PROJECT TITLE: SMART SOLUTIONS FOR RAILWAYS

TEAM ID:PNT2022TMID03711

TEAM MEMBERS:

- SHAJIVAN S(TEAM LEADER)
- ANBARASAN K
- ESHWAR S
- AJAY SRIRAM D

INTRODUCTION

1.1 PROJECT OVERVIEW:

SMART SOLUTIONS FOR RAILWAYS is to manage Indian Railways isthe largest railway network in Asia and additionally world's second largest networkoperated underneath a single management. Due to its large size it is difficult to monitor the cracks in tracks manually. This paper deals with this problem and detects cracks in tracks with the help of ultrasonic sensor attached to moving assembly with help of stepper motor. Ultrasonic sensor allows the device to moves back and forth across the track and if there is any fault, it gives information to the cloud server through which railway department is informed on time about cracks and many lives can be saved. This is the application of IoT, due to this it is cost effectivesystem. This effectivemethodology of continuous observation and assessment of rail tracks might facilitate to stop accidents. This methodology endlessly monitors the rail stress, evaluate the results and provide the rail break alerts such as potential buckling conditions, bending of rails and wheel impact load detection to the concerned authorities.

1.2 PURPOSE:

Internet is basically system of interconnected computers throughnetwork. But now its use is changing with changing world and it is not justconfined to emails or web browsing.Today’s internet also deals with embeddedsensorsand has led to development of smart homes, smart rural area, e-healthcare’s etc. and this introduced the concept of IoT . Internet of Things refers to interconnection or communication between two or more devices without human- to-human and human-to-computer interaction. Connected devices are equipped with sensors or actuators perceive their surroundings. IOT has four major components whichinclude sensing the device, accessing the device, processing the information of the device,and provides application and services. In addition to thisit also provides security and privacy of data .Automation has affected every aspect of our daily lives. More improvements are being introduced in almost all fields to reduce human effort and save time.

LITERATURE SURVEY

2.1 EXISTINGSYSTEM:

In the Existing train tracks are manually researched. LED (Light Emitting Diode) and LDR (Light Dependent Resister) sensors cannot be implemented on the block of the tracks]. The input image processing is a clamorous system with high cost and does not give the exact result.That The Automated Visual Test Method is a complicated method as the video color inspection is implemented to examine the cracks in rail track which does not give accurate result in bad weather. This traditional system, delays transfer of information.

2.2 REFERENCES:

- D. Hesse, "Rail Inspection Using Ultrasonic SurfaceWaves" Thesis, ImperialCollege of London, 2007.
- Md. Reya Shad Azim1 , Khizir Mahmud2 and C. K. Das. Automatic railway track switching system, International Journal of Advanced Technology, Volume 54, 2014.
- S. Somalraju, V. Murali, G. saha and V. Vaidehi, "Title-robust railway crackdetection scheme using LED (Light Emitting Diode) - LDR (Light Dependent Resistor)assembly IEEE 2012.
- S. Srivastava, R. P. Chourasia, P. Sharma, S. I. Abbas, N. K. Singh, "Railway Track Crack detection vehicle", IARJSET, Vol. 4, pp. 145-148, Issued in 2, Feb 2017.
- U. Mishra, V. Gupta, S. M. Ahzam and S. M. Tripathi, "Google Map Based Railway Track Fault Detection Over the Internet", International Journal of AppliedEngineering Research, Vol. 14, pp. 20-23, Number2, 2019.
- R. A. Raza, K. P. Rauf, A. Shafeeq, "Crackdetection in Railway track using Imageprocessing", IJARIIT, Vol. 3, pp. 489-496, Issue 4,2017.
- N. Bhargav, A. Gupta, M. Khirwar, S. Yadav, and V. Sahu, "Automatic Fault Detection of Railway Track System Based on PLC (ADOR TAST)", InternationalJournal of Recent Research Aspects,Vol. 3, pp. 91-94, 2016.

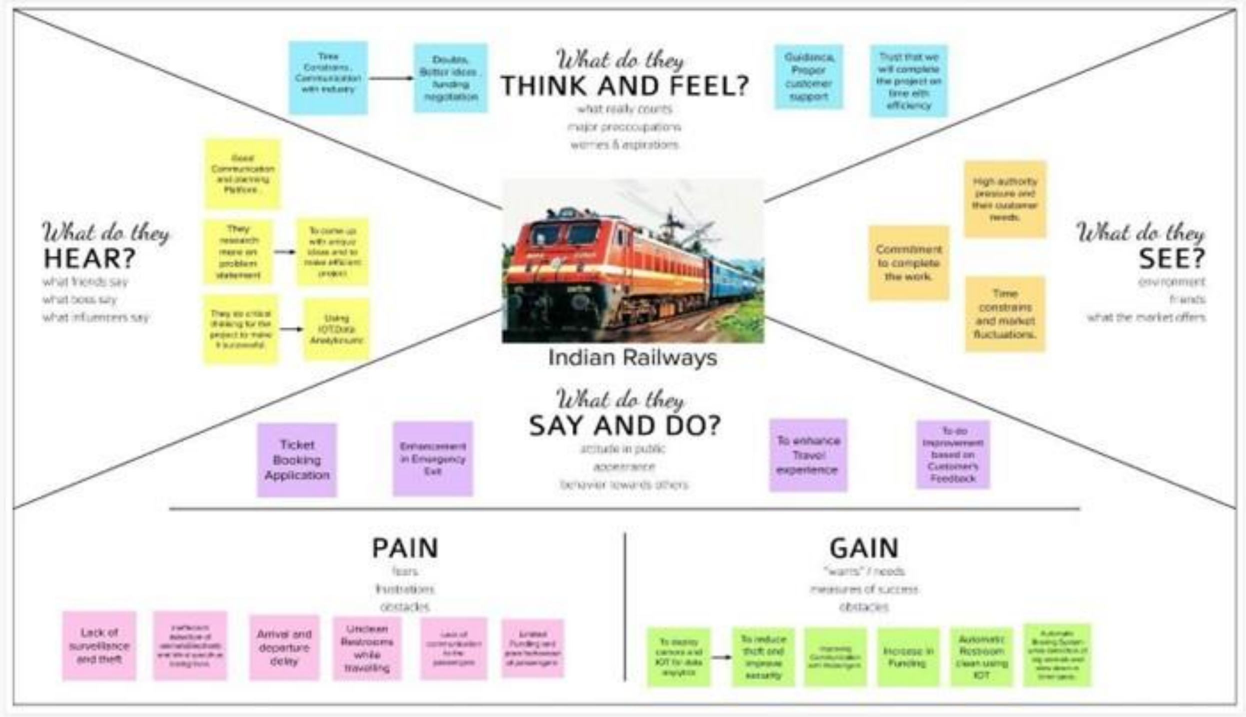
2.3 PROBLEM STATEMENT DEFINITION:

Among the various modes of transport, railways is one of the biggest modesof transport in the world. Though there are competitive threats from airlines, luxury buses,public transports, and personalized transports the problem statement is to answer the question

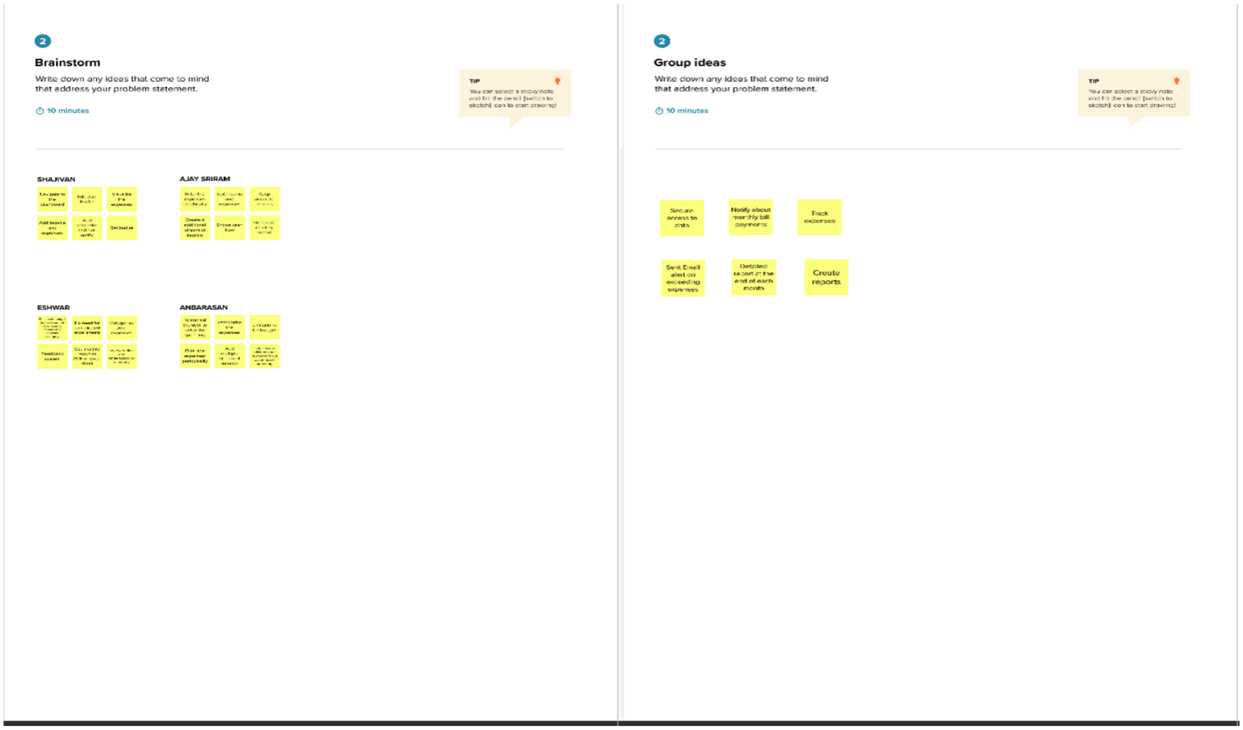
“What are the problems faced by the passengers while travellingby train at station and on board”.

IDEATION AND PROPOSED SOLUTON

3.1 EMPATHY MAP CANVAS:


What do they THINK AND FEEL?
what really counts
major preoccupations
worries & aspirations
Time Constrains, Communication with industry
Doubts, Better ideas, funding negotiation
Guidance, Proper customer support
Trust that we will complete the project on time eith efficiency
What do they HEAR?
what friends say
what boss say
what influencers say
Good Communication and planning Platform
They research more on problem statement
To come up with unique ideas and to make efficient project
They do critical thinking for the project to make it successful
Using IOT,Data Analytics,etc
What do they SEE?
environment
friends
what the market offers
High authority pressure and their customer needs.
Commitment to complete the work.
Time constrains and market fluctuations.
Indian Railways
What do they SAY AND DO?
attitude in public
appearance
behavior towards others
Ticket Booking Application
Enhancement in Emergency Exit
To enhance Travel experience
To do improvement based on Customer's Feedback
PAIN
fears
frustrations
obstacles
Lack of surveillance and theft
Arrival and departure delay
Unclean Restrooms while travelling
Lack of communication to the passengers
Limited Funding and poor behaviour of passengers
GAIN
"wants" / needs
measures of success
obstacles
To deploy camera and IOT for data anaytics
To reduce theft and improve security
Improving Communication with Passengers
Increase in Funding
Automatic Restroom clean using IOT

3.2 IDEATION & BRAINSTORMING:



2

Brainstorm

Write down any ideas that come to mind that address your problem statement.

10 minutes

TIP

You can select a sticky note and hit the pencil [switch to sketch] icon to start drawing!

