# Learning Report – Applied SDLC with Software Testing

**GLOBAL ENGINEERING ACADEMY**

Genesis

**L&T Technology Services**

**L&T Technology Services**

**Document History**

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| 3 | 28/09/2020 | V.S.SHANDHIYA-99002477 | 99002473, 99002474 | Pagala Prithvi Shekhar and Srinivas K | |
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*Activity 1*– *System/Software Development*

## ACTIVITY 1– SYSTEM/SOFTWARE DEVELOPMENT

### TOPIC- MAGNETIC LEAKAGE DETECTOR

INTRODUCTION

The transportation of natural resources to different places is the major problem. The pipelines are generally used to transport the resources like oil, gas etc. The pipelines are mostly affected by the external environment. So, it is necessary to detect the integrity of the pipelines. The loss in material integrity leads to failure of the pipelines. Sometimes the defects in the tubes used in the chemical industry leads hazard to plant personnel. The manufacturing voids are also leading to loss in material integrity which cause catastrophic failure due to ageing effects. To maintain the safe operation, the certain maintenance methods are used. The cost for the replacement of the pipelines is too high, so the maintenance techniques are adopted to find the defect in prior.

REQUIREMENTS

**Table 1-REQUIREMENTS**

| ID | DESCRIPTION |
|----|-------------|
| **H01** | The basic idea of magnetic flux leakage inspection is that the ferromagnetic material is magnetized close to saturation under the applied magnetic field. |
| **H02** | If there is no defect in the material, most magnetic flux lines will pass through the inside of the ferromagnetic material; if not, because the magnetic permeability of the defect site is much smaller than that of the ferromagnetic material itself, magnetic resistance will increase in the defect area, so the magnetic field in the region is distorted. |
| **H03** | Magnetic flux lines will be bent, some will leak out of the material surface, and a magnetic leakage field will form at the defect area. By using magnetic sensitive sensors to detect the |

| | |
|---|---|
| | magnetic leakage field, the corresponding electrical signals can be obtained. Then the detected signals are analysed so that the status of the defect can be determined |
| **H04_L01** | Defects caused by corrosion can appear in the interior and exterior surfaces of the pipeline, and magnetic flux leakage pipeline detection can detect them, but it cannot distinguish between internal and external defects. Therefore, a classification approach based on support vector machines (SVM) is presented to achieve defect discrimination |
| **H05_L02** | Past method which is available for the detection of leakages in the industrial pipelines are Ultrasonic Leakage Detector, where the whole system needs to shut down. But in this project, need not need any shut down. |

## SWOT ANALYSIS

**STRENGTH:**

The main strength of this product is it can be used in all type of industries where both liquids and gases are transferred. In industries where high level hazardous liquids or gases are transferred this product plays an important role as the power shut down of the whole system is not required.

**WEAKNESS:**

For detection in minute bends and joints it cannot move on its own so it requires an external supervisor to manage it. Issues arises during detection of leakage in underground pipes.
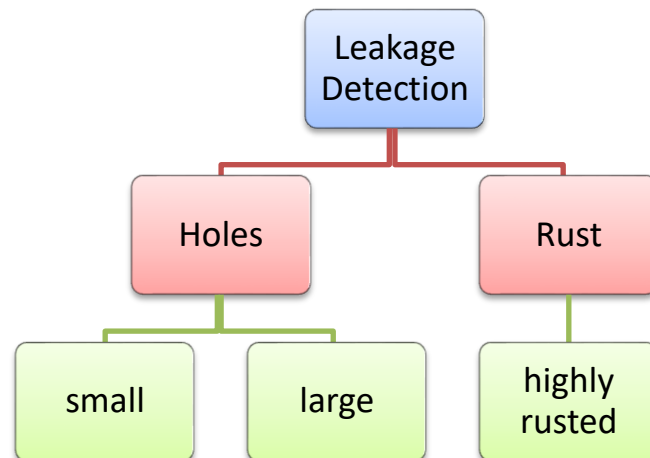
**OPPORTUNITY:**

This product helps us to provide great opportunity in reducing the burden of the human.

**THREATS:**

User acceptance. Still most operators in industries are not well known to operate the technologically improved products.

