Project Report

1. INTRODUCTION

1.1 PROJECT OVERVIEW

RAILWAYS is to manage Indian Railways isthe largest railway network in Asia and additionally world's second largest network operated 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 effective system. This effective methodology 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 through network. But now its use is changing with changing world and it is not just confined to emails or web browsing. Today's internet also deals with embedded sensors and 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 which include sensing the device, accessing the device, processing the information of the device, and provides application and services. In addition to this it 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. Thinking of the same is trying to introduce automation in the field of track testing. Railroad track is an integral part of any company's asset base, since it provides them with the necessary business functionality. Problems that occur due to problems in railroads need to be overcome. The latest method used by the Indian railroad is the tracking of the train track which requires a lot of manpower and is time-consuming.

2. LITERATURE SURVEY

2.1 EXISTING SYSTEM

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. 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. Srivastava et al., (2017) proposed a moving gadget to detect the cracks with the help of an array of IR sensors to identify the actual position of the cracks as well as notify to nearest railway station . Mishra et al., (2019) developed a system to track the cracks with the help of Arduino mega power using solar energy and laser. A GSM along with a GPS module was implemented to get the actual location of the faulty tracks to inform the authorities using SMS via a link to find actual location on Google Maps. Rizvi Aliza Raza presented a prototype in that is capable of capturing photos of the track and compare it with the old database and sends a message to the authorities regarding the crack detected. The detailed analysis of traditional railway track fault detection techniques is explained in table

2.2 REFERENCE

1. D. Hesse, “Rail Inspection Using Ultrasonic Surface Waves” Thesis, Imperial College of London, 2007.

2.Md. Reya Shad Azim1 , Khizir Mahmud2 and C. K. Das. Automatic railway track switching system, International Journal of Advanced Technology, Volume 54, 2014.

2. S. Somalraju, V. Murali, G. saha and V. Vaidehi, “Title-robust railway crack detection scheme using LED (Light Emitting Diode) - LDR (Light Dependent Resistor) assembly IEEE 2012.
3. 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.
4. U. Mishra, V. Gupta, S. M. Ahzam and S. M. Tripathi, “Google Map Based Railway Track Fault Detection Over the Internet”, International Journal of Applied Engineering Research, Vol. 14, pp. 20-23, Number 2, 2019.
5. R. A. Raza, K. P. Rauf, A. Shafeeq, “Crack detection in Railway track using Image processing”, IJARIIT, Vol. 3, pp. 489-496, Issue 4, 2017.
6. N. Bhargav, A. Gupta, M. Khirwar, S. Yadav, and V. Sahu, “Automatic Fault Detection of Railway Track System Based on PLC (ADOR TAST)”, International Journal of Recent Research Aspects, Vol. 3, pp. 91-94, 2016