SHAJIVAN

- Navigate to the dashboard
- Edit user Profile
- Visualize the expenses
- Add income and expenses
- Add reminder and notify
- Set budget

AJAY SRIRAM

- Filter the expenses graphically
- Edit income and expenses
- Keep accounts records
- Create a additional stream of income
- Shows cash flow
- Generate monthly report

ESHWAR

- [illegible]
- No need for complicated excel sheets
- Categorize your expenses
- Feedback system
- Get monthly reports as PDF or excel sheet
- [illegible]

ANBARASAN

- To remind the user to enter the spending
- Categorize the expenses
- Limitation for budget
- Filter the expenses periodically
- Add multiple streams of income
- [illegible]

2

Group ideas

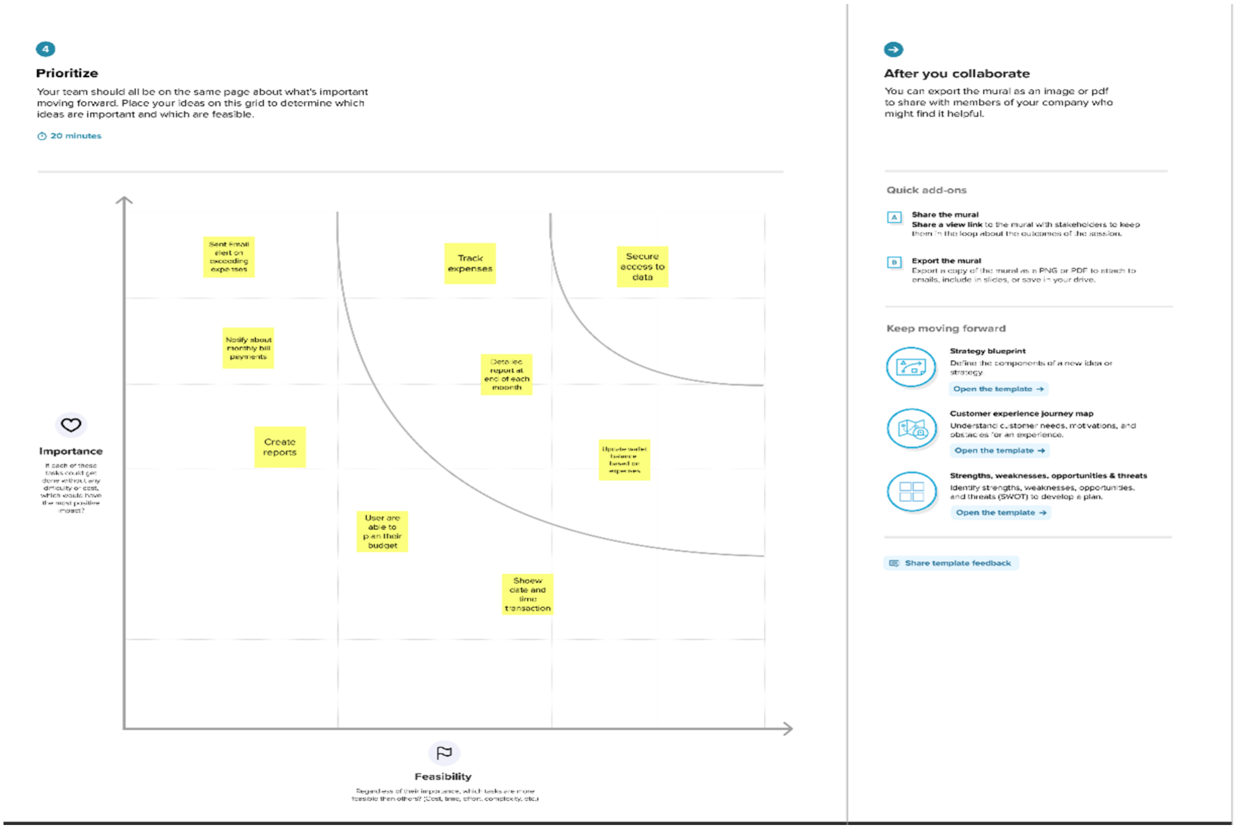
Write down any ideas that come to mind that address your problem statement.

10 minutes

TIP

You can select a sticky note and hit the pencil [switch to sketch] icon to start drawing!

- Secure access to data
- Notify about monthly bill payments
- Track expenses
- Sent Email alert on exceeding expenses
- Detailed report at the end of each month
- Create reports



4

Prioritize

Your team should all be on the same page about what's important moving forward. Place your ideas on this grid to determine which ideas are important and which are feasible.

20 minutes

Sent Email alert on exceeding expenses
Track expenses
Secure access to data
Notify about monthly bill payments
Detailed report at end of each moonth
Create reports
Update wallet balance based on expenses
User are able to plan their budget
Shoew date and time transaction
Importance
If each of these tasks could get done without any difficulty or cost, which would have the most positive impact?
Feasibility
Regardless of their importance, which tasks are more feasible than others? (Cost, time, effort, complexity, etc.)

After you collaborate

You can export the mural as an image or pdf to share with members of your company who might find it helpful.

Quick add-ons

A **Share the mural**
Share a view link to the mural with stakeholders to keep them in the loop about the outcomes of the session.

B **Export the mural**
Export a copy of the mural as a PNG or PDF to attach to emails, include in slides, or save in your drive.

Keep moving forward

Strategy blueprint
Define the components of a new idea or strategy.
Open the template →

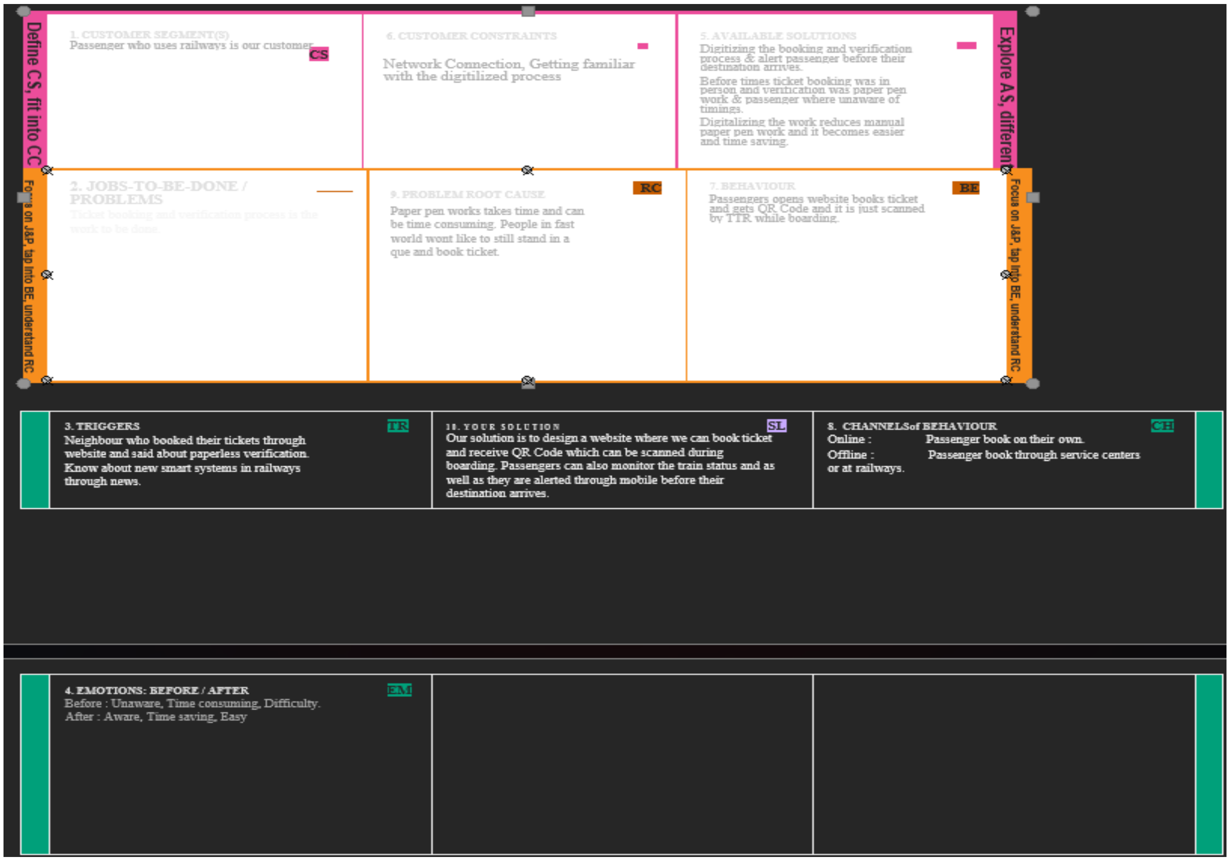
Customer experience journey map
Understand customer needs, motivations, and obstacles for an experience.
Open the template →

Strengths, weaknesses, opportunities & threats
Identify strengths, weaknesses, opportunities, and threats (SWOT) to develop a plan.
Open the template →

Share template feedback

1.	Problem Statement (Problem to besolved)	● To provide an efficient way by introducing paperless tickets using QR code ● To design a GPS module to track the location of the train.
2.	Idea / Solution description	● GPS tracker is placed in the train so that the passengers can track the location of the train even it is delayed. ● Passengers can book their tickets using the website which is possible at anytime, anywhere. ● Smart ticketing to avail seasons so that physical work is eradicated.
3.	Novelty / Uniqueness	● This project stands unique from the existing ones, by implementing facilities for getting train seasons online and the passenger is alerted through mobile phone before destination arrives.
4.	Social Impact/ Customer Satisfaction	● No Queuing to get tickets and burden less because of e-tickets. ● Elimination of dilemma whether the train has left or yet to arrive. ● Can get the status and avail of e-seasons instead of visiting the station physically everytime.
5.	Business Model(Revenue Model)	● This project enables railways to optimize their services by implementing e-ticketing when compared to the cost involved in paper ticketing thereby profiting with an increase in the number of users.
6.	Scalability of the Solution	● The solution comprises high scalability to meet the increasing demand of users over the nation for more efficient and comfortable services.

3.4 PROBLEM SOLUTION FIT:


Define CS, fit into CC
Focus on J&P, tap into BE, understand RC
Explore AS, differen
Focus on J&P, tap into BE, understand RC
CS
RC
BE
TR
SL
CH
EM

1. CUSTOMER SEGMENT(S)
Passenger who uses railways is our customer

6. CUSTOMER CONSTRAINTS
Network Connection, Getting familiar with the digitilized process

5. AVAILABLE SOLUTIONS
Digitizing the booking and verification process & alert passenger before their destination arrives.

Before times ticket booking was in person and verification was paper pen work & passenger where unaware of timings.

Digitalizing the work reduces manual paper pen work and it becomes easier and time saving.

2. JOBS-TO-BE-DONE / PROBLEMS
Ticket booking and verification process is the work to be done.

9. PROBLEM ROOT CAUSE
Paper pen works takes time and can be time consuming. People in fast world wont like to still stand in a que and book ticket.

7. BEHAVIOUR
Passengers opens website books ticket and gets QR Code and it is just scanned by TTR while boarding.

3. TRIGGERS
Neighbour who booked their tickets through website and said about paperless verification. Know about new smart systems in railways through news.

10. YOUR SOLUTION
Our solution is to design a website where we can book ticket and receive QR Code which can be scanned during boarding. Passengers can also monitor the train status and as well as they are alerted through mobile before their destination arrives.

8. CHANNELSof BEHAVIOUR
Online : Passenger book on their own.
Offline : Passenger book through service centers or at railways.

4. EMOTIONS: BEFORE / AFTER
Before : Unaware, Time consuming, Difficulty.
After : Aware, Time saving, Easy

REQUIREMENT ANALYSIS

4.1 FUNCTIONAL REQUIREMENTS:

FR No.	FunctionalRequirement (Epic)	Sub Requirement (Story/ Sub-Task)
FR-1	Passenger ticket booking	Booking through the online railway mobileapp and website.
FR-2	Booking Confirmation	BookingConfirmation via EmailBooking Confirmation via SMS
FR-3	Passenger objections and feedback	Through the online application, SMS, andemail to the respective authority.

FR-4	Passengerschedule	Passenger can see their train timing throughthe mobile app
FR-5	PassengerEmergency	Passengers in an Emergency, in case of accidents, natural disasters, or theft duringthe journey can complain through online applications, emergency calls, SMS, and email.

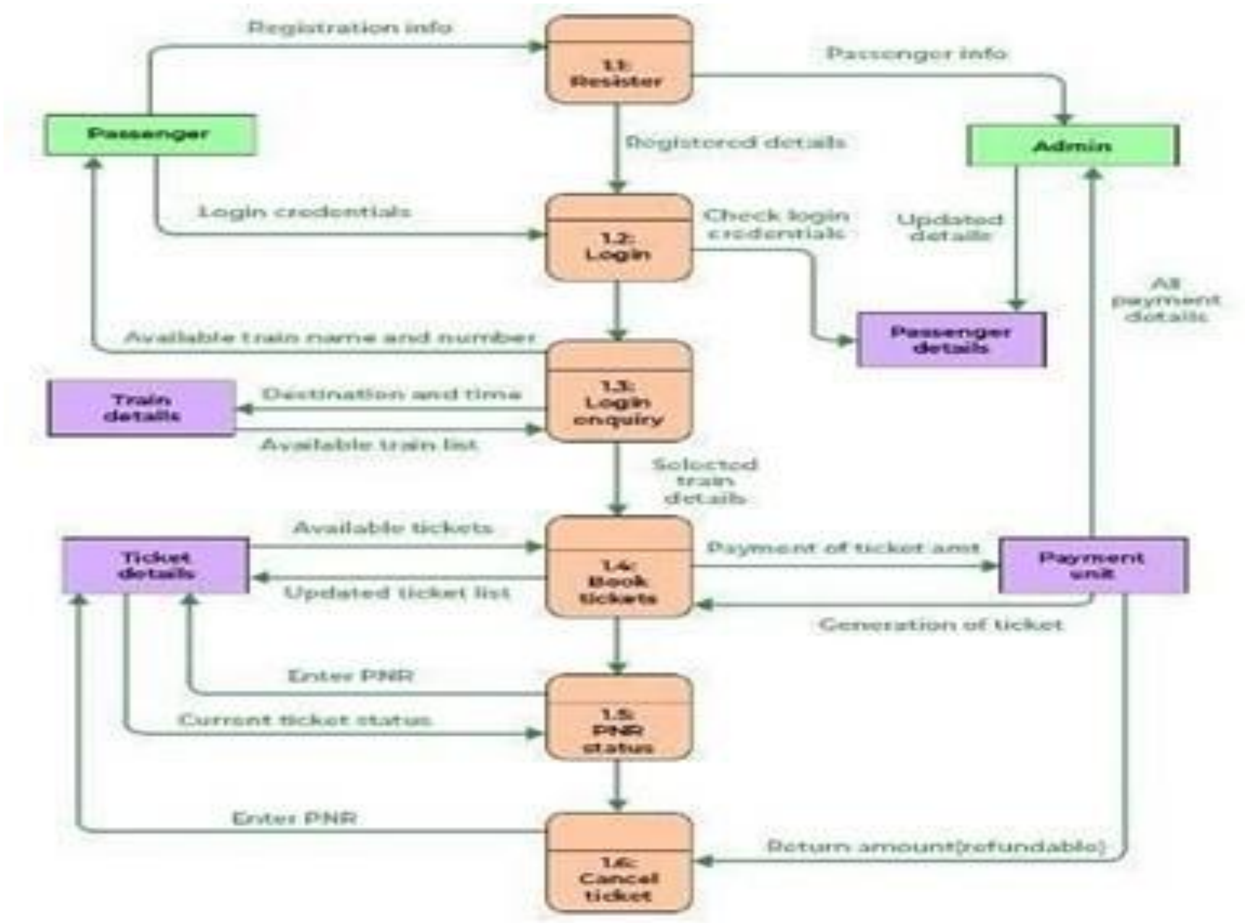
4.2 NON-FUNCTIONAL REQUIREMENTS:

FR No.	Non-Functional Requirement	Description
NFR-1	Usability	Within periodic maintenance, we can detect cracksin the railwaytrack. which willbe highly usableon remote railway tracks.
NFR-2	Security	Accidents and property damagecan beprevented with the help of our smartsensors which immediately sendthe fault to the pilot and administration.
NFR-3	Reliability	Traffic lights and signalling can be madeaccurately withthe help of sensors. so itismore reliable.
NFR-4	Performance	Communication plays a vital role in transferring the crack-detected signalto the responsible authority so that they can take appropriate measures within a shortspan.
NFR-5	Availability	Our idea is to make the crack alert to allthe trains passingthrough that fault-prone area.