## DESIGN MODELS

## BEHAVIOURAL DIAGRAMS:

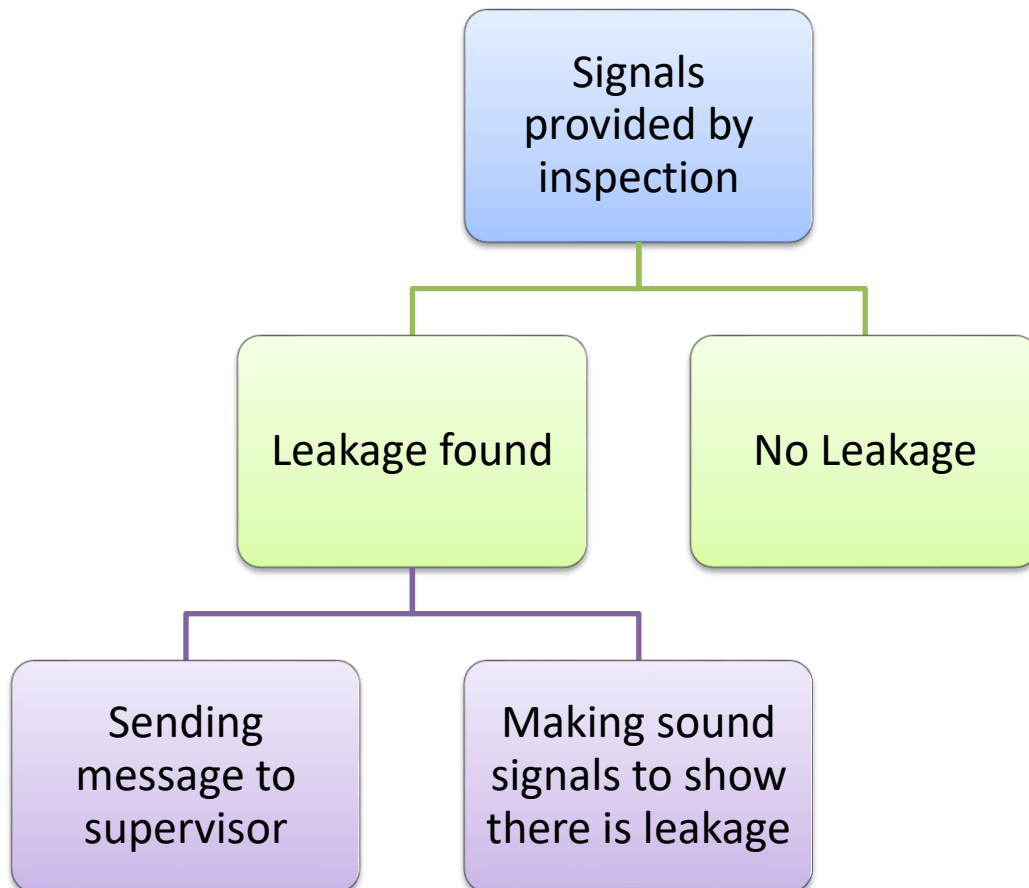**UML- Behavioural-1**

1. Finding the leakage:

**Figure 1- FINDING THE LEAKAGE**

**UML-Behavioural-2**

2. Leakage due to holes:
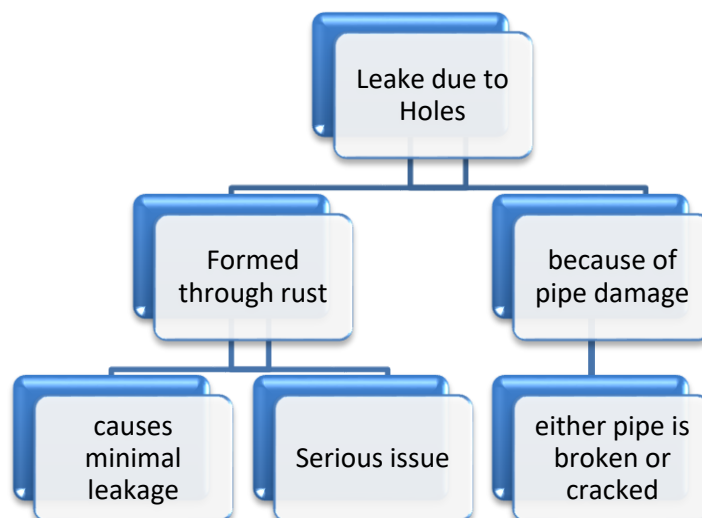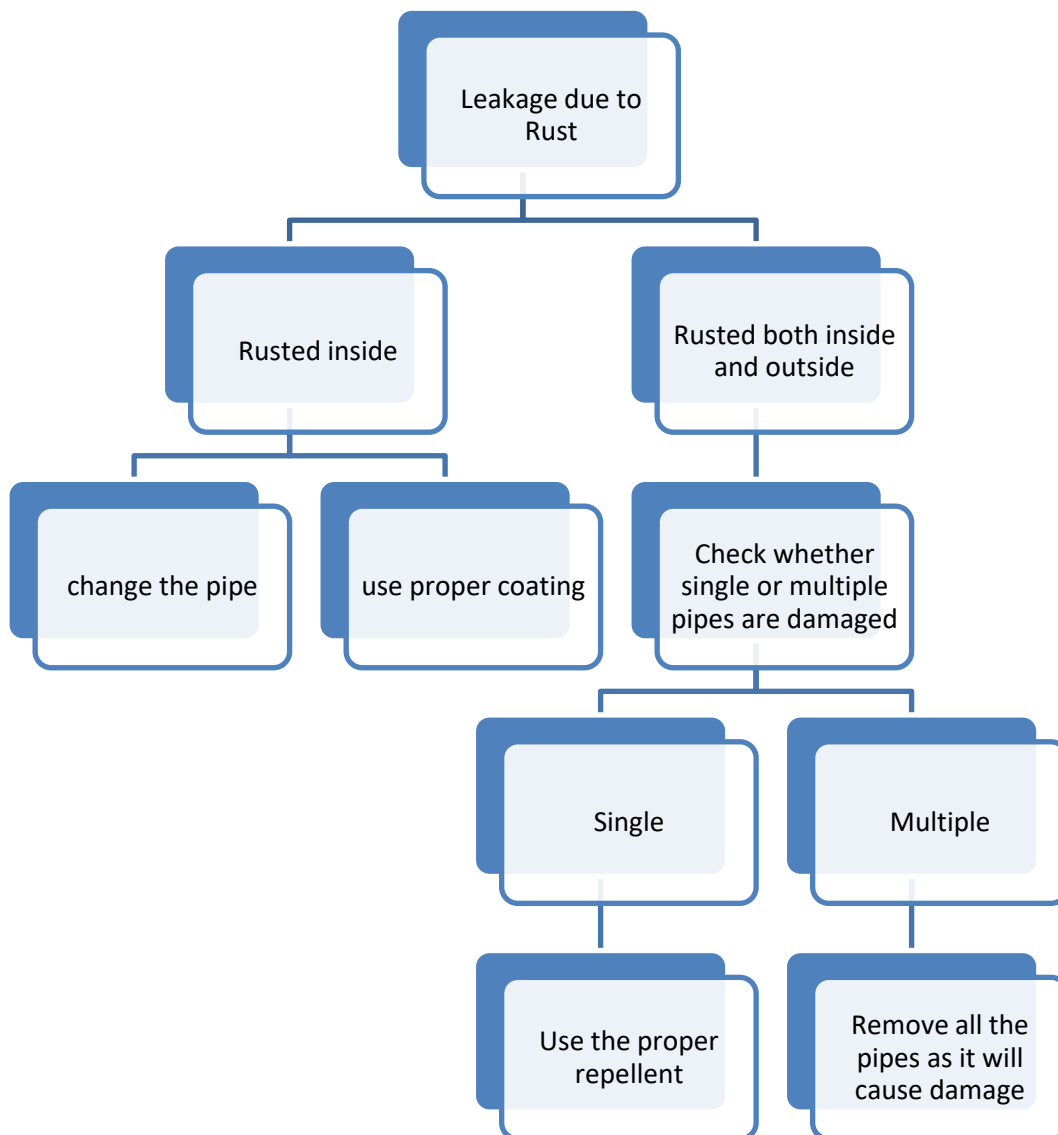
**Figure 2- LEAKAGE DUE TO HOLES**

**UML-Behavioural-3**

3. Signals provided by inspection:



**Figure 3- SIGNAL PROVIDED BY INSPECTION**

**HIGH LEVEL:**

**UML-Behavioural-4**
  4.  Leakage due to Rust:



**Figure 4- LEAKAGE DUE TO RUST**

## STRUCTURAL DIAGRAMS:

**LOW LEVEL:**
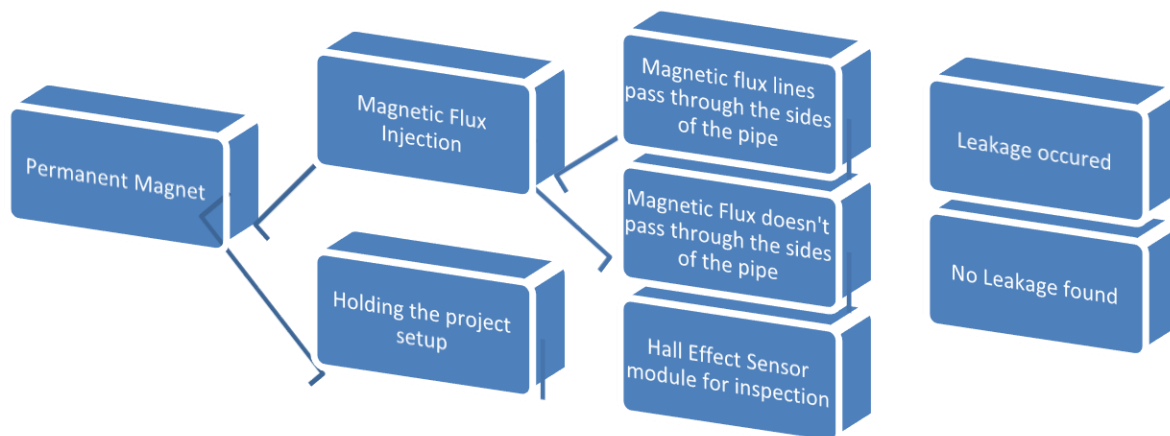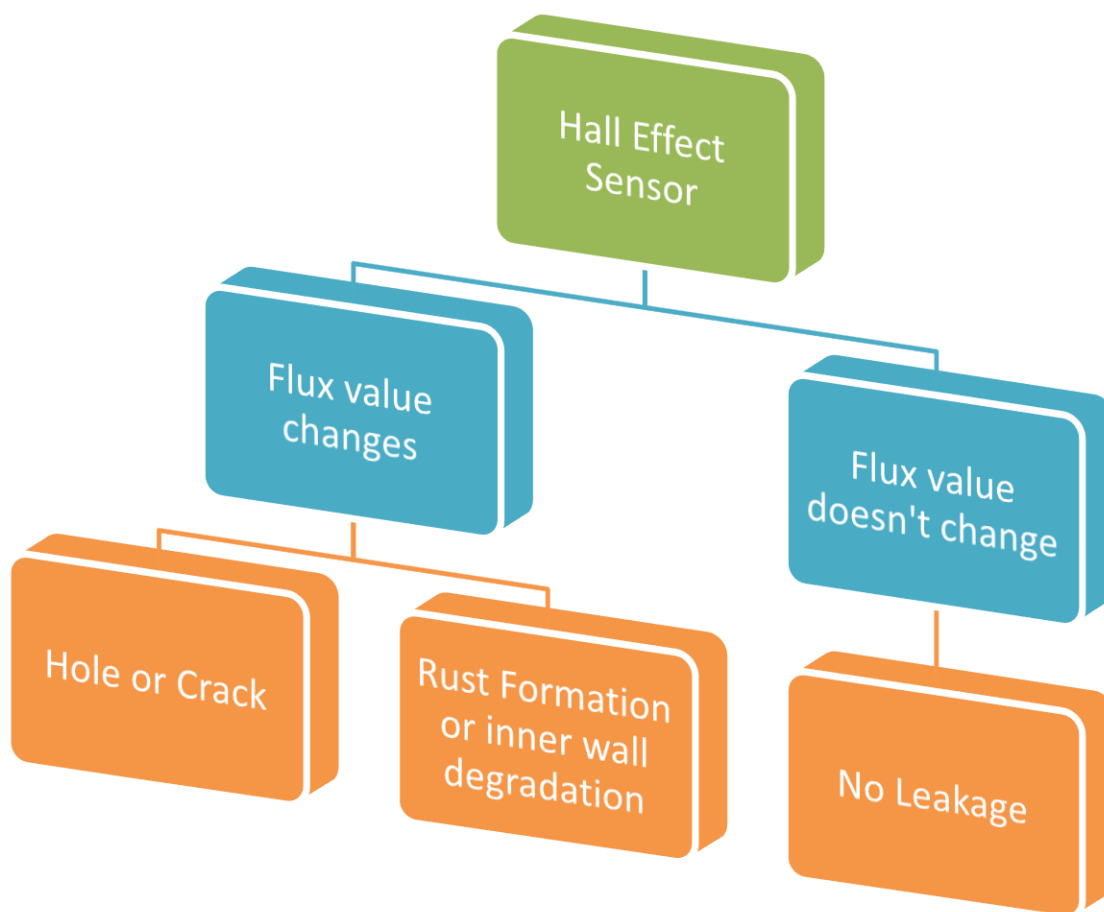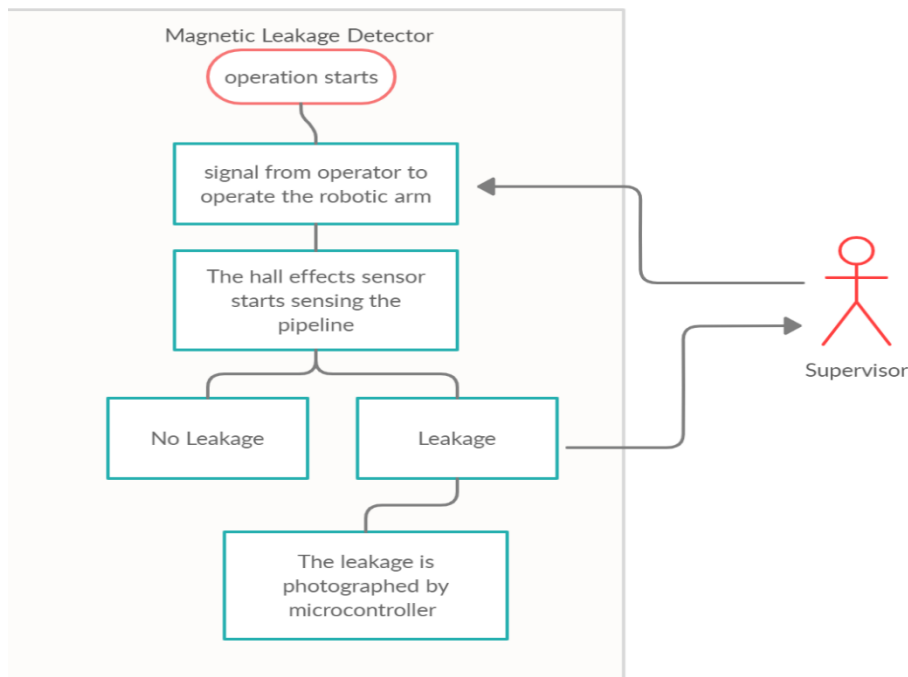
**UML-Structural-1**