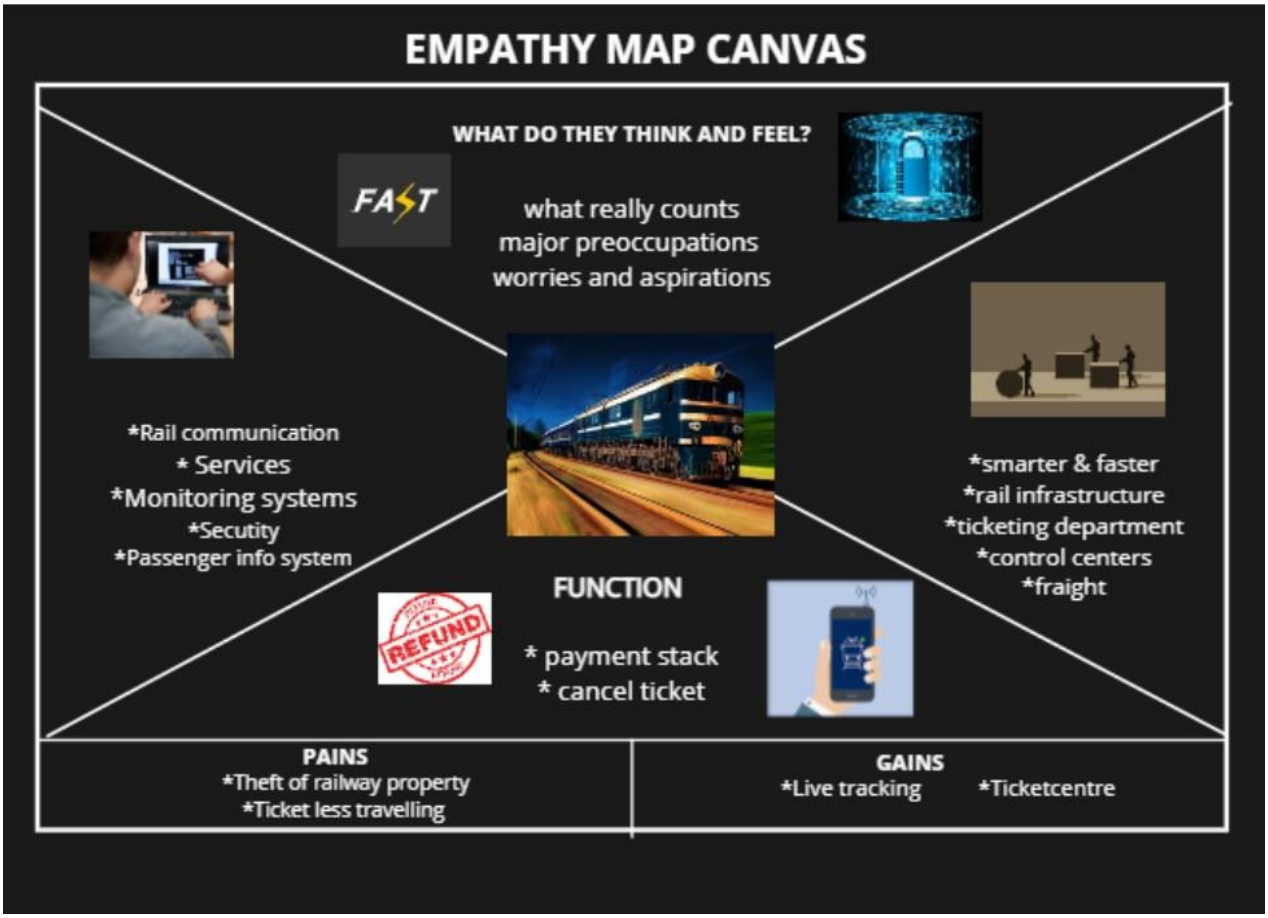
2.3 **PROBLEM STATEMENT DEFINITION**

Among the various modes of transport, Railways is one of the biggest modes of passenger transport in the world. Indian Railways face more competitive threats from airlines, luxury buses, public transports, and personalized transports. Though there are competitions from various mode of transport, Indian Railways has its unique features and provide more services to the passengers .With the increase of technological advancements, Indian Railways have started to use the latest technology for making the service delivery process more efficient. In order to satisfy the passengers, the Indian Railways provides various services to its passengers . But, the passengers face some problems. Hence, the researcher in this study has made an attempt to answer the question "What are the problems faced by the passengers while travelling by train, at station and on board?

Problem Statement (PS)	**Iam**	**I'm trying to**	**But**	**Because**	**Which makes me feel**
PS-1	A passenger	travel	Late arrival oftrain	Weather conditio n	frustration