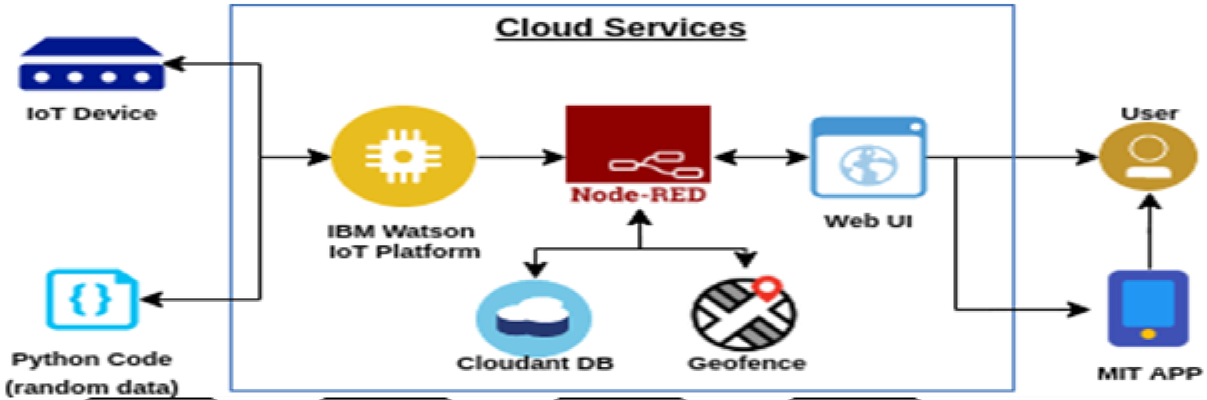
NFR-6	Scalability	Our project is based on IoT & cloud,which makesthe pilot and authorityupdated every single sec. Adhocis easy to handle.

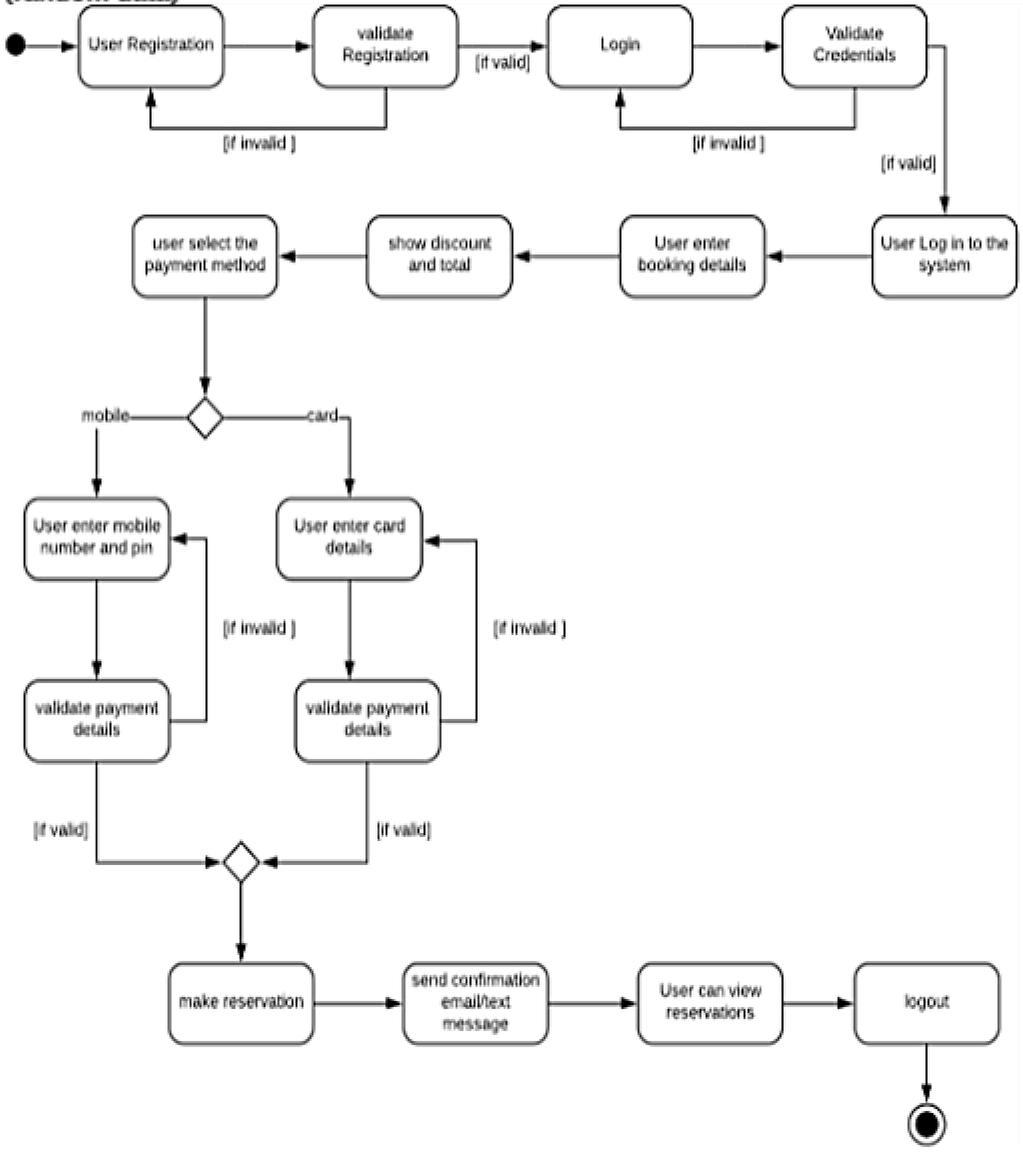
PROJECT DESIGN

5.1 DATA FLOW DIAGRAMS:



5.2 SOLUTION & TECHNICAL ARCHITECTURE:





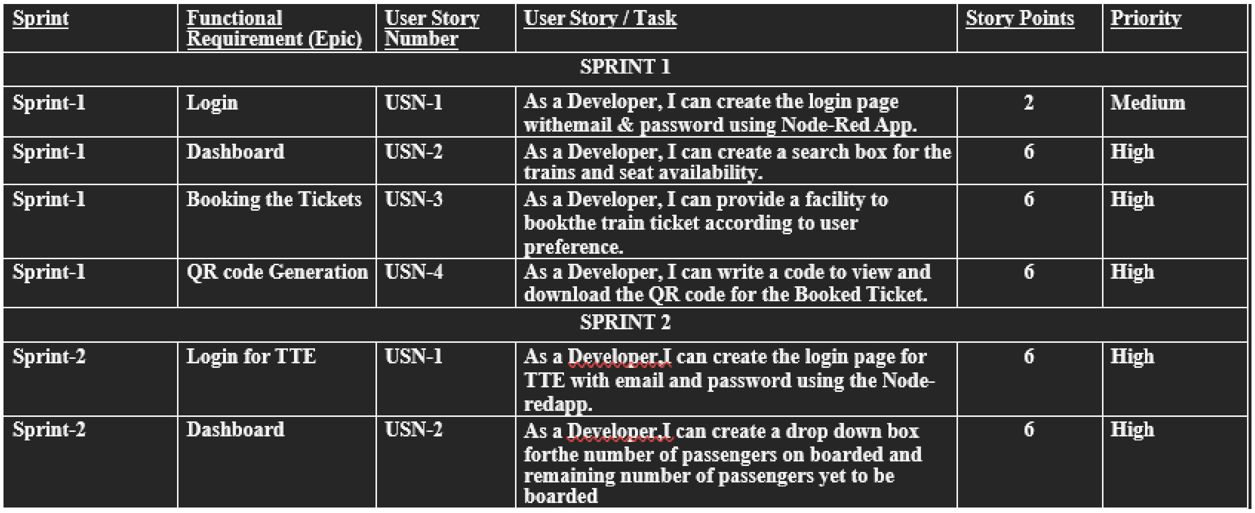
5.3 USER STORIES:

UserType	Functional Requirement (Epic)	User Story Number	User Story / Task	Acceptance criteria	Priority	Release
Customer (Mobile user, Webuser)	Registration	USN-1	As a user, I can register through the form by Fillingin my details	I can register and create my account / dashboard	High	Sprint-1
		USN-2	As a user, I can register through phone numbers, Gmail, Facebook or other socialsites	I can register & create my dashboard with Facebook login or other socialsites	High	Sprint-2
	Conformation	USN-3	As a user, I will receiveconfirmation through email or OTP once registration is successful	I can receive confirmation email & click confirm.	High	Sprint-1
	Authentication/Login	USN-4	As a user, I can loginvia login id and password or through OTP received on register phonenumber	I can login and access my account/dashboard	High	Sprint-1
	DisplayTrain details	USN-5	As a user, I can enter the startand destinationto get the list of trains available connecting the above	I can view thetrain details (name & number), corresponding routes it passes through based on the start and destination entered.	High	Sprint-1
	Booking	USN-6	As a use, I can provide the basicdetails such as a name, age,gender etc…	I will view, modify or confirmthe details enter.	High	Sprint-1
		USN-7	As a user, I can choosethe class, seat/berth. If a preferred seat/berth isn't available I can be allocated basedon the availability.	I will view, modify or confirmthe seat/class berth selected	High	Sprint-1
	Payment	USN-8	As a user,I can choose to pay through credit Card/debit card/UPI.	I can view thepayment Options availableand select my desirable choice To proceedwiththe payment	High	Sprint-1
		USN-9	As a user, I will be redirected to the selected Payment gatewayand upon successful	I can pay through the payment portal and confirm the booking if any changes need to	High	Sprint-1