1. Process of detection:



**Figure 3- PROCESS OF DETECTION**

**UML-Structural-2**

2. Working of Hall Effect Sensor:

**Figure 4- WORKING OF HALL EFFECT SENSOR**

**HIGH LEVEL:**

3. **UML-Structural-3**



**Figure 5- STRUCTURAL UML**

TEST PLAN:

Test survey has been taken to show the uniqueness of my project.

1. **In traditional old model-Ultrasonic Leakage Detector [LOW LEVEL]**

Table 2- LOW LEVEL TEST PLAN

| ID | Description | Pre-condition | Expected-input | Expected-output | Actual output |
|----|-------------|---------------|----------------|-----------------|---------------|
| 1 | Power shut down Problem during inspection | No shut down of system during running of project | Operate while inspecting | The inspection is done while liquids are flowing | The system fails to operate |

| 2 | Problem arises due to the size of the pipe | The inspection had to be done whatever the size of the pipe | Can flow in any size of pipe | The inspection kit inspects in all size of the pipe | The system fails to operate |
| 3 | Pipe wall's material effect | The inspection should be done for any material of pipe | Any pipe material like PVC, Plastic, Ferromagnetic pipes | The inspection can be done in all kind of material | No, the system fails |

## 2. By implementing our project-Magnetic Leakage Detector [HIGH LEVEL]

Table 3- HIGH LEVEL TEST PLAN

| ID | Description | Pre-condition | Expected-input | Expected-output | Actual output |
|---|---|---|---|---|---|
| 1 | Power shut down Problem during inspection | No shut down of system during running of project | Operate while inspecting | The inspection is done while liquids are flowing | The system works |
| 2 | Problem arises due to the size of the pipe | The inspection had to be done whatever the size of the pipe | Can flow in any size of pipe | The inspection kit inspects in all size of the pipe | As the system travels above the pipeline it is very easy to inspect the whole system |
| 3 | Pipe wall's material effect | The inspection should be done for any material of pipe | Any pipe material like PVC, Plastic, Ferromagnetic pipes | The inspection can be done in all kind of material | The system inspects all kind of pipe as magnetic flux passes through all material of pipes |

