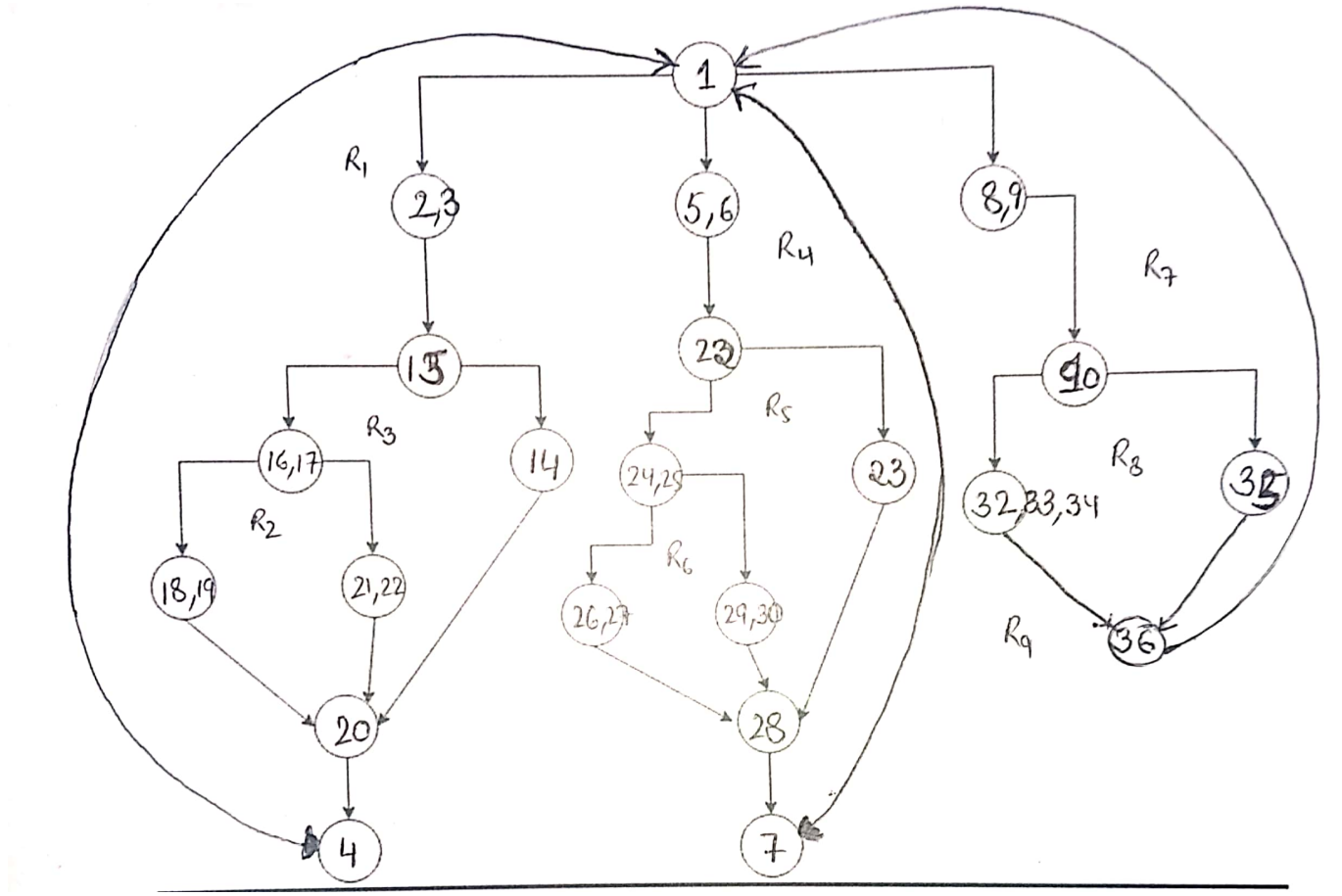
```
    }
}
login_user()
{
    Enter login credentials

    if(login_id==userid & password==userpassword)
    {
        Login Successful
        link_to_nearest_food_booth
        switch(action)
        {
            case 1 : Register to eat
                    eat();
                    break;
            case 2 : Provide Feedback
                    feedback();
                    break;
        }
    }
}

donate_food()
{
```

```
        Enter food quantity, type;
        confirm_pickup();
        .....
    }
    eat()
    {
        Enter details of persons
        book_slot();
        .....
    }
}
```

7. Testing



Regions : 9

No of Nodes : 21

No of edges : 24

Cyclomatic Complexity

E - N + 2 = 24 – 21 + 2 = 5

INDEPENDENT PATHS

1. 1-2-3-15-16-17-18-19-20-4-1

2. 1-2-3-15-14-20-1

3. 1-2-3-15-16-17-21-22-20-4-1

4. 1-5-6-22-24-25-26-27-28-7-1

5. 1-5-6-22-24-25-29-30-28-7-1

6. 1-5-6-22-23-28-7-1

7. 1-8-9-10-32-33-34-36-1

8. 1-8-9-10-35-36-1

8. References:-

- 1.Software Engineering (Roger S. Pressman).
- 2.Internet.