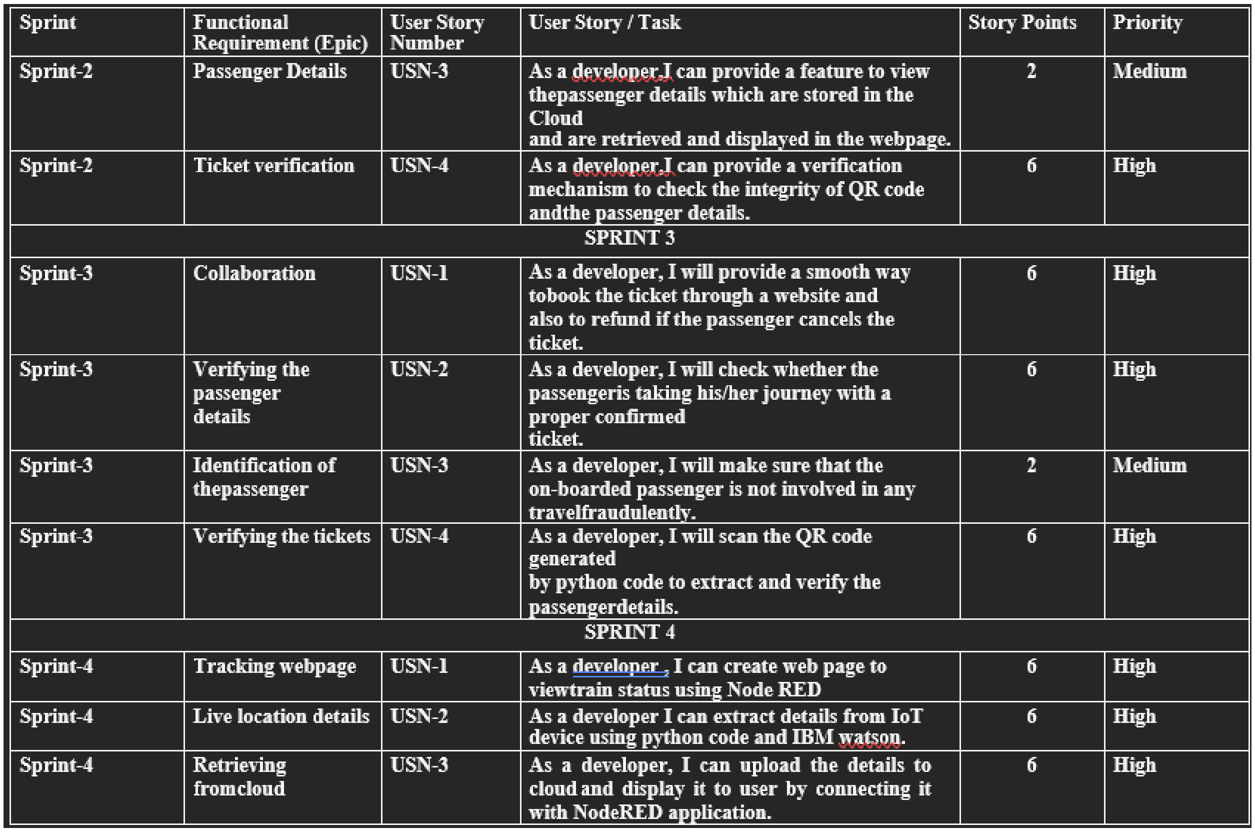
UserType	Functional Requirement (Epic)	User Story Number	User Story/ Task	Acceptance criteria	Priority	Release
			completion of paymentI’ll be redirected to the booking website.	be done I can move back to the initial payment page		
	Ticket generation	USN-10	As a user,I can download the generated e-ticket for my journey alongwith the QR code which is used for authentication during my journey.	I can show the generated QR codeso that authentication can be done quickly.	High	Sprint-1
	Ticket status	USN-11	As a user,I can see the status of my ticket Whether it’s confirmed/waiting/RAC.	I can confidentially getthe Information and arrange alternate transport if the ticket isn’t Confirmed	High	Sprint-1
	Remainders notification	USN-12	As a user, I get remainders about my journey A day before my actual journey.	I can make sure that I don’tmiss the journey because of theconstant notifications.	Medium	Sprint-2
		USN-13	As a user, I can track the train using GPSandcan get information such as ETA, Current stopand delay.	I can trackthe train and get to know about the delays pian accordingly	Medium	Sprint-2
	Ticket cancellation	USN-14	As a user, I can cancel my tickets if there’s anyChange of plan	I can cancel the ticket and get a refund based on how close the date is to the journey.	High	Sprint-1
	Raise queries	USN-15	As a user, I can raise queries through the query box or via mail.	I can view my pervious queries.	Low	Sprint-2
Customer care Executive	Answer the queries	USN-16	As a user,I will answerthe questions/doubts Raised by the customers.	I can view the queries and make it onceresolved	Medium	Sprint-2
Administrator	Feed details	USN-17	As a user, I will feed information about the trains delays and add extra seats if a new compartment is added.	I can view and ensure the corrections of the information fed.	High	Sprint-1

PROJECT PLANNING AND SCHEDULING

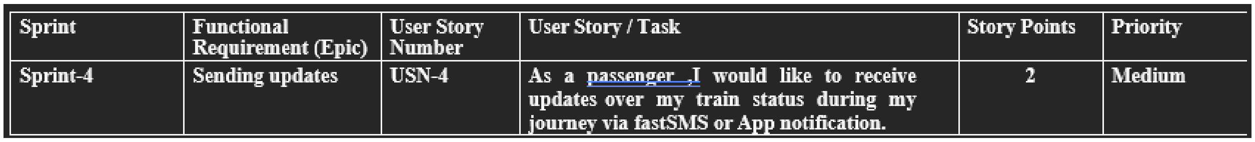
6.1 SPRINT PLANNING& ESTIMATION:



Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority
SPRINT 1					
Sprint-1	Login	USN-1	As a Developer, I can create the login page withemail & password using Node-Red App.	2	Medium
Sprint-1	Dashboard	USN-2	As a Developer, I can create a search box for the trains and seat availability.	6	High
Sprint-1	Booking the Tickets	USN-3	As a Developer, I can provide a facility to bookthe train ticket according to user preference.	6	High
Sprint-1	QR code Generation	USN-4	As a Developer, I can write a code to view and download the QR code for the Booked Ticket.	6	High
SPRINT 2					
Sprint-2	Login for TTE	USN-1	As a Developer,I can create the login page for TTE with email and password using the Node-redapp.	6	High
Sprint-2	Dashboard	USN-2	As a Developer,I can create a drop down box forthe number of passengers on boarded and remaining number of passengers yet to be boarded	6	High

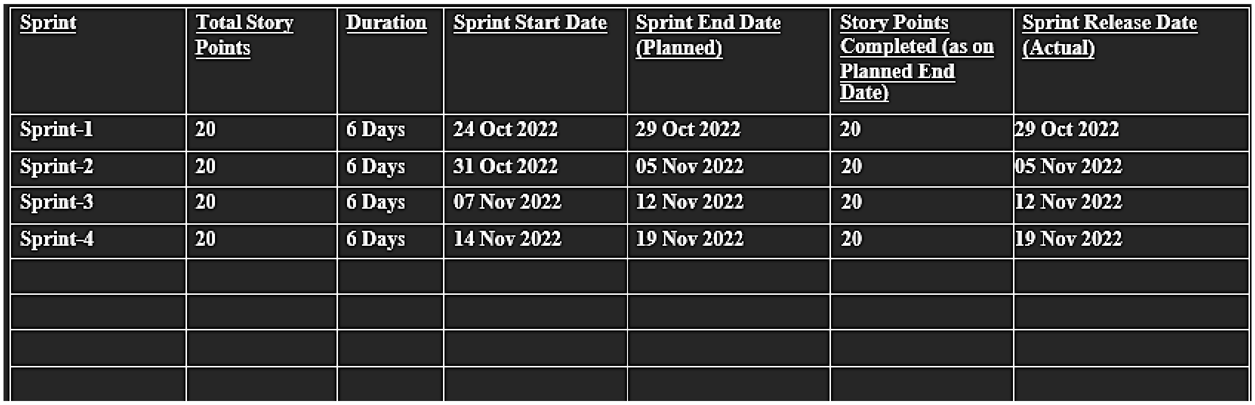


Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority
Sprint-2	Passenger Details	USN-3	As a developer,I can provide a feature to view thepassenger details which are stored in the Cloud and are retrieved and displayed in the webpage.	2	Medium
Sprint-2	Ticket verification	USN-4	As a developer,I can provide a verification mechanism to check the integrity of QR code andthe passenger details.	6	High
SPRINT 3					
Sprint-3	Collaboration	USN-1	As a developer, I will provide a smooth way tobook the ticket through a website and also to refund if the passenger cancels the ticket.	6	High
Sprint-3	Verifying the passenger details	USN-2	As a developer, I will check whether the passengeris taking his/her journey with a proper confirmed ticket.	6	High
Sprint-3	Identification of thepassenger	USN-3	As a developer, I will make sure that the on-boarded passenger is not involved in any travelfraudulently.	2	Medium
Sprint-3	Verifying the tickets	USN-4	As a developer, I will scan the QR code generated by python code to extract and verify the passengerdetails.	6	High
SPRINT 4					
Sprint-4	Tracking webpage	USN-1	As a developer , I can create web page to viewtrain status using Node RED	6	High
Sprint-4	Live location details	USN-2	As a developer I can extract details from IoT device using python code and IBM watson.	6	High
Sprint-4	Retrieving fromcloud	USN-3	As a developer, I can upload the details to cloud and display it to user by connecting it with NodeRED application.	6	High



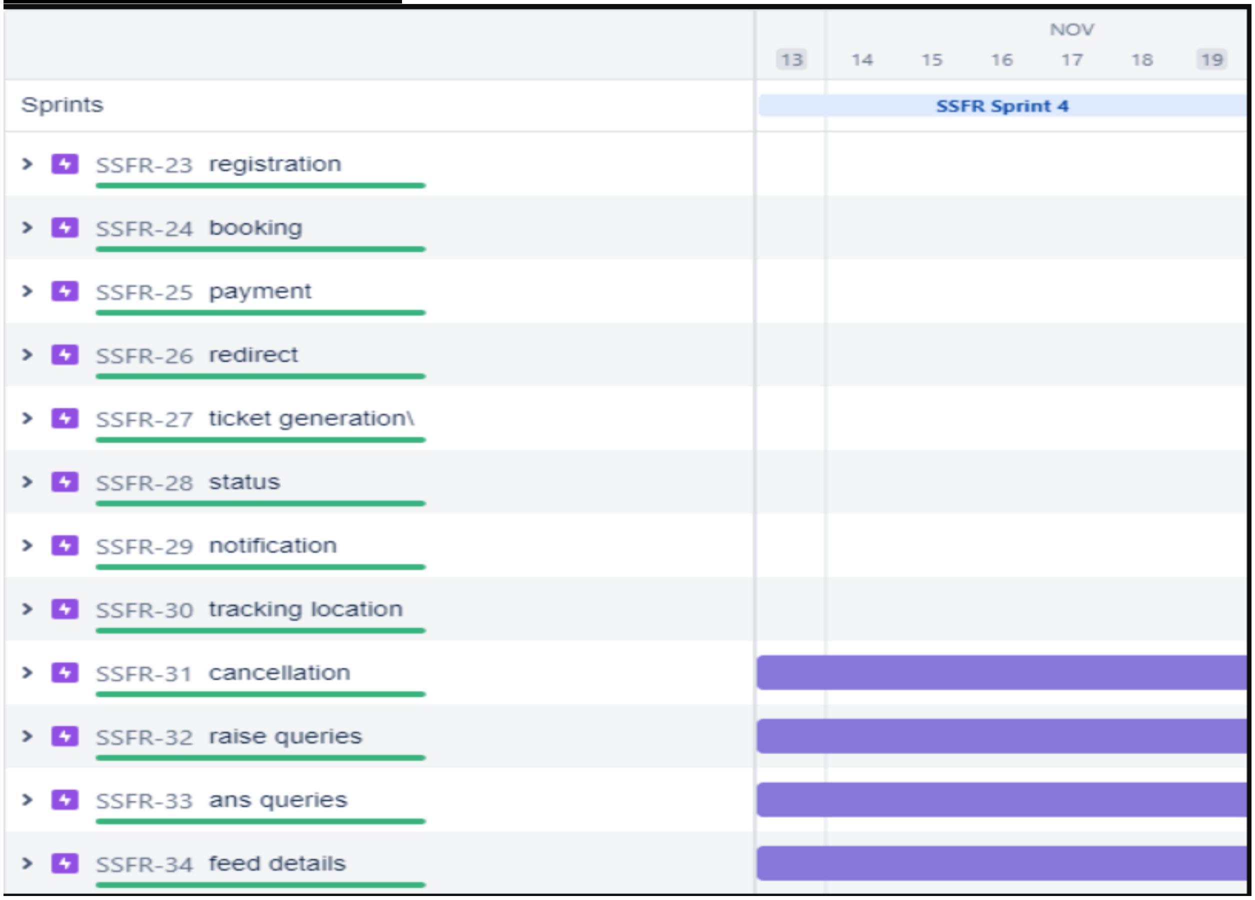
Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority
Sprint-4	Sending updates	USN-4	As a passenger ,I would like to receive updates over my train status during my journey via fastSMS or App notification.	2	Medium

5.2 SPRINT DELIVERY SCHEDULE:



Sprint	Total Story Points	Duration	Sprint Start Date	Sprint End Date (Planned)	Story Points Completed (as on Planned End Date)	Sprint Release Date (Actual)
Sprint-1	20	6 Days	24 Oct 2022	29 Oct 2022	20	29 Oct 2022
Sprint-2	20	6 Days	31 Oct 2022	05 Nov 2022	20	05 Nov 2022
Sprint-3	20	6 Days	07 Nov 2022	12 Nov 2022	20	12 Nov 2022
Sprint-4	20	6 Days	14 Nov 2022	19 Nov 2022	20	19 Nov 2022