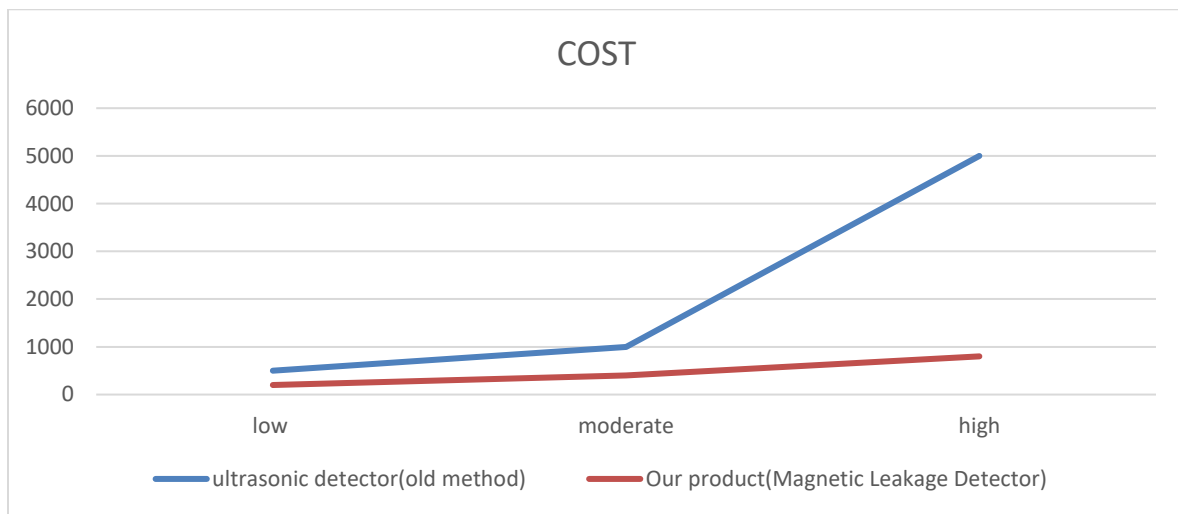L&T Technology Services

COST FOR DETECTION:
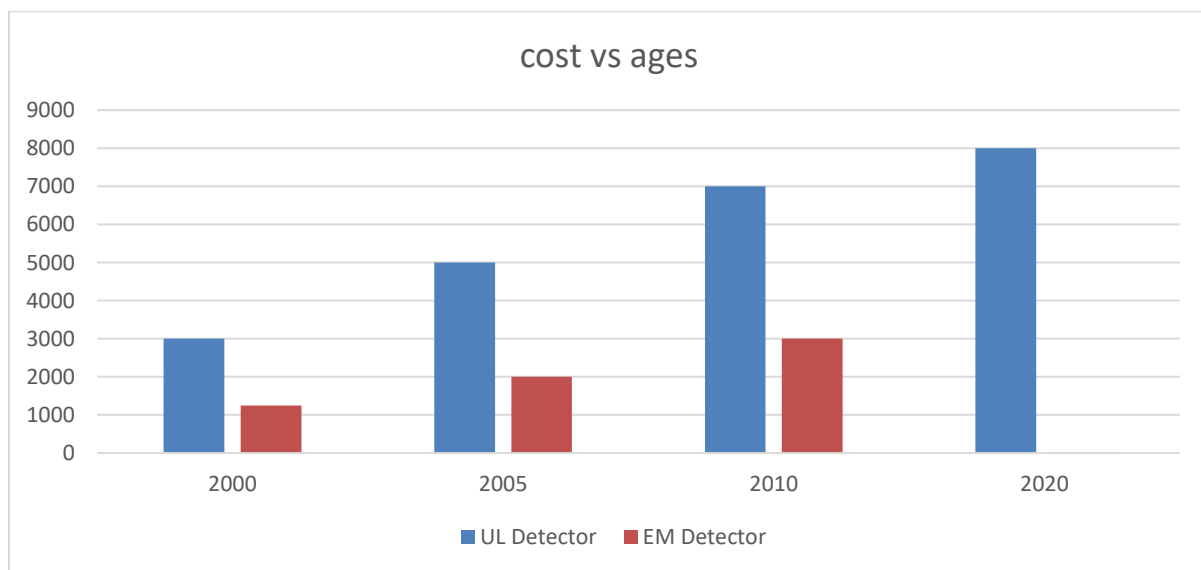


**Figure 6- COST COMPARISON**



**Figure 7- COST VS AGE**

# REFERENCES

[1] Hui Min Kim, Yong Woo Rho, Hui RyongYoo, Sung Ho Cho, Dong Kyu Kim, Sung Ja Koo, Gwan Soo Park (2012), "A study on the measurement of axial cracks in the magnetic flux leakage NDT system" 8th IEEE International Conference on Automation Science and Engineering, Seoul, Korea, pp. 624–629.

[2] R. Wagner, O. Goncalves, A. Demma, M. Lowe (2013), "Guided wave testing performance studies: comparison with ultrasonic and magnetic flux leakage pigs" Insight - Non-Destructive Testing and Condition Monitoring, vol. 55, no. 4, pp. 187-196.

[3] P. Karuppasamy, A. Abudhahir, M. Prabhakaran, S. Thirunavukkarasu, B. P. C. Rao, T. Jayakumar (2016), "Model-Based Optimization of MFL Testing of Ferromagnetic Steam Generator Tubes" Journal of Nondestructive Evaluation, vol. 35, no. 5.

[4] V.E. Loskutov, A.F. Matvienko, B.V. Patramanskii, V.E. Shcherbinin (2006), "The magnetic method for in-tube non-destructive testing of gas and oil pipelines: The past and the present" Russian Journal of Non-destructive Testing, vol. 42, no. 8, pp. 493-504.

[5] J. Chen, Q.S. Feng, F.X. Wang, H.L. Zhang, Song, H.C (2012), "Research on burst tests of pipeline with spiral weld defects" In Proceedings of the 9th International Pipeline Conference, Calgary, AL, Canada, pp. 53–60.

[6] Y.L. Ma, L. Li (2014), "Research on internal and external defect identification of drill pipe based on weak magnetic Inspection" Insight - Non-Destructive Testing and Condition Monitoring, vol. 56, pp. 31–34.

*ACTIVITY-2*

*AGILE METHODOLOGY*

## ACTIVITY-2-AGILE METHODOLOGY

Theme:

    Magnetic flux leakage (MFL) detection is one of the most popular methods of pipeline inspection. This project introduces the main principles, measurement and processing of MFL data. As the key point of a quantitative analysis of MFL detection, the identification of the leakage magnetic signal is also discussed. In addition, the advantages and disadvantages of different identification methods are analyzed.

Epic and User Story:

**Table 4- EPIC AND USER STORY**

| USER TYPE | EPIC | USER STORY |
|---|---|---|
| **Industrial user** | Size of the pipe | As the tester, I need to test for all size of pipes |
| | | As the user, I will be going on testing all bends and turning |
| | | As a user, I need to be in one place and verify any leakage is there |
| **Supervisor** | Material of pipe | As the supervisor, I need to inspect any material of pipeline |
| | | I should reduce the burden of the co-workers |
| **Manager** | Power shut down | As my responsibility is to manage the whole process it need not to shut down while inspecting |
| | | As the manager, I need to improve the product manufacturing rather than waiting for the result of inspection |
| | | I need to inspect accordingly not my other works are being stopped |

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*ACTIVITY-3*
*GITHUB*

**ACTIVITY 3- GITHUB**

**TOPIC =Automatic Bus Ticket Booking System**

INTRODUCTION

This is the project on the online ticketing system of express bus company, which in most cases; the company has problems with their ticketing and scheduling process. This project intends to computerize its semi computerized ticketing system to provide better customer service. Because of that, the company can provide the easier way of travelling to the customer or passenger. Electronic tickets, or e-tickets, give evidence that their holders have permission to enter a place of entertainment, use a means of transportation, or have access to some Internet services. Bus Ticket Reservation System enables the bus company's customer to buy bus ticket online. E-ticket is the easier and quickest way to take bus. The online system is a new system because it havens exists in bus company and even in Malaysia. Currently, staff at the bus ticket counter is using an internal system to sell ticket at the counter. Customer is unable to buy bus ticket online at this moment and must go to the counter to buy bus ticket. Sometimes, customer needs to queue up a long queue to buy bus ticket and ask for information. Besides that, customer also not allows buying bus ticket through telephone and Transnational's telephone line is always busy.

REQUIREMENTS

**Table 5- REQUIREMENT ANALYSIS**

| Users | Type | Description |
|---|---|---|
| Admin | Admin-level-1 | Admin totally control the proposed system they can action view and every work including checking ticket are displayed to the passengers, and every counter transaction status. |
| Operator | Operator(level-2) | Operator can view the seats distribution. If a visitor or user request for a new ticket with fully follows their instruction and the operator confirm his ticket and send the confirmation by phone. |

| Visitor/Registered user | Basic level-3 | The user can request only new ticket from to destination place. |
|---|---|---|

## SWOT ANALYSIS:

**STRENGTH:**

The main strength of this project is it is user friendly and can easily handle by the android mobile user. The accuracy level is higher.

**WEAKNESS:**

Tickets become a barer bond commodity type of asset the second they are printed, resulting in potential theft, loss and counterfeit to the patron, and lost income, information and theft for the event sponsor.

**OPPORTUNITY:**

This product helps us to provide great opportunity in reducing the burden of the human. This project will reduce the risk of travelling and booking the travels and we can do anything in the remote location.