5.3 REPORTS FROM JIRA:



Sprints

SSFR-23 registration

SSFR-24 booking

SSFR-25 payment

SSFR-26 redirect

SSFR-27 ticket generation\

SSFR-28 status

SSFR-29 notification

SSFR-30 tracking location

SSFR-31 cancellation

SSFR-32 raise queries

SSFR-33 ans queries

SSFR-34 feed details

CODING AND SOLUTIONING

7.1. FEATURE 1:

· IOT device
· IBM Watson platform

· Node red

· Cloudant DB

· Web UI

· Geofence

· MIT App

· Python code

7.2. FEATURE 2:

· Registration

· Login

· Verification

· Ticket Booking

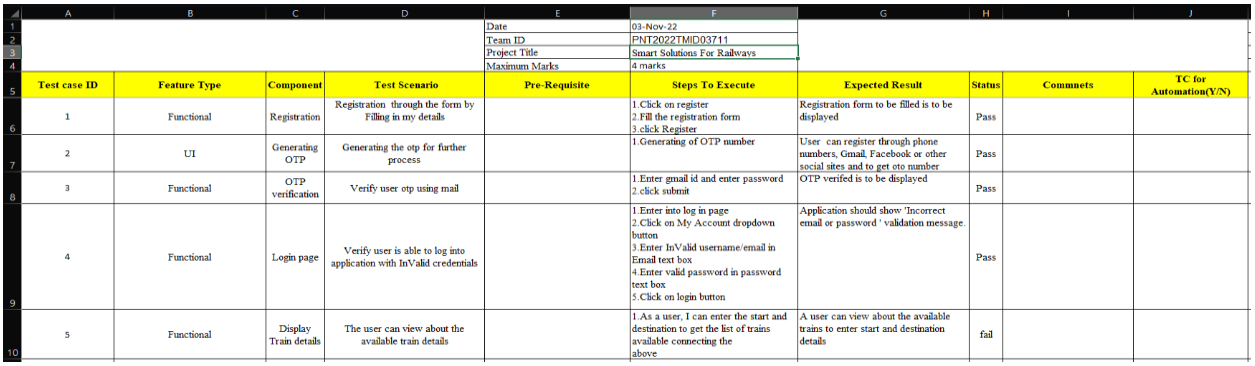
· Payment

· Ticket Cancellation

· Adding Queries

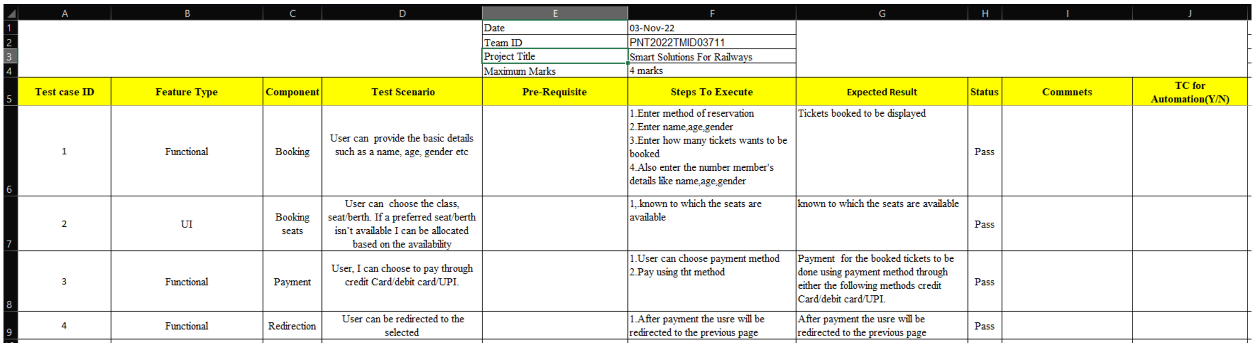
TESTING

8.1.TEST CASE



Date	03-Nov-22
Team ID	PNT2022TMID03711
Project Title	Smart Solutions For Railways
Maximum Marks	4 marks

Test case ID	Feature Type	Component	Test Scenario	Pre-Requisite	Steps To Execute	Expected Result	Status	Commnets	TC for Automation(Y/N)
1	Functional	Registration	Registration through the form by Filling in my details		1.Click on register 2.Fill the registration form 3.click Register	Registration form to be filled is to be displayed	Pass		
2	UI	Generating OTP	Generating the otp for further process		1.Generating of OTP number	User can register through phone numbers, Gmail, Facebook or other social sites and to get oto number	Pass		
3	Functional	OTP verification	Verify user otp using mail		1.Enter gmail id and enter password 2.click submit	OTP verifed is to be displayed	Pass		
4	Functional	Login page	Verify user is able to log into application with InValid credentials		1.Enter into log in page 2.Click on My Account dropdown button 3.Enter InValid username/email in Email text box 4.Enter valid password in password text box 5.Click on login button	Application should show 'Incorrect email or password ' validation message.	Pass		
5	Functional	Display Train details	The user can view about the available train details		1.As a user, I can enter the start and destination to get the list of trains available connecting the above	A user can view about the available trains to enter start and destination details	fail		



Date	03-Nov-22
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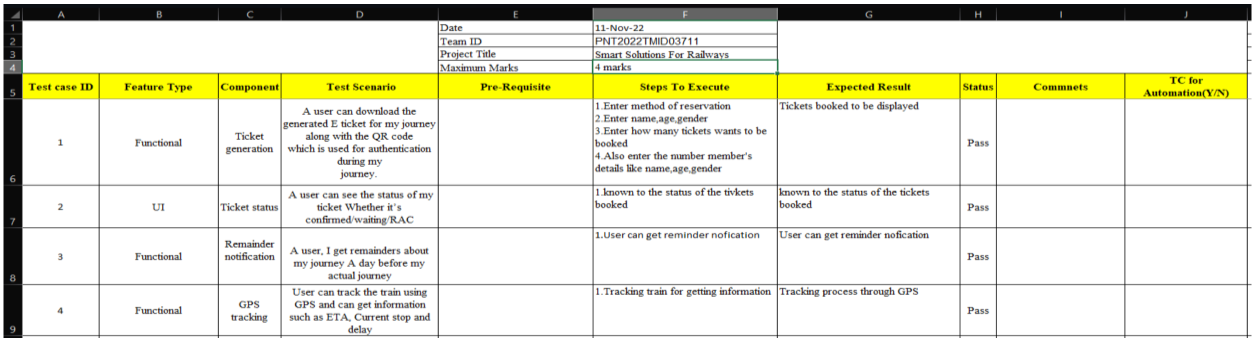
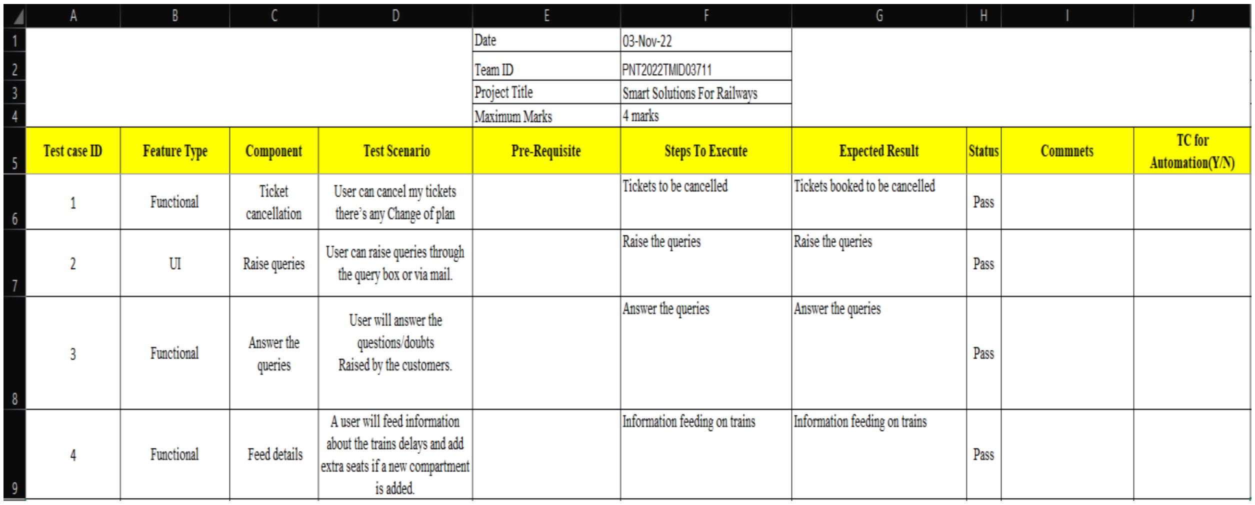
Project Title	Smart Solutions For Railways
Maximum Marks	4 marks

Test case ID	Feature Type	Component	Test Scenario	Pre-Requisite	Steps To Execute	Expected Result	Status	Commnets	TC for Automation(Y/N)
1	Functional	Booking	User can provide the basic details such as a name, age, gender etc		1.Enter method of reservation 2.Enter name,age,gender 3.Enter how many tickets wants to be booked 4.Also enter the number member's details like name,age,gender	Tickets booked to be displayed	Pass		
2	UI	Booking seats	User can choose the class, seat/berth. If a preferred seat/berth isn't available I can be allocated based on the availability		1,.known to which the seats are available	known to which the seats are available	Pass		
3	Functional	Payment	User, I can choose to pay through credit Card/debit card/UPI.		1.User can choose payment method 2.Pay using tht method	Payment for the booked tickets to be done using payment method through either the following methods credit Card/debit card/UPI.	Pass		
4	Functional	Redirection	User can be redirected to the selected		1.After payment the usre will be redirected to the previous page	After payment the usre will be redirected to the previous page	Pass		



Date	11-Nov-22
Team ID	PNT2022TMID03711
Project Title	Smart Solutions For Railways
Maximum Marks	4 marks

Test case ID	Feature Type	Component	Test Scenario	Pre-Requisite	Steps To Execute	Expected Result	Status	Commnets	TC for Automation(Y/N)
1	Functional	Ticket generation	A user can download the generated E ticket for my journey along with the QR code which is used for authentication during my journey.		1.Enter method of reservation 2.Enter name,age,gender 3.Enter how many tickets wants to be booked 4.Also enter the number member's details like name,age,gender	Tickets booked to be displayed	Pass		
2	UI	Ticket status	A user can see the status of my ticket Whether it's confirmed/waiting/RAC		1.known to the status of the tivkets booked	known to the status of the tickets booked	Pass		
3	Functional	Remainder notification	A user, I get remainders about my journey A day before my actual journey		1.User can get reminder nofication	User can get reminder nofication	Pass		
4	Functional	GPS tracking	User can track the train using GPS and can get information such as ETA, Current stop and delay		1.Tracking train for getting information	Tracking process through GPS	Pass		

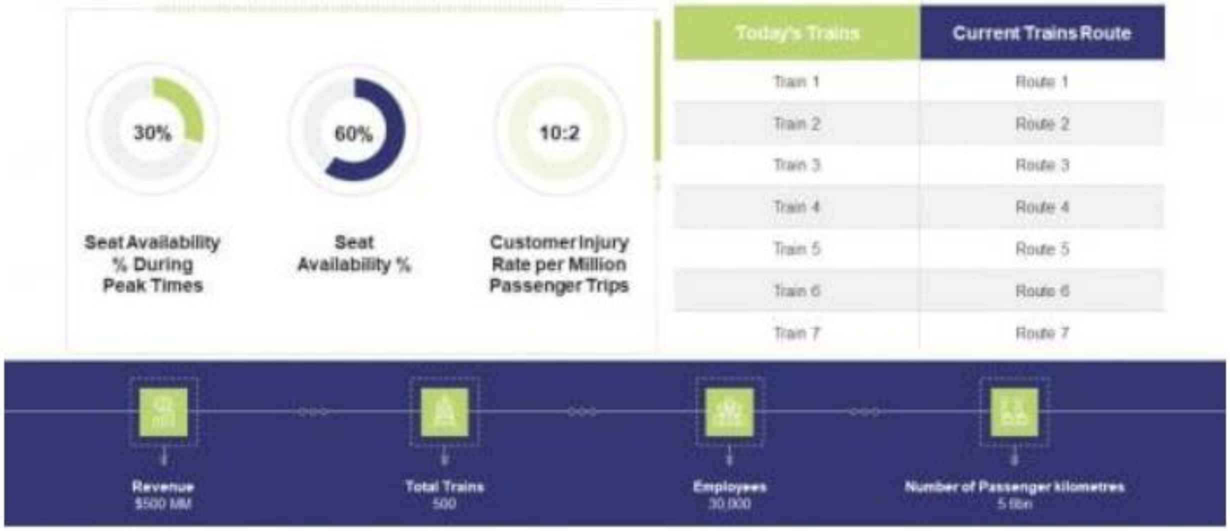


Date	03-Nov-22
Team ID	PNT2022TMID03711
Project Title	Smart Solutions For Railways
Maximum Marks	4 marks

Test case ID	Feature Type	Component	Test Scenario	Pre-Requisite	Steps To Execute	Expected Result	Status	Commnets	TC for Automation(Y/N)
1	Functional	Ticket cancellation	User can cancel my tickets there's any Change of plan		Tickets to be cancelled	Tickets booked to be cancelled	Pass		
2	UI	Raise queries	User can raise queries through the query box or via mail.		Raise the queries	Raise the queries	Pass		
3	Functional	Answer the queries	User will answer the questions/doubts Raised by the customers.		Answer the queries	Answer the queries	Pass		
4	Functional	Feed details	A user will feed information about the trains delays and add extra seats if a new compartment is added.		Information feeding on trains	Information feeding on trains	Pass		

RESULT

9.1.PERFORMANCE METRICS:


30%
Seat Availability % During Peak Times
60%
Seat Availability %
10:2
Customer Injury Rate per Million Passenger Trips

Today's Trains	Current Trains Route
Train 1	Route 1
Train 2	Route 2
Train 3	Route 3
Train 4	Route 4
Train 5	Route 5
Train 6	Route 6
Train 7	Route 7

Revenue
$500 MM

Total Trains
500

Employees
30,000

Number of Passenger kilometres
5 Bn

ADVANTAGES & DISADVANTAGES

10.1.ADVANTAGES:

- Openness – compatibility between different system modules, potentially from different vendors;
- Orchestration – ability to manage large numbers of devices, with full visibility over them;
- Dynamic scaling – ability to scale the system according to the application needs, through resource virtualization and cloud operation;

10.2.DISADVANTAGES:

- Approaches to flexible, effective, efficient, and low-cost data collection for both railway vehicles and infrastructure monitoring, using regular trains.
- Data processing, reduction, and analysis in local controllers, and subsequent sending of that data to the cloud, for further processing.
- Integrated, interoperable, and scalable solutions for railway systems preventive maintenance.