**THREATS:**

To control illegal ticket trading activities by ticket brokers and all the ticket scalpers, law enforcement agencies are being challenged. The server can become problem and the same seats might happen.
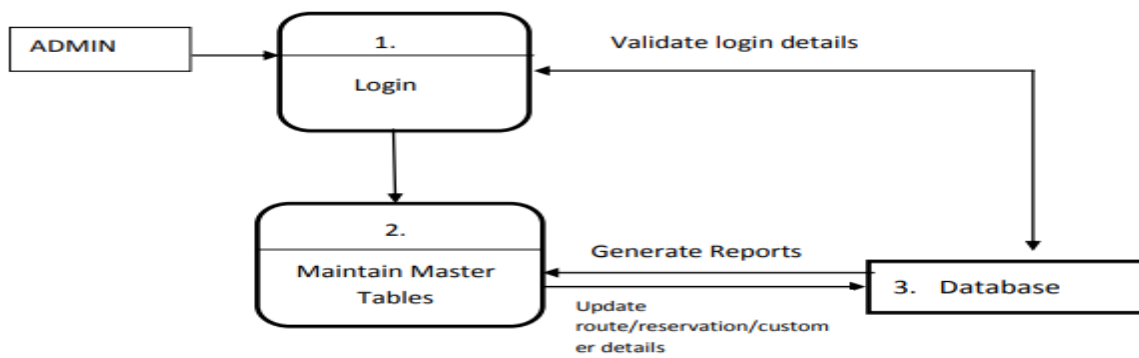
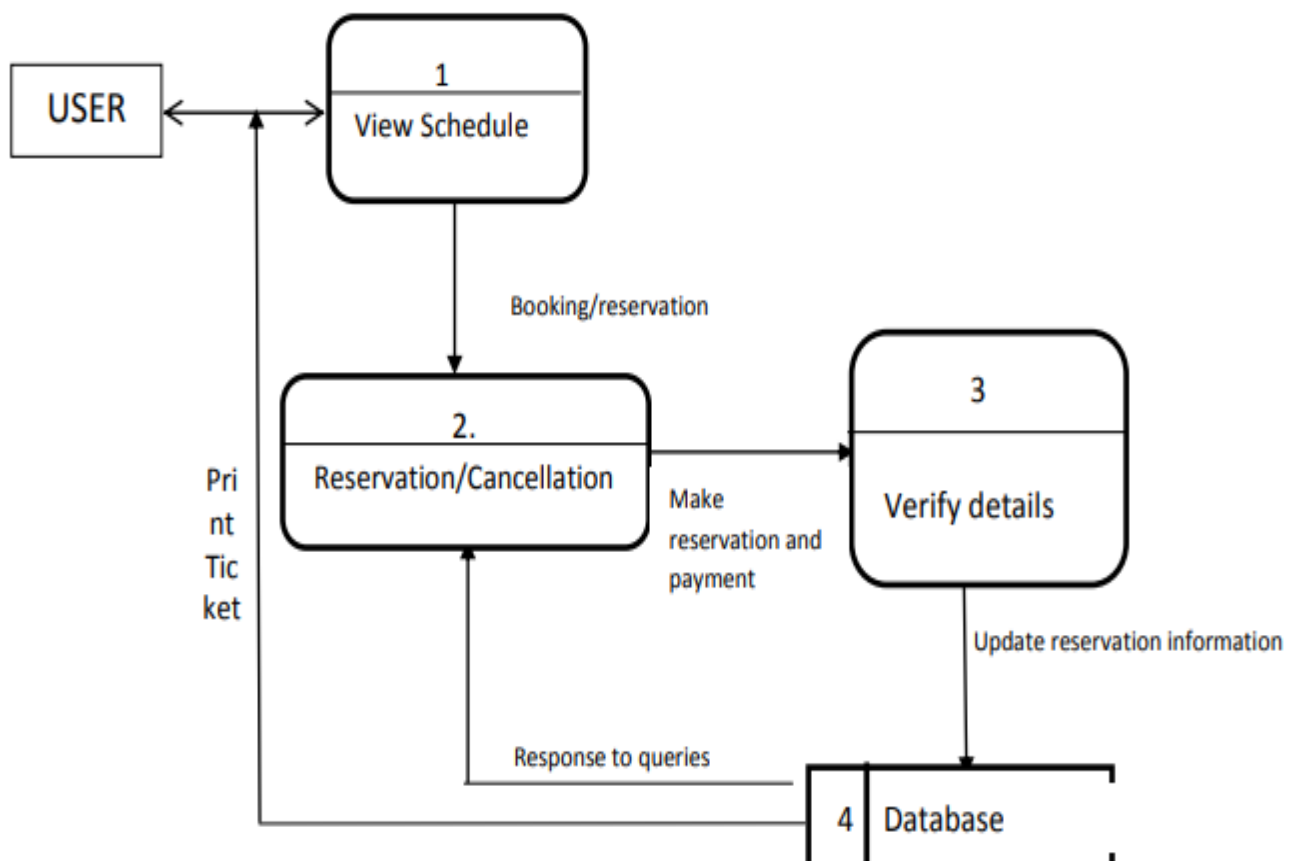**DESIGN**

**Low level:**

**Figure 8- LOW LEVEL REQUIREMENTS**

**High LEVEL:**



**Figure 9- HIGH LEVEL REQUIREMENTS**
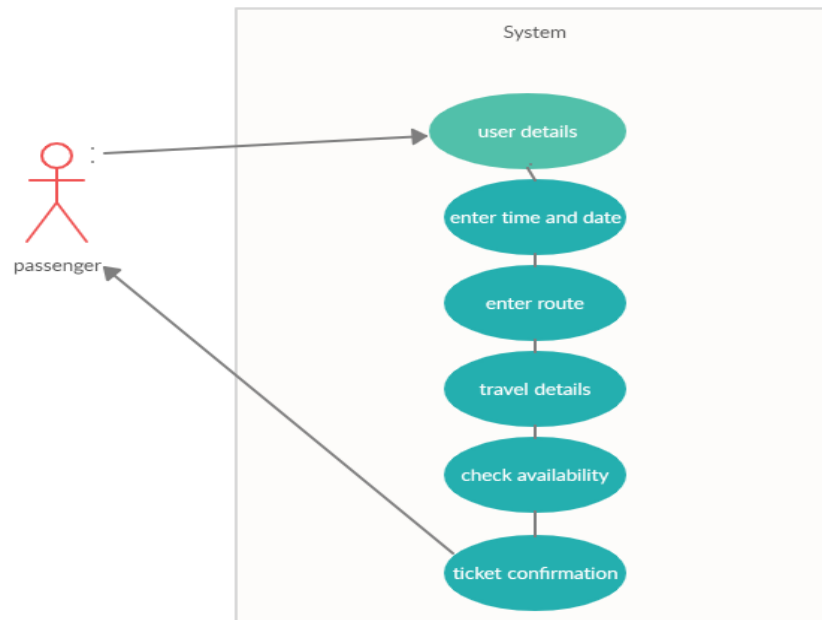
# BEHAVIORAL DIAGRAM



**Figure 10- BEHAVIOURAL DIAGRAM**
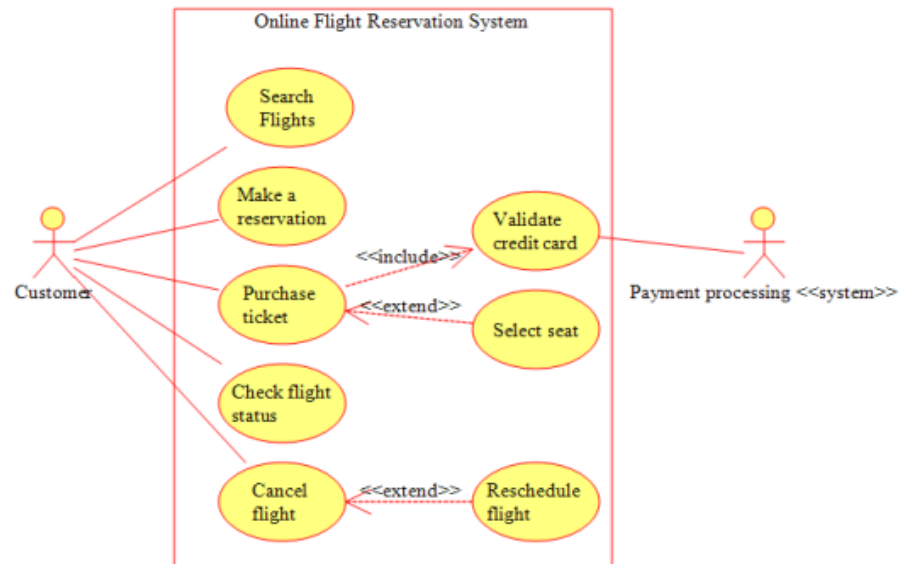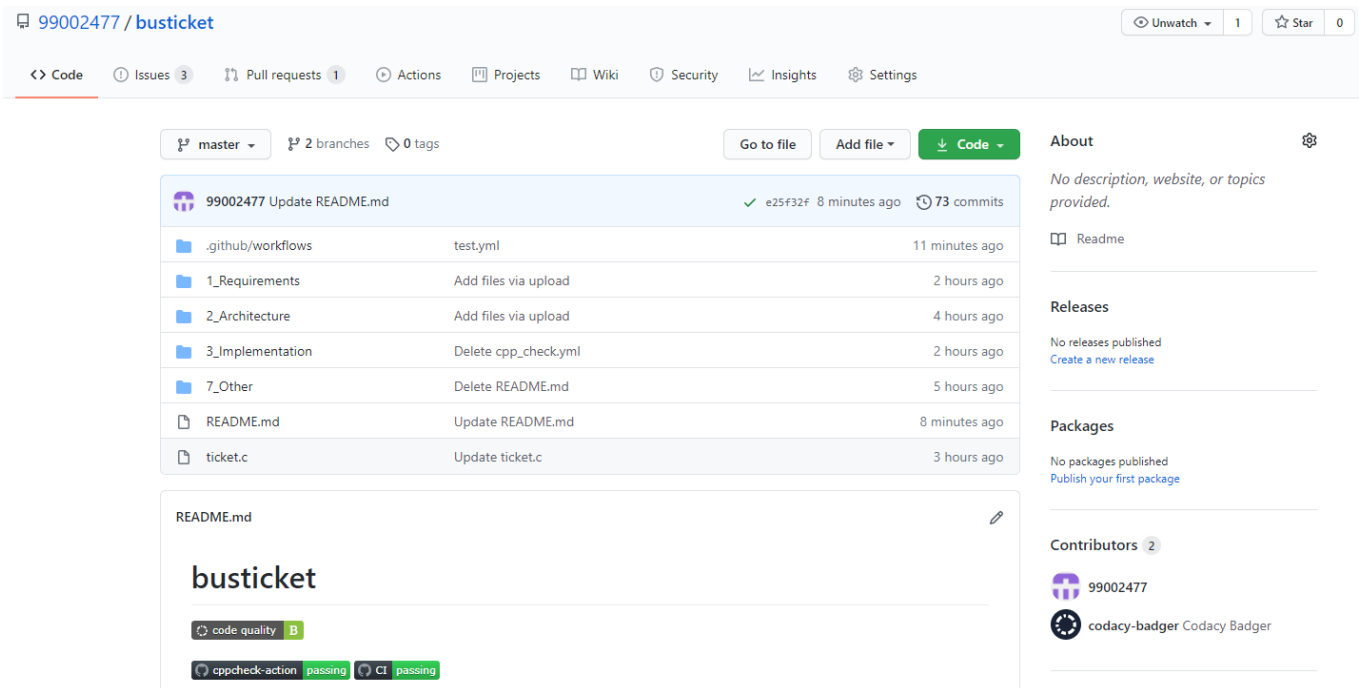
# STRUCTURAL  DIAGRAM