CONCLUSION

The railway industry is on its way to integrate predictive maintenance and Big Data. Recent advancements in sensors and condition monitoring technologies have led to continuous data collection and evaluation, significantly minimising the number and cost of unscheduled maintenance.Most significant improvements have been evidenced by more informative and user-friendly websites, mobile applications for real-time information about vehicles in motion, and e-ticket purchases and timetable information implemented at stations and stops.

FUTURE SCOPE

In future CCTV systems with IP based camera can be used for monitoring the visual videos captured from the track. It will also increase security for both passengers and railways. GPS can also be used to detect exact location of track fault area, IP cameras can also be used to show fault with the help of video. Locations on Google maps with the help of sensors can be used to detect in which area track is broken.

APPENDIX

13.1.SOURCE PROGRAM:

```
import wiotp.sdk.device
import time
import random
myConfig = {
        "identity": {
          "orgId": "gagtey",
          "typeId": "GPS",
          "deviceId":"12345"
        },
        "auth": {
          "token": "12345678"
        }
}
def myCommandCallback (cmd):
        print ("Message received from IBM IoT Platform: %s" % cmd.data['command'])
        m=cmd.data['command']

client = wiotp.sdk.device.DeviceClient(config=myConfig, logHandlers=None)
client.connect()
```

```
def pub (data):
    client.publishEvent(eventId="status", msgFormat="json", data=myData, qos=0,
onPublish=None)
    print ("Published data Successfully: %s", myData)
while True:
    myData={'name': 'Train1', 'lat': 17.6387448, 'lon': 78.4754336}
    pub (myData)
    time.sleep (3)
    #myData={'name': 'Train2', 'lat': 17.6387448, 'lon': 78.4754336)
    #pub (myData)
    #time.sleep (3)
    myData={'name': 'Train1', 'lat': 17.6341908, 'lon': 78.4744722}
    pub(myData)
    time.sleep(3)
    myData={'name': 'Train1', 'lat': 17.6340889, 'lon': 78.4745052}
    pub (myData)
    time.sleep (3)
    myData={'name': 'Train1', 'lat': 17.6248626, 'lon': 78.4720259}
    pub (myData)
    time.sleep (3)
    myData={'name': 'Train1', 'lat': 17.6188577, 'lon': 78.4698726}
    pub (myData)
    time.sleep (3)
    myData={'name': 'Train1', 'lat': 17.6132382, 'lon': 78.4707318}
    pub (myData)
    time.sleep (3)
    client.commandCallback = myCommandCallback
client.disconnect ()
```

QR Scanner Code:

```
from ibmcloudant import CouchDbSessionAuthenticator
from ibm_cloud_sdk_core.authenticators import BasicAuthenticator

authenticator = BasicAuthenticator('apikey-v2-16u3crmdpkghhxefdi
kvpssoh5fwezrmuup5fv5g3ubz', 'b0ab119f45d3e6255eabb978')
service = CloudantV1(authenticator=authenticator)
```

```
service.set_service_url('https://apikey-v2-16u3ermdpkghhxefdikvpssoh5fwezrmuup5fv5g3ubz:b0ab119145d3e6255eabb978e7e2f0')

cap= cv2.VideoCapture(0)
font = cv2.FONT_HERSHEY_PLAIN
while True:
        _, frame = cap.read()
        decodedObjects = pyzbar.decode (frame)
        for obj in decodedObjects:
          #print ("Data", obj.data)
          a=obj.data.decode('UTF-8')
          cv2.putText(frame, "Ticket", (50, 50), font, 2,        (255, 0, 0), 3)

          #print (a)
          try:
               response = service.get_document(
                    db='booking',
                    doc_id = a
               ).get_result()
               print (response)
               time.sleep(5)
          except Exception as e:
               print ("Not a Valid Ticket")
               time.sleep(5)

        cv2.imshow("Frame",frame)
        if cv2.waitKey(1) & 0xFF ==ord('q'):
          break
cap.release()
cv2.destroyAllWindows()
client.disconnect()
```

LOGIN:

```
from tkinter import *
import sqlite3

root = Tk()
root.title("Python: Simple Login Application")
```

```
width = 400
height = 280
screen_width = root.winfo_screenwidth()
screen_height = root.winfo_screenheight()
x = (screen_width/2) - (width/2)
y = (screen_height/2) - (height/2)
root.geometry("%dx%d+%d+%d" % (width, height, x, y))
root.resizable(0, 0)
USERNAME = StringVar()
PASSWORD = StringVar()

Top = Frame(root, bd=2,  relief=RIDGE)
Top.pack(side=TOP, fill=X)
Form = Frame(root, height=200)
Form.pack(side=TOP, pady=20)

lbl_title = Label(Top, text = "Python: Simple Login Application", font=('arial', 15))
lbl_title.pack(fill=X)
lbl_username = Label(Form, text = "Username:", font=('arial', 14), bd=15)
lbl_username.grid(row=0, sticky="e")
lbl_password = Label(Form, text = "Password:", font=('arial', 14), bd=15)
lbl_password.grid(row=1, sticky="e")
lbl_text = Label(Form)
lbl_text.grid(row=2, columnspan=2)

username = Entry(Form, textvariable=USERNAME, font=(14))
username.grid(row=0, column=1)
password = Entry(Form, textvariable=PASSWORD, show="*", font=(14))
password.grid(row=1, column=1)




def Database():
    global conn, cursor
    conn = sqlite3.connect("pythontut.db")
    cursor = conn.cursor()
    cursor.execute("CREATE TABLE IF NOT EXISTS `member` (mem_id INTEGER NOT
NULL PRIMARY KEY  AUTOINCREMENT, username TEXT, password TEXT)")
    cursor.execute("SELECT * FROM `member` WHERE `username` = 'admin' AND `password`
= 'admin'")
    if cursor.fetchone() is None:
        cursor.execute("INSERT INTO `member` (username, password) VALUES('admin',
'admin')")
        conn.commit()
def Login(event=None):
    Database()
    if USERNAME.get() == "" or PASSWORD.get() == "":
        lbl_text.config(text="Please complete the required field!", fg="red")
    else:
        cursor.execute("SELECT * FROM `member` WHERE `username` = ? AND `password` =
?", (USERNAME.get(), PASSWORD.get()))
        if cursor.fetchone() is not None:
            HomeWindow()
            USERNAME.set("")
            PASSWORD.set("")
            lbl_text.config(text="")
        else:
            lbl_text.config(text="Invalid username or password", fg="red")
            USERNAME.set("")
            PASSWORD.set("")
    cursor.close()
    conn.close()

 btn_login = Button(Form, text="Login", width=45, command=Login)
btn_login.grid(pady=25, row=3, columnspan=2)
btn_login.bind('<Return>', Login)



def HomeWindow():
    global Home
    root.withdraw()
    Home = Toplevel()
    Home.title("Python: Simple Login Application")
    width = 600
    height = 500
    screen_width = root.winfo_screenwidth()
    screen_height = root.winfo_screenheight()
    x = (screen_width/2) - (width/2)
    y = (screen_height/2) - (height/2)
    root.resizable(0, 0)
    Home.geometry("%dx%d+%d+%d" % (width, height, x, y))
    lbl_home = Label(Home, text="Successfully Login!", font=('times new roman', 20)).pack()
    btn_back = Button(Home, text='Back', command=Back).pack(pady=20, fill=X)

def Back():
    Home.destroy()
    root.deiconify()
```

OTP GENERATION:

```
# import library
import math, random

# function to generate OTP
def generateOTP() :

    # Declare a digits variable
    # which stores all digits
    digits = "0123456789"
    OTP = ""

   # length of password can be changed
   # by changing value in range
    for i in range(4) :
        OTP += digits[math.floor(random.random() * 10)]

    return OTP
 # Driver code
if __name__ == "__main__" :

    print("OTP of 4 digits:", generateOTP())
```

OTP VERIFICATON:

```
import os
import math
import random
import smtplib

digits = "0123456789"
OTP = ""

for i in range (6):
   OTP += digits[math.floor(random.random()*10)]

otp = OTP + " is your OTP"
message = otp
s = smtplib.SMTP('smtp.gmail.com', 587)
s.starttls()

emailid = input("Enter your email: ")
s.login("YOUR Gmail ID", "YOUR APP PASSWORD")
s.sendmail('&&&&&&',emailid,message)

a = input("Enter your OTP >>: ")
if a == OTP:
   print("Verified")
else:
   print("Please Check your OTP again")
```

REGISTERATION:

```
from tkinter import*
base = Tk()
base.geometry("500x500")
base.title("registration form")

labl_0 = Label(base, text="Registration form",width=20,font=("bold", 20))
labl_0.place(x=90,y=53)

lb1= Label(base, text="Enter Name", width=10, font=("arial",12))
lb1.place(x=20, y=120)
en1= Entry(base)
```

```
en1.place(x=200, y=120)

lb3= Label(base, text="Enter Email", width=10, font=("arial",12))
lb3.place(x=19, y=160)
en3= Entry(base)
en3.place(x=200, y=160)

lb4= Label(base, text="Contact Number", width=13,font=("arial",12))
lb4.place(x=19, y=200)
en4= Entry(base)
en4.place(x=200, y=200)

lb5= Label(base, text="Select Gender", width=15, font=("arial",12))
lb5.place(x=5, y=240)
var = IntVar()
Radiobutton(base, text="Male", padx=5,variable=var, value=1).place(x=180, y=240)
Radiobutton(base, text="Female", padx =10,variable=var, value=2).place(x=240,y=240)
Radiobutton(base, text="others", padx=15, variable=var, value=3).place(x=310,y=240)

list_of_cntry = ("United States", "India", "Nepal", "Germany")
cv = StringVar()
drplist= OptionMenu(base, cv, *list_of_cntry)
drplist.config(width=15)
cv.set("United States")
lb2= Label(base, text="Select Country", width=13,font=("arial",12))
lb2.place(x=14,y=280)
drplist.place(x=200, y=275)

lb6= Label(base, text="Enter Password", width=13,font=("arial",12))
lb6.place(x=19, y=320)
en6= Entry(base, show='*')
en6.place(x=200, y=320)

lb7= Label(base, text="Re-Enter Password", width=15,font=("arial",12))
lb7.place(x=21, y=360)
en7 =Entry(base, show='*')
en7.place(x=200, y=360)
```

```
Button(base, text="Register", width=10).place(x=200,y=400)
base.mainloop
```

START AND DESTINATION:

```
# import module
import requests
from bs4 import BeautifulSoup

# user define function
# Scrape the data
def getdata(url):
    r = requests.get(url)
    return r.text
  # input by geek
from_Station_code = "GAYA"
from_Station_name = "GAYA"

To_station_code = "PNBE"
To_station_name = "PATNA"
# url
url = "https://www.railyatri.in/booking/trains-between-stations?from_code="+from_Station_code+"&from_name="+from_Station_name+"+JN+&journey_date=+Wed&src=tbs&to_code=" + \
    To_station_code+"&to_name="+To_station_name + \
    "+JN+&user_id=-1603228437&user_token=355740&utm_source=dwebsearch_tbs_search_trains"
 # pass the url
# into getdata function
htmldata = getdata(url)
soup = BeautifulSoup(htmldata, 'html.parser')

# find the Html tag
# with find()
# and convert into string
data_str = ""
for item in soup.find_all("div", class_="col-xs-12 TrainSearchSection"):
    data_str = data_str + item.get_text()
result = data_str.split("\n")
  print("Train between "+from_Station_name+" and "+To_station_name)
print("")

# Display the result
for item in result:
    if item != "":
        print(item)
```

SPRINT-2:

BOOKING:

```
print("\n\nTicket Booking System\n")
restart = ('Y')

while restart != ('N','NO','n','no'):
                print("1.Check PNR status")
                print("2.Ticket Reservation")
                option = int(input("\nEnter your option : "))

                if option == 1:
                    print("Your PNR status is t3")
                    exit(0)

                elif option == 2:
                    people = int(input("\nEnter no. of Ticket you want : "))
                    name_l = []
                    age_l = []
                    sex_l = []
                    for p in range(people):
                            name = str(input("\nName : "))
                            name_l.append(name)
                            age  = int(input("\nAge  : "))
                            age_l.append(age)
                            sex  = str(input("\nMale or Female : "))
                            sex_l.append(sex)

                    restart = str(input("\nDid you forgot someone? y/n: "))
                    if restart in ('y','YES','yes','Yes'):
                            restart = ('Y')
                    else :
```

```
            x = 0
            print("\nTotal Ticket : ",people)
            for p in range(1,people+1):
                print("Ticket : ",p)
                print("Name : ", name_l[x])
                print("Age  : ", age_l[x])
                print("Sex : ",sex_l[x])
                x += 1
```

PAYMENT:

```
from django.contrib.auth.base_user import AbstractBaseUser
from django.db import models

class User(AbstractBaseUser):
    """
    User model.
    """
 USERNAME_FIELD = "email"

    REQUIRED_FIELDS = ["first_name", "last_name"]

    email = models.EmailField(
        verbose_name="E-mail",
        unique=True
    )
     first_name = models.CharField(
        verbose_name="First name",
        max_length=30
    )
 last_name = models.CharField(
        verbose_name="Last name",
        max_length=40
    )
      city = models.CharField(
        verbose_name="City",
        max_length=40
    )
      stripe_id = models.CharField(
        verbose_name="Stripe ID",
        unique=True,
        max_length=50,
        blank=True,
        null=True
    )

    objects = UserManager()

  @property
    def get_full_name(self):
        return f"{self.first_name} {self.last_name}"

    class Meta:
        verbose_name = "User"
        verbose_name_plural = "Users"

class Profile(models.Model):
    """
    User's profile.
    """
phone_number = models.CharField(
        verbose_name="Phone number",
        max_length=15
    )

    date_of_birth = models.DateField(
        verbose_name="Date of birth"
    )
     postal_code = models.CharField(
        verbose_name="Postal code",
        max_length=10,
        blank=True
    )
     address = models.CharField(
        verbose_name="Address",
        max_length=255,
        blank=True
    )
     class Meta:
        abstract = True

class UserProfile(Profile):
    """
    User's profile model.
    """
user = models.OneToOneField(
        to=User, on_delete=models.CASCADE, related_name="profile",
    )

    group = models.CharField(
        verbose_name="Group type",
        choices=GroupTypeChoices.choices(),
        max_length=20,
        default=GroupTypeChoices.EMPLOYEE.name,
    )
     def __str__(self):
        return self.user.email

    class Meta:

# user 1 - employer
user1, _ = User.objects.get_or_create(
    email="foo@bar.com",
    first_name="Employer",
    last_name="Testowy",
    city="Białystok",
)
user1.set_unusable_password()
group_name = "employer"

_profile1, _ = UserProfile.objects.get_or_create(
    user=user1,
    date_of_birth=datetime.now() - timedelta(days=6600),
    group=GroupTypeChoices(group_name).name,
    address="Myśliwska 14",
    postal_code="15-569",
    phone_number="+48100200300",
)
# user2 - employee
user2, _ = User.objects.get_or_create()
    email="bar@foo.com",
    first_name="Employee",
    last_name="Testowy",
    city="Białystok",
)
user2.set_unusable_password()
group_name = "employee"
_profile2, _ = UserProfile.objects.get_or_create()
  user=user2,
    date_of_birth=datetime.now() - timedelta(days=7600),
    group=GroupTypeChoices(group_name).name,
    address="Myśliwska 14",
    postal_code="15-569",
    phone_number="+48200300400",
)
response_customer = stripe.Customer.create()
    email=user.email,
    description=f"EMPLOYER - {user.get_full_name}",
    name=user.get_full_name,
    phone=user.profile.phone_number,
)
user1.stripe_id = response_customer.stripe_id
user1.save()

mcc_code, url = "1520", "https://www.softserveinc.com/"

response_ca = stripe.Account.create()
    type="custom",
    country="PL",
    email=user2.email,
    default_currency="pln",
    business_type="individual",
    settings={"payouts": {"schedule": {"interval": "manual", }}},
    requested_capabilities=["card_payments", "transfers", ],
    business_profile={"mcc": mcc_code, "url": url},
    individual={
        "first_name": user2.first_name,
        "last_name": user2.last_name,
        "email": user2.email,
        "dob": {
            "day": user2.profile.date_of_birth.day,
            "month": user2.profile.date_of_birth.month,
            "year": user2.profile.date_of_birth.year,
        },
        "phone": user2.profile.phone_number,
        "address": {
            "city": user2.city,
            "postal_code": user2.profile.postal_code,
            "country": "PL",
            "line1": user2.profile.address,
        },
    },
)
user2.stripe_id = response_ca.stripe_id
user2.save()
tos_acceptance = {"date": int(time.time()), "ip": user_ip},
stripe.Account.modify(user2.stripe_id, tos_acceptance=tos_acceptance)
passport_front = stripe.File.create(
    purpose="identity_document",
    file=_file, # ContentFile object
    stripe_account=user2.stripe_id,
)
individual = {
    "verification": {
        "document": {"front": passport_front.get("id"),},
        "additional_document": {"front": passport_front.get("id"),},
    }
}
stripe.Account.modify(user2.stripe_id, individual=individual)

new_card_source = stripe.Customer.create_source(user1.stripe_id, source=token)
```

```
stripe.SetupIntent.create(
    payment_method_types=["card"],
    customer=user1.stripe_id,
    description="some description",
    payment_method=new_card_source.id,
)
payment_method = stripe.Customer.retrieve(user1.stripe_id).default_source

payment_intent = stripe.PaymentIntent.create(
    amount=amount,
    currency="pln",
    payment_method_types=["card"],
    capture_method="manual",
    customer=user1.stripe_id, # customer
    payment_method=payment_method,
    application_fee_amount=application_fee_amount,
    transfer_data={"destination": user2.stripe_id}, # connect account
    description=description,
    metadata=metadata,
)

payment_intent_confirm = stripe.PaymentIntent.confirm(
    payment_intent.stripe_id, payment_method=payment_method
)

stripe.PaymentIntent.capture(
    payment_intent.id, amount_to_capture=amount
)
stripe.Balance.retrieve(stripe_account=user2.stripe_id)

stripe.Charge.create(
    amount=amount,
    currency="pln",
    source=user2.stripe_id,
    description=description
)
```

```
stripe.PaymentIntent.cancel(payment_intent.id)
        unique_together = ("user", "group")
```

<u>REDIRECT:</u>

```
import logging
import attr
from flask import Blueprint, flash, redirect, request, url_for
from flask.views import MethodView
from flask_babelplus import gettext as _
from flask_login import current_user, login_required
from pluggy import HookimplMarker

@attr.s(frozen=True, cmp=False, hash=False, repr=True)
class UserSettings(MethodView):
    form = attr.ib(factory=settings_form_factory)
    settings_update_handler = attr.ib(factory=settings_update_handler)

    decorators = [login_required]

    def get(self):
        return self.render()

    def post(self):
        if self.form.validate_on_submit():
            try:
                self.settings_update_handler.apply_changeset(
                    current_user, self.form.as_change()
                )
            except StopValidation as e:
                self.form.populate_errors(e.reasons)
                return self.render()
            except PersistenceError:
                logger.exception("Error while updating user settings")
                flash(_("Error while updating user settings"), "danger")
                return self.redirect()

            flash(_("Settings updated."), "success")
            return self.redirect()
        return self.render()

    def render(self):
        return render_template("user/general_settings.html", form=self.form)

    def redirect(self):
        return redirect(url_for("user.settings"))

@attr.s(frozen=True, hash=False, cmp=False, repr=True)
class ChangePassword(MethodView):
    form = attr.ib(factory=change_password_form_factory)
    password_update_handler = attr.ib(factory=password_update_handler)
    decorators = [login_required]

    def get(self):
        return self.render()
      def post(self):
        if self.form.validate_on_submit():
            try:
                self.password_update_handler.apply_changeset(
                    current_user, self.form.as_change()
                )
            except StopValidation as e:
                self.form.populate_errors(e.reasons)
                return self.render()
            except PersistenceError:
                logger.exception("Error while changing password")
                flash(_("Error while changing password"), "danger")
                return self.redirect()

            flash(_("Password updated."), "success")
            return self.redirect()
        return self.render()

    def render(self):
        return render_template("user/change_password.html", form=self.form)

    def redirect(self):
        return redirect(url_for("user.change_password"))

@attr.s(frozen=True, cmp=False, hash=False, repr=True)
class ChangeEmail(MethodView):
    form = attr.ib(factory=change_email_form_factory)
    update_email_handler = attr.ib(factory=email_update_handler)
    decorators = [login_required]

    def get(self):
        return self.render()

    def post(self):
        if self.form.validate_on_submit():
            try:
                self.update_email_handler.apply_changeset(
                    current_user, self.form.as_change()
                )
            except StopValidation as e:
                self.form.populate_errors(e.reasons)
                return self.render()
            except PersistenceError:
                logger.exception("Error while updating email")
                flash(_("Error while updating email"), "danger")
                return self.redirect()

            flash(_("Email address updated."), "success")
            return self.redirect()
        return self.render()

    def render(self):
        return render_template("user/change_email.html", form=self.form)

    def redirect(self):
        return redirect(url_for("user.change_email"))
```

SEAT BOOKING:

```
def berth_type(s):
    if s>0 and s<73:
        if s % 8 == 1 or s % 8 == 4:
            print (s), "is lower berth"
        elif s % 8 == 2 or s % 8 == 5:
            print (s), "is middle berth"
        elif s % 8 == 3 or s % 8 == 6:
            print (s), "is upper berth"
        elif s % 8 == 7:
            print (s), "is side lower berth"
        else:
            print (s), "is side upper berth"
    else:
        print (s), "invalid seat number"
 # Driver code
s = 10
berth_type(s)      # fxn call for berth type
 s = 7
berth_type(s)     # fxn call for berth type
 s = 0
berth_type(s)      # fxn call for berth
```

SPRINT-3

TICKET GENERATION:

```
class Ticket:
    counter=0
    def __init__(self,passenger_name,source,destination):
        self.__passenger_name=passenger_name
        self.__source=source
        self.__destination=destination
        self.Counter=Ticket.counter
        Ticket.counter+=1
    def validate_source_destination(self):
        if (self.__source=="Delhi" and (self.__destination=="Pune" or
self.__destination=="Mumbai" or self.__destination=="Chennai" or
self.__destination=="Kolkata")):
            return True
        else:
            return False
       def generate_ticket(self ):
        if True:
            __ticket_id=self.__source[0]+self.__destination[0]+"0"+str(self.Counter)
            print( "Ticket id will be:",__ticket_id)
        else:
            return False
    def get_ticket_id(self):
        return self.ticket_id
    def get_passenger_name(self):
        return self.__passenger_name
    def get_source(self):
        if self.__source=="Delhi":
            return self.__source
        else:
            print("you have written invalid soure option")
            return None
    def get_destination(self):
        if self.__destination=="Pune":
            return self.__destination
        elif self.__destination=="Mumbai":
            return self.__destination
        elif self.__destination=="Chennai":
            return self.__destination
        elif self.__destination=="Kolkata":
            return self.__destination
 else:
            return None
```

CONFIRMATION:

```
# import module
import requests
from bs4 import BeautifulSoup
import pandas as pd
# user define function
# Scrape the data
def getdata(url):
    r = requests.get(url)
    return r.text

# input by geek
train_name = "03391-rajgir-new-delhi-clone-special-rgd-to-ndls"

# url
url = "https://www.railyatri.in/live-train-status/"+train_name
# pass the url
# into getdata function
htmldata = getdata(url)
soup = BeautifulSoup(htmldata, 'html.parser')

# traverse the live status from
# this Html code
data = []
for item in soup.find_all('script', type="application/ld+json"):
    data.append(item.get_text())

# convert into dataframe
df = pd.read_json(data[2])

# display this column of
# dataframe
print(df["mainEntity"][0]['name'])
print(df["mainEntity"][0]['acceptedAnswer']['text'])
```

NOTIFICATION:

```
import pyttsx3
from plyer import notification
import time
# Speak method
def Speak(self, audio):

    # Calling the initial constructor
    # of pyttsx3
    engine = pyttsx3.init('sapi5')
    # Calling the getter method
    voices = engine.getProperty('voices')

    # Calling the setter method
    engine.setProperty('voice', voices[1].id)

    engine.say(audio)
    engine.runAndWait()
def Take_break():
    Speak("Do you want to start sir?")
    question = input()

    if "yes" in question:
        Speak("Starting Sir")

    if "no" in question:
        Speak("We will automatically start after 5 Mins Sir.")
        time.sleep(5*60)
        Speak("Starting Sir")

    # A notification we will held that
    # Let's Start sir and with a message of
    # will tell you to take a break after 45
    # mins for 10 seconds
    while(True):
        notification.notify(title="Let's Start sir",
        message="will tell you to take a break after 45 mins",
        timeout=10)

# For 45 min the will be no notification but
        # after 45 min a notification will pop up.
        time.sleep(0.5*60)

        Speak("Please Take a break Sir")
        notification.notify(title="Break Notification",
        message="Please do use your device after sometime as you have"
```

```
            "been continuously using it for 45 mins and it will affect your eyes",
            timeout=10)
# Driver's Code
if __name__ == '__main__':
        Take_break()
```