**Figure 11- STRUCTURAL DIAGRAM**

TEST PLAN:

Table 6-TEST PLAN

| ID | Description | Pre-condition | Expected-input | Expected-output | Actual output |
|----|-------------|---------------|----------------|-----------------|---------------|
| 1 | Problem arises in booking | When 2 peoples booking same seat | The two peoples need same seat. | The person who fills first can hold on the same seat and the other person should occupy the other seat | The system operates |
| 2 | Problem arises due to the size of the bus | While entering through the booking site the number of seats available should be shown | The person needs more seats than available | The reminder or an alert should be given to help the customer. | The system operates successfully. |
| 3 | Age of the person | The age which is below the limit | Ages of the person | It should sportify it. | It will run. |

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SNAP SHOTS:

## 1. Code Quality



**Figure 12- CODE QUALITY**

## 2.Commits:
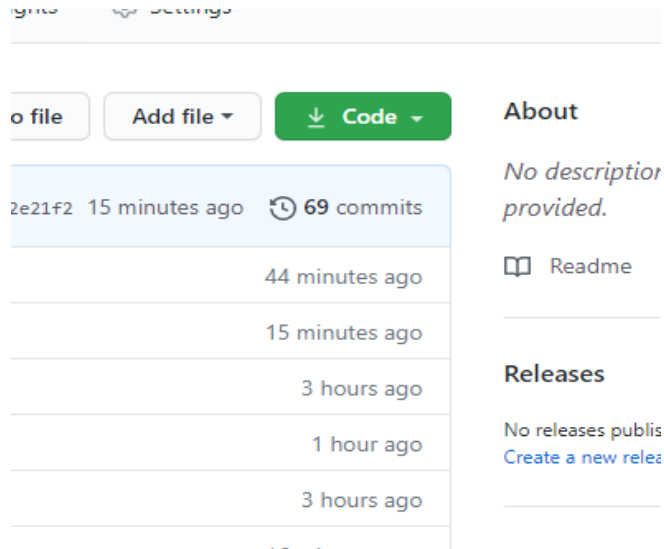


**Figure 13- COMMITS**

## 3.CPP-Check
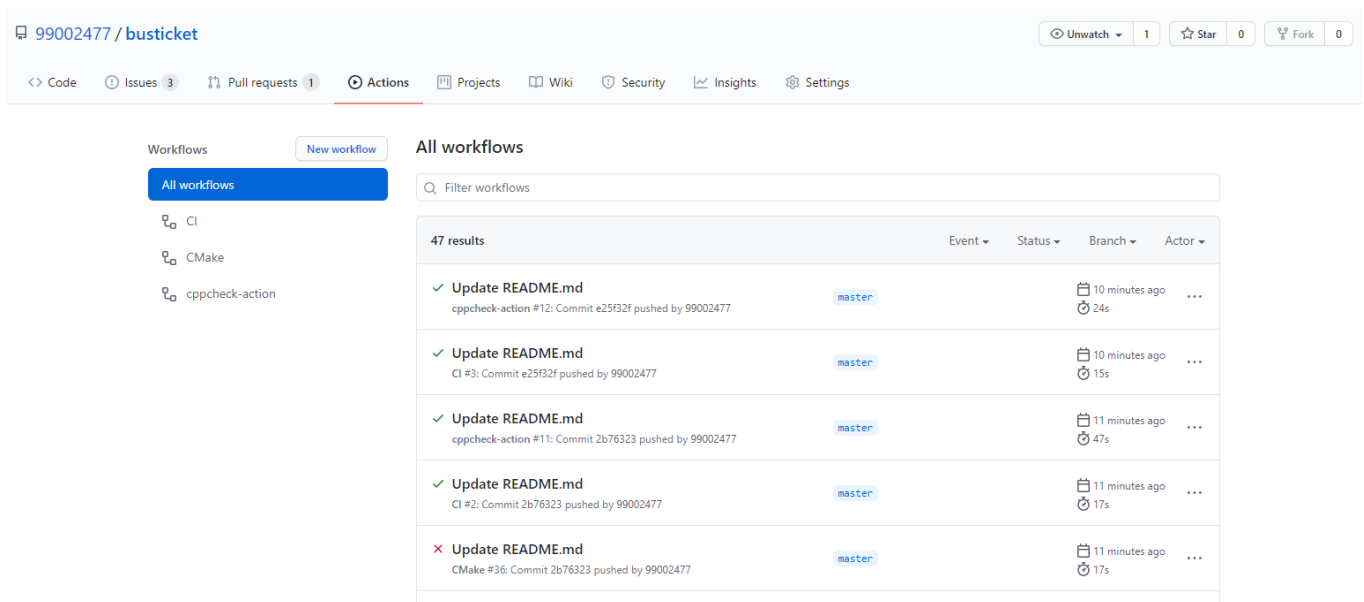


**Figure 14- CPP-CHECK**

## 4.Issue:

---
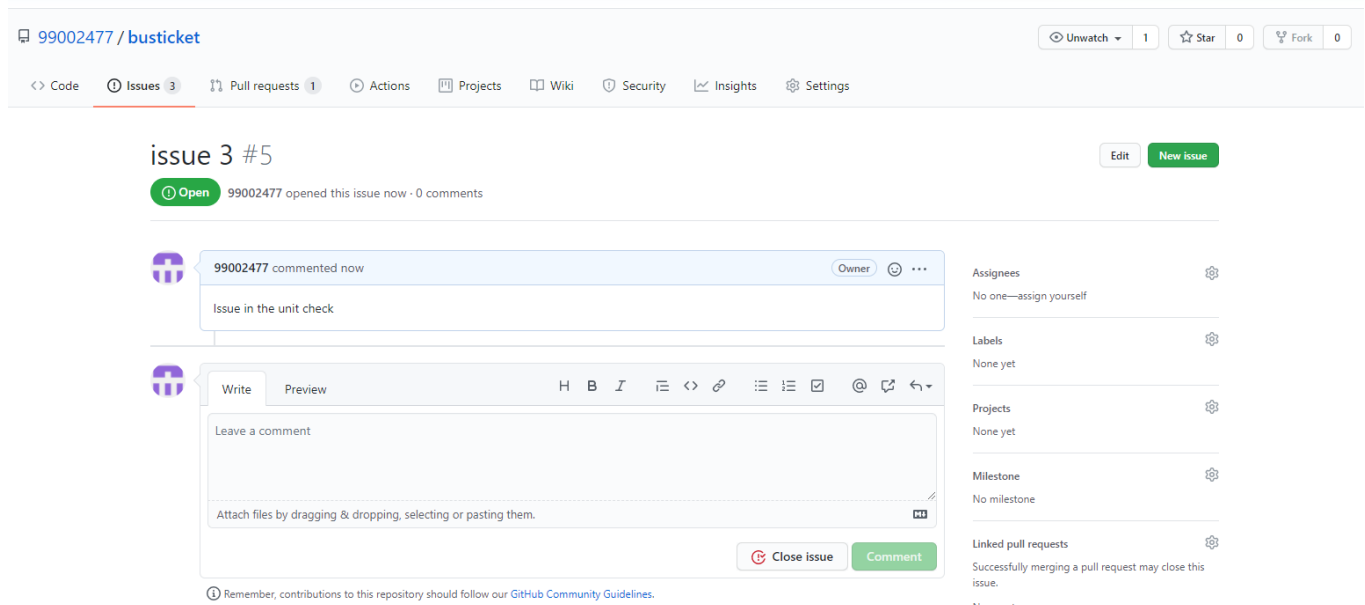
**Figure 15- ISSUE**

GitHub link: https://github.com/99002477/busticket

CONCLUSION:

It can be observed that computer applications are very important in every field of human endeavor. Here all the information about customer that made reservation can be gotten just by clicking a button with this new system, some of the difficulties encountered with the manual system are overcome. It will also reduce the workload of the staff, reduce the time used for making reservation at the bus terminal and increase efficiency. The application also can update records in various files automatically thereby relieving the company's staff the stress of working from file security of data.

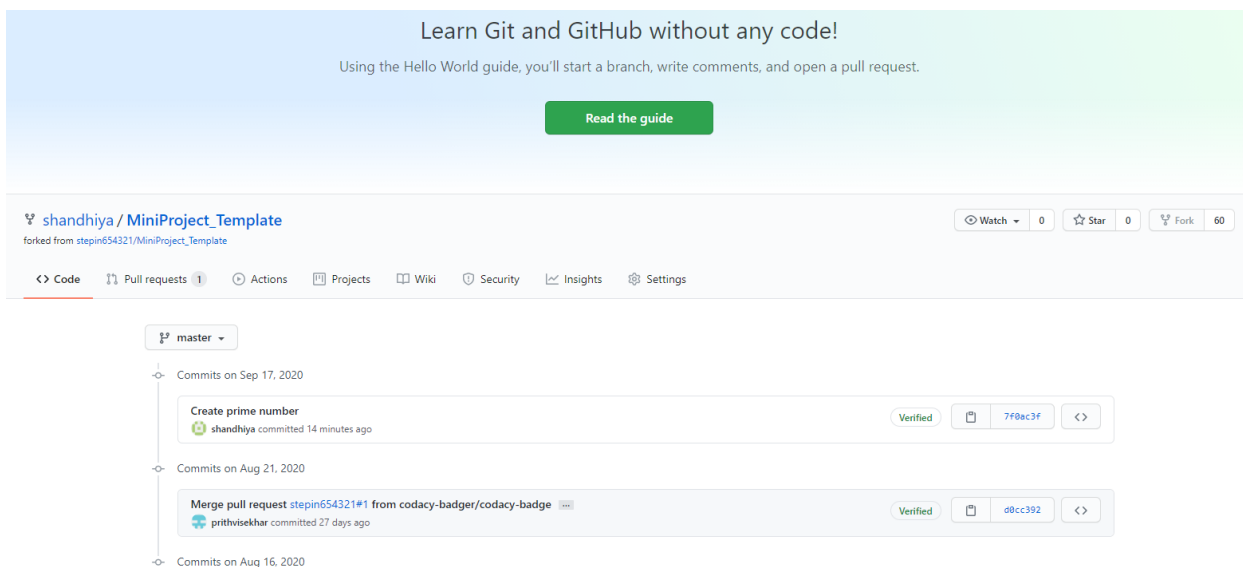REFERENCES:

[1] 4 october 2017. [Online]. Available: http://www.securionpay.com.

[2] RACHNA and P. SINGH, "Issues and Challenges of Electronic Payment Systems," International Journal for Research in Management and Pharmacy, 9, December 2013.

[3] Princewill Aigbe and Jackson Akpojaro, "Analysis of Security Issues in Electronic Payment Systems," International Journal of Computer Applications (0975 – 8887), 10, December 2014.

[4] S. Sumanjeet, "Emergence of Payment Systems in the age of Electronic Commerce: The State of Art," Asia Pacific Journal of Finance and Banking Research.

[5] D. U. P. S. B. V. Goyal, "Mobile Banking in India: Practices, Challenges and Security Issues," International Journal of Advanced Trends in Computer Science and Engineering, 2012.

[6] A. Y. A. M. S. Uddin, "E-Wallet System for Bangladesh an Electronic Payment System".

**APPENDIX**

# APPENDIX

CI FRAMEWORK FLOW:

## 1. GIT

## 2. BUILD
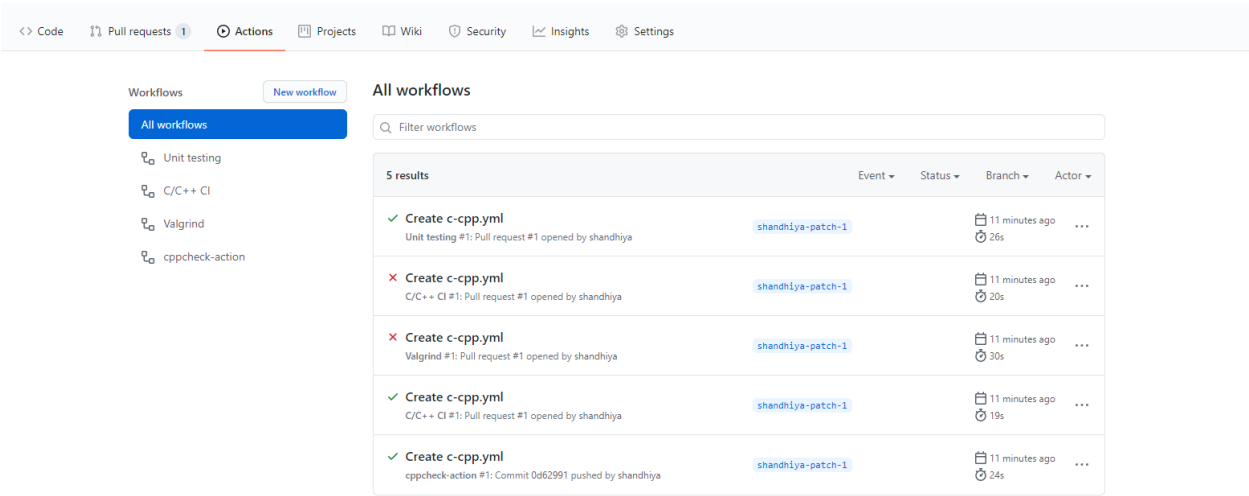


## 3. MAKE

README.md

# STEPin MiniProject_Template Sample

code quality  B

| Build | Unit Test | cppcheck | Valgrind | Codacy |
|---|---|---|---|---|
| C/C++ CI passing | Unit testing passing | cppcheck-action passing | Valgrind passing | code quality B |