GPS TRACKING:

```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
from PIL import Image, ImageDraw

data_path = 'data.csv'
data = pd.read_csv(data_path, names=['LATITUDE', 'LONGITUDE'], sep=',')
gps_data = tuple(zip(data['LATITUDE'].values, data['LONGITUDE'].values))

image = Image.open('map.png', 'r')  # Load map image.
img_points = []
for d in gps_data:
   x1, y1 = scale_to_img(d, (image.size[0], image.size[1]))  # Convert GPS coordinates to image
coordinates.
   img_points.append((x1, y1))
draw = ImageDraw.Draw(image)
draw.line(img_points, fill=(255, 0, 0), width=2)  # Draw converted records to the map image.

image.save('resultMap.png')
x_ticks = map(lambda x: round(x, 4), np.linspace(lon1, lon2, num=7))
y_ticks = map(lambda x: round(x, 4), np.linspace(lat1, lat2, num=8))
y_ticks = sorted(y_ticks, reverse=True)  # y ticks must be reversed due to conversion to image
coordinates.
fig, axis1 = plt.subplots(figsize=(10, 10))
axis1.imshow(plt.imread('resultMap.png'))  # Load the image to matplotlib plot.
axis1.set_xlabel('Longitude')
axis1.set_ylabel('Latitude')
axis1.set_xticklabels(x_ticks)
axis1.set_yticklabels(y_ticks)
axis1.grid()
plt.show()
```

SPRINT-4:

ANS QUERIES:

```
import email, smtplib, ssl
from email import encoders
from email.mime.base import MIMEBase
from email.mime.multipart import MIMEMultipart
from email.mime.text import MIMEText

subject = "An email with attachment from Python"
body = "This is an email with attachment sent from Python"
sender_email = "my@gmail.com"
receiver_email = "your@gmail.com"
password = input("Type your password and press enter:")
# Create a multipart message and set headers
message = MIMEMultipart()
message["From"] = sender_email
message["To"] = receiver_email
message["Subject"] = subject
message["Bcc"] = receiver_email  # Recommended for mass emails

# Add body to email
message.attach(MIMEText(body, "plain"))

filename = "document.pdf"  # In same directory as script
# Open PDF file in binary mode
with open(filename, "rb") as attachment:
    # Add file as application/octet-stream
    # Email client can usually download this automatically as attachment
    part = MIMEBase("application", "octet-stream")
    part.set_payload(attachment.read())

# Encode file in ASCII characters to send by email
encoders.encode_base64(part)

# Add header as key/value pair to attachment part
part.add_header(
    "Content-Disposition",
    f"attachment; filename= {filename}",
)

# Add attachment to message and convert message to string
message.attach(part)
text = message.as_string()

# Log in to server using secure context and send email
context = ssl.create_default_context()
with smtplib.SMTP_SSL("smtp.gmail.com", 465, context=context) as server:
    server.login(sender_email, password)
    server.sendmail(sender_email, receiver_email, text)
```

FEED INFORMATION:

```
# Python program to find PNR
# status using RAILWAY API

# import required modules
import requests, json
# Enter API key here
api_key = "Your_API_key"

# base_url variable to store url
base_url = "https://api.railwayapi.com/v2/pnr-status/pnr/"

# Enter valid pnr_number
pnr_number = "6515483790"

# Stores complete url address
complete_url = base_url + pnr_number + "/apikey/" + api_key + "/"

# get method of requests module
# return response object
response_ob = requests.get(complete_url)

# json method of response object convert
# json format data into python format data
result = response_ob.json()
```

```
# now result contains list
# of nested dictionaries
if result["response_code"] == 200:
	# train name is extracting
	# from the result variable data
	train_name = result["train"]["name"]

	# train number is extracting from
	# the result variable data
	train_number = result["train"]["number"]

	# from station name is extracting
	# from the result variable data
	from_station = result["from_station"]["name"]

	# to_station name is extracting from
	# the result variable data
	to_station = result["to_station"]["name"]

	# boarding point station name is
	# extracting from the result variable data
	boarding_point = result["boarding_point"]["name"]

	# reservation upto station name is
	# extracting from the result variable data
	reservation_upto = result["reservation_upto"]["name"]

	# store the value or data of "pnr"
	# key in pnr_num variable
	pnr_num = result["pnr"]

	# store the value or data of "doj" key
	# in variable date_of_journey variable
	date_of_journey = result["doj"]

	# store the value or data of
# "total_passengers" key in variable
total_passengers = result["total_passengers"]

# store the value or data of "passengers"
# key in variable passengers_list
passengers_list = result["passengers"]

# store the value or data of
# "chart_prepared" key in variable
chart_prepared = result["chart_prepared"]

# print following values
print(" train name : " + str(train_name)
    + "\n train number : " + str(train_number)
    + "\n from station : " + str(from_station)
    + "\n to station : " + str(to_station)
    + "\n boarding point : " + str(boarding_point)
    + "\n reservation upto : " + str(reservation_upto)
    + "\n pnr number : " + str(pnr_num)
    + "\n date of journey : " + str(date_of_journey)
    + "\n total no. of passengers: " + str(total_passengers)
    + "\n chart prepared : " + str(chart_prepared))

# looping through passenger list
for passenger in passengers_list:

    # store the value or data
    # of "no" key in variable
    passenger_num = passenger["no"]

    # store the value or data of
    # "current_status" key in variable
    current_status = passenger["current_status"]

    # store the value or data of
    # "booking_status" key in variable
    booking_status = passenger["booking_status"]
```

```
                    # print following values
                    print(" passenger number : " + str(passenger_num)
                              + "\n current status : " + str(current_status)
                              + "\n booking_status : " + str(booking_status))

else:
                print("Record Not Found")
```

TICKET CANCELLATION:

```
from pickle import load,dump
import time
import random
import os
class tickets:
    def __init__(self):
        self.no_ofac1stclass=0
        self.totaf=0
        self.no_ofac2ndclass=0
        self.no_ofac3rdclass=0
        self.no_ofsleeper=0
        self.no_oftickets=0
        self.name="
        self.age="
        self.resno=0
        self.status="
    def ret(self):
        return(self.resno)
    def retname(self):
        return(self.name)
    def display(self):
        f=0
        fin1=open("tickets.dat","rb")
        if not fin1:
            print "ERROR"
        else:
            print
            n=int(raw_input("ENTER PNR NUMBER : "))
            print "\n\n"
            print ("FETCHING DATA . . .".center(80))
            time.sleep(1)
            print
            print('PLEASE WAIT...!!'.center(80))
            time.sleep(1)
            os.system('cls')
            try:
                while True:
                    tick=load(fin1)
                    if(n==tick.ret()):
                        f=1
                        print "="*80
                        print("PNR STATUS".center(80))
                        print"="*80
                        print
                        print "PASSENGER'S NAME :",tick.name
                        print
                        print "PASSENGER'S AGE :",tick.age
                        print
                        print "PNR NO :",tick.resno
                        print
                        print "STATUS :",tick.status
                        print
                        print "NO OF SEATS BOOKED : ",tick.no_oftickets
                        print
            except:
                pass
            fin1.close()
            if(f==0):
                print
                print "WRONG PNR NUMBER..!!"
                print
    def pending(self):
        self.status="WAITING LIST"
        print "PNR NUMBER :",self.resno
        print
```

```
     time.sleep(1.2)
     print "STATUS = ",self.status
     print
     print "NO OF SEATS BOOKED : ",self.no_oftickets
     print
def confirmation (self):
    self.status="CONFIRMED"
    print "PNR NUMBER : ",self.resno
    print
    time.sleep(1.5)
    print "STATUS = ",self.status
    print
def cancellation(self):
    z=0
    f=0
    fin=open("tickets.dat","rb")
    fout=open("temp.dat","ab")
    print
    r= int(raw_input("ENTER PNR NUMBER : "))
    try:
        while(True):
            tick=load(fin)
            z=tick.ret()
            if(z!=r):
                dump(tick,fout)
            elif(z==r):
                 f=1
    except:
        pass
    fin.close()
    fout.close()
    os.remove("tickets.dat")
    os.rename("temp.dat","tickets.dat")
    if (f==0):
        print
        print "NO SUCH RESERVATION NUMBER FOUND"
        print
        time.sleep(2)
```

```
            os.system('cls')
        else:
            print
            print "TICKET CANCELLED"
            print"RS.600 REFUNDED...."
    def reservation(self):
        trainno=int(raw_input("ENTER THE TRAIN NO:"))
        z=0
        f=0
        fin2=open("tr1details.dat")
        fin2.seek(0)
        if not fin2:
            print "ERROR"
        else:
            try:
                while True:
                    tr=load(fin2)
                    z=tr.gettrainno()
                    n=tr.gettrainname()
                    if (trainno==z):
                        print
                        print "TRAIN NAME IS : ",n
                        f=1
                        print
                        print "-"*80
                        no_ofac1st=tr.getno_ofac1stclass()
                        no_ofac2nd=tr.getno_ofac2ndclass()
                        no_ofac3rd=tr.getno_ofac3rdclass()
                        no_ofsleeper=tr.getno_ofsleeper()
                    if(f==1):
                        fout1=open("tickets.dat","ab")
                        print
                        self.name=raw_input("ENTER THE PASSENGER'S NAME ")
                        print
                        self.age=int(raw_input("PASSENGER'S AGE : "))
                        print
                        print"\t\t SELECT A CLASS YOU WOULD LIKE TO TRAVEL IN :- "
                        print "1.AC FIRST CLASS"
                        print
                        print "2.AC SECOND CLASS"
                        print
                        print "3.AC THIRD CLASS"
                        print
                        print "4.SLEEPER CLASS"
                        print
                        c=int(raw_input("\t\t\tENTER YOUR CHOICE = "))
                        os.system('cls')
                        amt1=0
                        if(c==1):
                            self.no_oftickets=int(raw_input("ENTER NO_OF FIRST CLASS AC SEATS
            TO BE BOOKED : "))
                            i=1
                            while(i<=self.no_oftickets):
                                self.totaf=self.totaf+1
                                amt1=1000*self.no_oftickets
                                i=i+1
                            print
                            print "PROCESSING. .",
                            time.sleep(0.5)
                            print ".",
                            time.sleep(0.3)
                            print'.'
                            time.sleep(2)
                            os.system('cls')
                            print "TOTAL AMOUNT TO BE PAID = ",amt1
                            self.resno=int(random.randint(1000,2546))
                            x=no_ofac1st-self.totaf
                            print
                            if(x>0):
                                self.confirmation()
                                dump(self,fout1)
                                break
                            else:
                                self.pending()
                                dump(tick,fout1)
                                break
```

```
                        elif(c==2):
                            self.no_oftickets=int(raw_input("ENTER NO_OF SECOND CLASS AC
SEATS TO BE BOOKED :  "))
                            i=1

def menu():
    tr=train()
    tick=tickets()
    print
    print "WELCOME TO PRAHIT AGENCY".center(80)
    while True:
            print
            print "="*80
            print " \t\t\t\t  RAILWAY"
            print
            print "="*80
            print
            print "\t\t\t1. **UPDATE TRAIN DETAILS."
            print
            print "\t\t\t2. TRAIN DETAILS. "
            print
            print "\t\t\t3. RESERVATION OF TICKETS."
            print
            print "\t\t\t4. CANCELLATION OF TICKETS. "
            print
            print "\t\t\t5. DISPLAY PNR STATUS."
            print
            print "\t\t\t6. QUIT."
            print"** - office use......"
            ch=int(raw_input("\t\t\tENTER YOUR CHOICE : "))
            os.system('cls')
            print "\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\t\t\t\t\t\t\tLOADING. .",
            time.sleep(1)
            print ("."),
            time.sleep(0.5)
            print (".")
            time.sleep(2)
            os.system('cls')
            if ch==1:
                j="*****"
                r=raw_input("\n\n\n\n\n\n\n\n\n\n\n\t\t\t\tENTER THE PASSWORD: ")
                os.system('cls')
                if (j==r):
                    x='y'
                    while (x.lower()=='y'):
                        fout=open("tr1details.dat","ab")
                        tr.getinput()
                        dump(tr,fout)
                        fout.close()
                        print"\n\n\n\n\n\n\n\n\n\n\n\t\t\tUPDATING TRAIN LIST PLEASE WAIT . .",
                        time.sleep(1)
                        print ("."),
                        time.sleep(0.5)
                        print ("."),
                        time.sleep(2)
                        os.system('cls')
                        print "\n\n\n\n\n\n\n\n\n\n\n"
                        x=raw_input("\t\tDO YOU WANT TO ADD ANY MORE TRAINS DETAILS ?
")
                        os.system('cls')
                    continue
elif(j<>r):
                    print"\n\n\n\n\n"
                    print "WRONG PASSWORD".center(80)
            elif ch==2:
                fin=open("tr1details.dat",'rb')
                if not fin:
                    print "ERROR"
                else:
                    try:
                        while True:
                            print"*"*80
                            print"\t\t\t\tTRAIN DETAILS"
                            print"*"*80
                            print
                            tr=load(fin)
                    tr.output()

                 raw_input("PRESS ENTER TO VIEW NEXT TRAIN DETAILS")
                    os.system('cls')
                except EOFError:
                    pass
            elif ch==3:
                print'='*80
                print "\t\t\t\tRESERVATION OF TICKETS"
                print'='*80
                print
                tick.reservation()
            elif ch==4:
                print"="*80
                print"\t\t\t\tCANCELLATION OF TICKETS"
                print
                print"="*80
                print
                tick.cancellation()
            elif ch==5:
                print "="*80
                print("PNR STATUS".center(80))
                print"="*80
                print
                tick.display()
            elif ch==6:
                quit()
          raw_input("PRESS ENTER TO GO TO BACK MENU".center(80))
        os.system('cls')

menu()
```

13.2.GIT HUB LINK:

https://github.com/IBM-EPBL/IBM-Project-26645-1660031949.git