Fig:20

## 4. CODE QUALITY

**CODE:**

```c
include<stdio.h>
                    #include<stdlib.h>
                    #include<string.h>
                    char r;
                    void login(){
                    int a=0,i=0;
                    char uname[10],c=' ',pword[10],code[10],user[]="user",pass[]="pass";
                    do{
                    printf("\n--------------------------LOGIN--------------------\n");
                    printf("\n\t\tEnter Username: ");
                    scanf("%s",uname);
                    getchar();
```

```c
printf("\t\tEnter Password: ");
/*while(i<10){
pword[i]=getch();
c=pword[i];
if(c==13)//enter key
break;
else
printf("*");
i++;
}
pword[i]='\0';
i=0;*/
scanf("%s",pword);
if(strcmp(uname,"user")==0 && strcmp(pword,"pass")==0){
printf("\n\nWELCOME TO THE BOOKING SYSTEM. LOGIN SUCCESSFUL\n");
printf("\n\t\tPress enter to continue........");
scanf("%c%c",&r,&r);
break;
}
else{
printf("\n\nLOGIN UNSUCCESSFUL.....");
a++;
}
}
while(a<2);
if(a>1){
printf("\nSorry you entered an incorrect password 3 times. Press Enter to
continue");
scanf("%c%c",&r,&r);
}
system("clear");
}
struct book{
char code[20];
char name[20];
char date[20];
int cost;
}b;
int seat=80;
void insert_details();
void view_All();
```
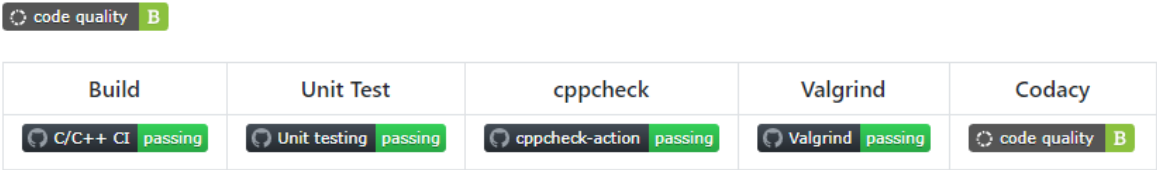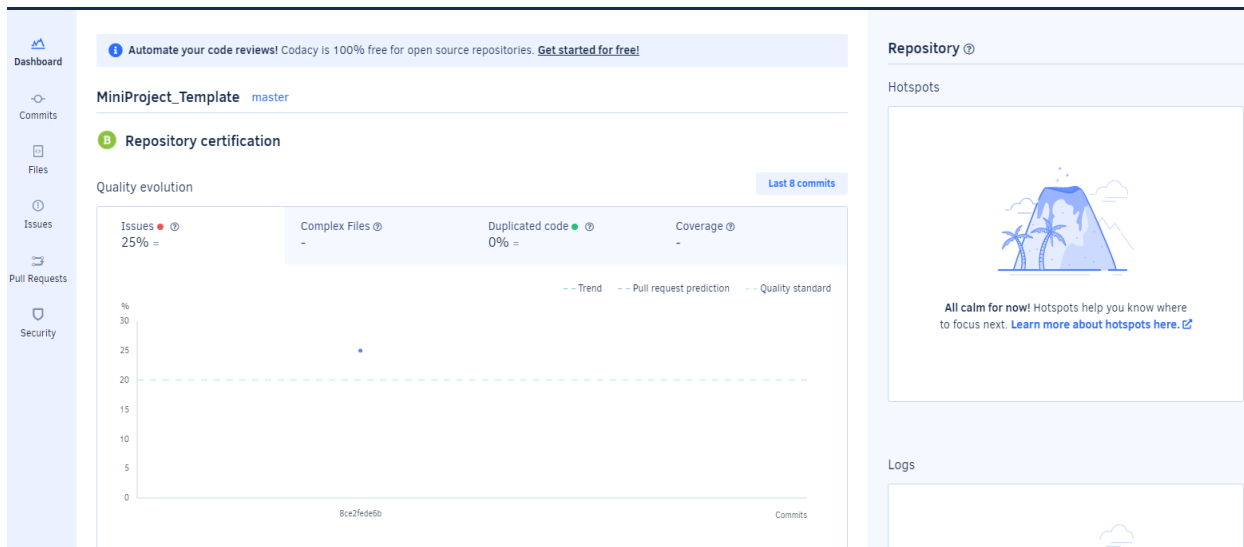
```c
void find();
void book_ticket();
void old_records();
void main(){
login();
int ch;
while(1){
printf("\n+++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++");
printf("\n\t Book Movie Ticket \n");
printf("\n+++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++");
printf("\nEnter >1< To Insert A Movie\nEnter >2< To View All Movies\nEnter >3<
To Find A Movie\nEnter >4< To Book A Ticket(s)\nEnter >5< To View All Recent
Transactions\nEnter >0< To Exit \nEnter your Choice :");
scanf("%d",&ch);
system("clear");
switch (ch){
case 1: insert_details();
break;
case 2: view_All();
break;
case 3: find();
break;
case 4: book_ticket();
break;
case 5: old_records();
break;
case 0: exit(0);
default: printf("Enter a valid option.");
}
}
}
void insert_details(){
FILE *fp;
struct book b;
printf("Enter movie code :- ");
scanf("%s",b.code);
printf("Enter name :- ");
scanf("%s",b.name);
printf("Enter Release Date:- ");
scanf("%s",b.date);
printf("Enetr Ticket Price:- ");
```

```c
scanf("%d",&b.cost);
fp=fopen("data.txt","a");
if(fp == NULL)
printf("FIle not Found");
else{
fprintf(fp,"%s %s %s %d \n",b.code,b.name,b.date,b.cost);
printf("Recorded Successfully\n");
}
fclose(fp);
system("clear");
}
void find(){
struct book b;
FILE *fp;
char ch[20];
printf("Enter movie code :");
scanf("%s",ch);
fp = fopen("data.txt","r");
if(fp == NULL){
printf("File Not Found");
exit(0);
}
else{
while(getc(fp) != EOF){
fscanf(fp,"%s %s %s %d",b.code,b.name,b.date,&b.cost);
if(strcmp(b.code,ch) == 0){
printf("\n Record Found\n");
printf("\n\t\tCode :%s",b.code);
printf("\n\t\tMovie Name :%s",b.name);
printf("\n\t\tMovie Date :%s",b.date);
printf("\n\t\tPrice of Ticket :%d",b.cost);
}
}
}
fclose(fp);
printf("\n\t\tPress enter to continue........");
scanf("%c%c",&r,&r);
system("clear");
}
void view_All(){
char ch;
```

```c
FILE *fp;
fp = fopen("data.txt","r");
if(fp == NULL){
printf("File Not Found");
exit(0);
}
else{
system("clear");
while((ch=fgetc(fp))!=EOF)
printf("%c",ch);
}
printf("\n\t\tPress enter to continue........");
scanf("%c%c",&r,&r);
system("clear");
fclose(fp);
}
void book_ticket(){
struct book b;
FILE *fp;
FILE *ufp;
int total_seat,mobile,total_amount;
char name[20];
char ch;
char movie_code[20];
fp = fopen("data.txt","r");
if(fp == NULL){
printf("file not found !");
exit(1);
}
else{
system("clear");
while( ( ch = fgetc(fp) ) != EOF )
printf("%c",ch);
}
fclose(fp);
printf("\n For Book ticket Choice Movie(Enter Movie Code First Latter Of
Movie)\n");
printf("\n Enter movie code :");
scanf("%s",movie_code);
fp = fopen("data.txt","r");
if(fp == NULL){
```

```c
printf("file not found !");
exit(1);
}
else{
while(getc(fp) != EOF){
fscanf(fp,"%s %s %s %d",b.code,b.name,b.date,&b.cost);
if(strcmp(b.code,movie_code) == 0){
printf("\n Record Found\n");
printf("\n\t\tCode :%s",b.code);
printf("\n\t\tMovie name :%s",b.name);
printf("\n\t\tdate name :%s",b.date);
printf("\n\t\tPrice of ticket:%d",b.cost);
}
}
}
printf("\n* Fill Your Details *");
printf("\n Your Name :");
scanf("%s",name);
printf("\n Mobile Number :");
scanf("%d",&mobile);
printf("\n Total number of tickets :");
scanf("%d",&total_seat);
total_amount = b.cost * total_seat;
printf("\n ENJOY YOUR MOVIE \n");
printf("\n\t\tName : %s",name);
printf("\n\t\tMobile Number : %d",mobile);
printf("\n\t\tMovie name : %s",b.name);
printf("\n\t\tTotal seats : %d",total_seat);
printf("\n\t\tCost per ticket : %d",b.cost);
printf("\n\t\tTotal Amount : %d",total_amount);
ufp=fopen("oldTransection.txt","a");
if(ufp == NULL){
printf("File not Found");
}
else{
fprintf(ufp,"%s %d %d %d %s %d
\n",name,mobile,total_seat,total_amount,b.name,b.cost);
printf("\n Record insert Sucessfull to the old record file");
}
printf("\n");
printf("\n\t\tPress enter to continue........");
```

```c
scanf("%c%c",&r,&r);
fclose(ufp);
fclose(fp);
}
void old_records(){
char ch;
FILE *fp;
fp = fopen("oldTransection.txt","r");
if(fp == NULL){
printf("file not found !");
exit(1);
}
else{
system("clear");
while((ch=fgetc(fp))!=EOF)
printf("%c",ch);
}
printf("\n\t\tPress enter to continue........");
scanf("%c%c",&r,&r);
fclose(fp);
}
```