3. IDEATION AND PROPOSED SOLUTON

3.1 EMPATHY MAP CANVAS

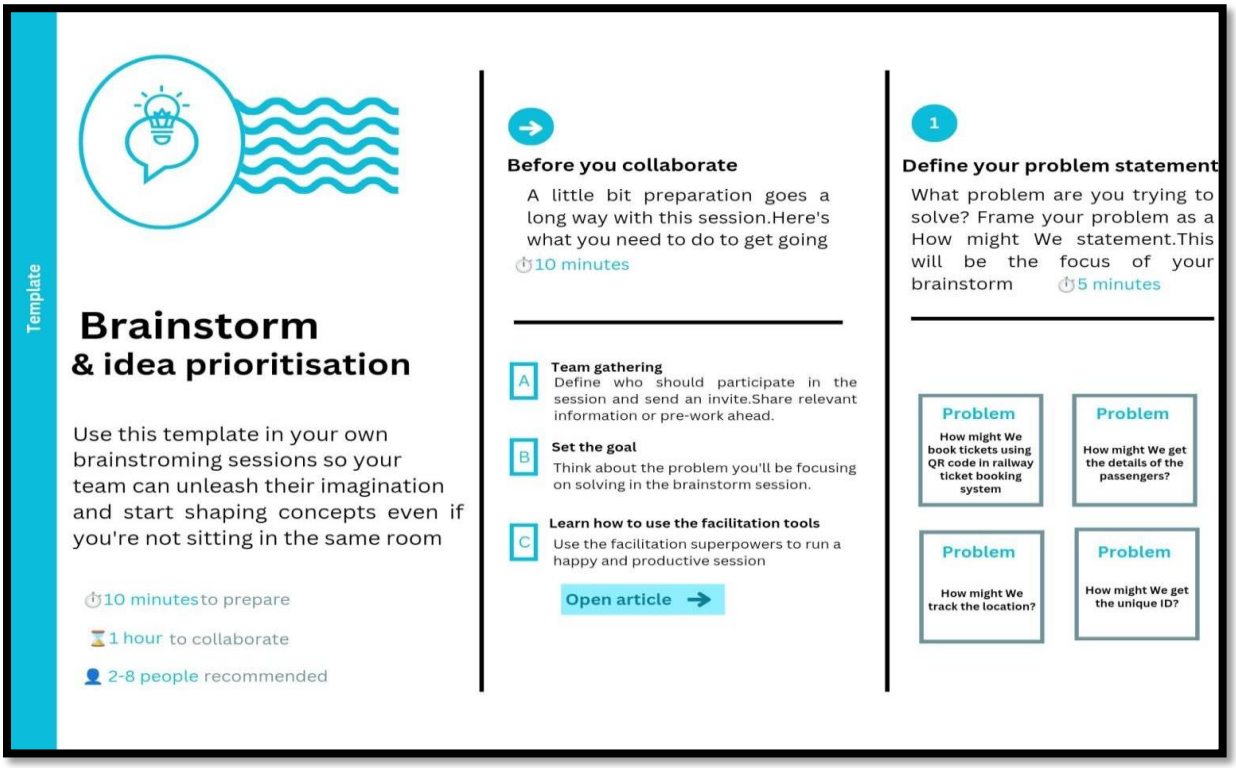


3.2 IDEATION & BRAINSTORMING

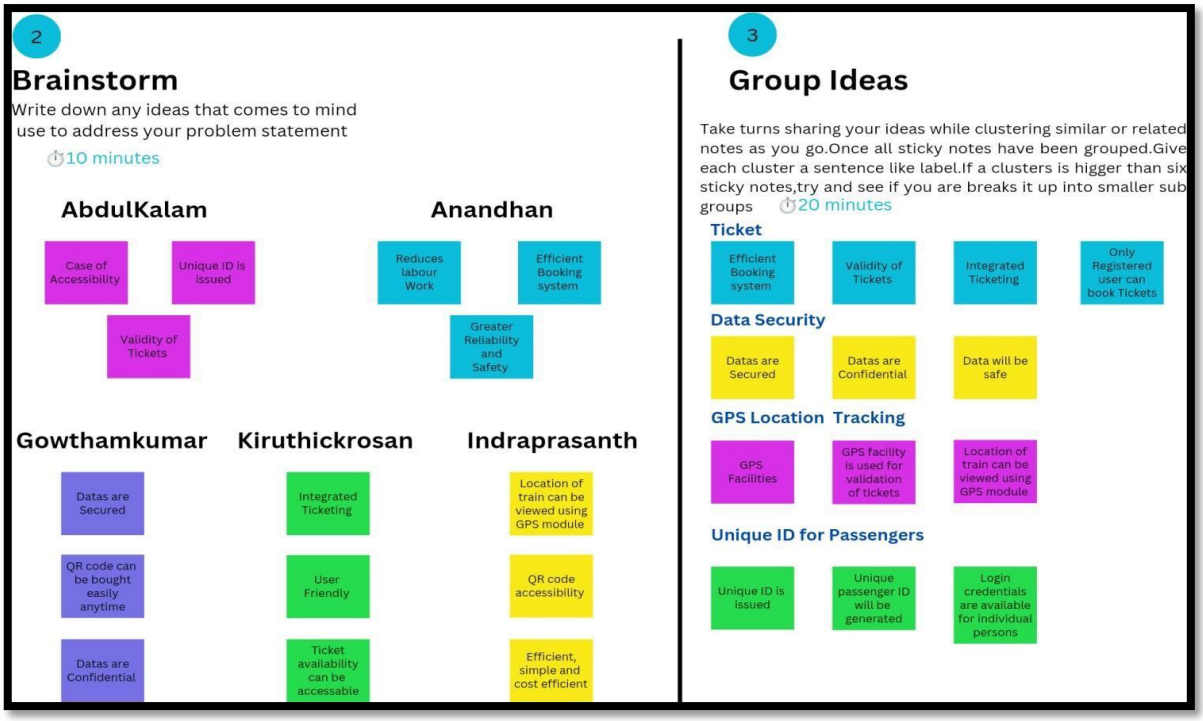
Brainstorming provides a free and open environment that encourages everyone within a team to participate in the creative thinking process that leads to problem solving. Prioritizing volume over value, out-of-the-box ideas are welcome and built upon, and all participants are encouraged to collaborate, helping each other develop a rich amount of creative solutions. Use this template in your own brainstorming sessions so your team can unleash their imagination and start shaping concepts even if you're not sitting in the same room.

Reference: https://www.mural.co/templates/empathy-map-canvas

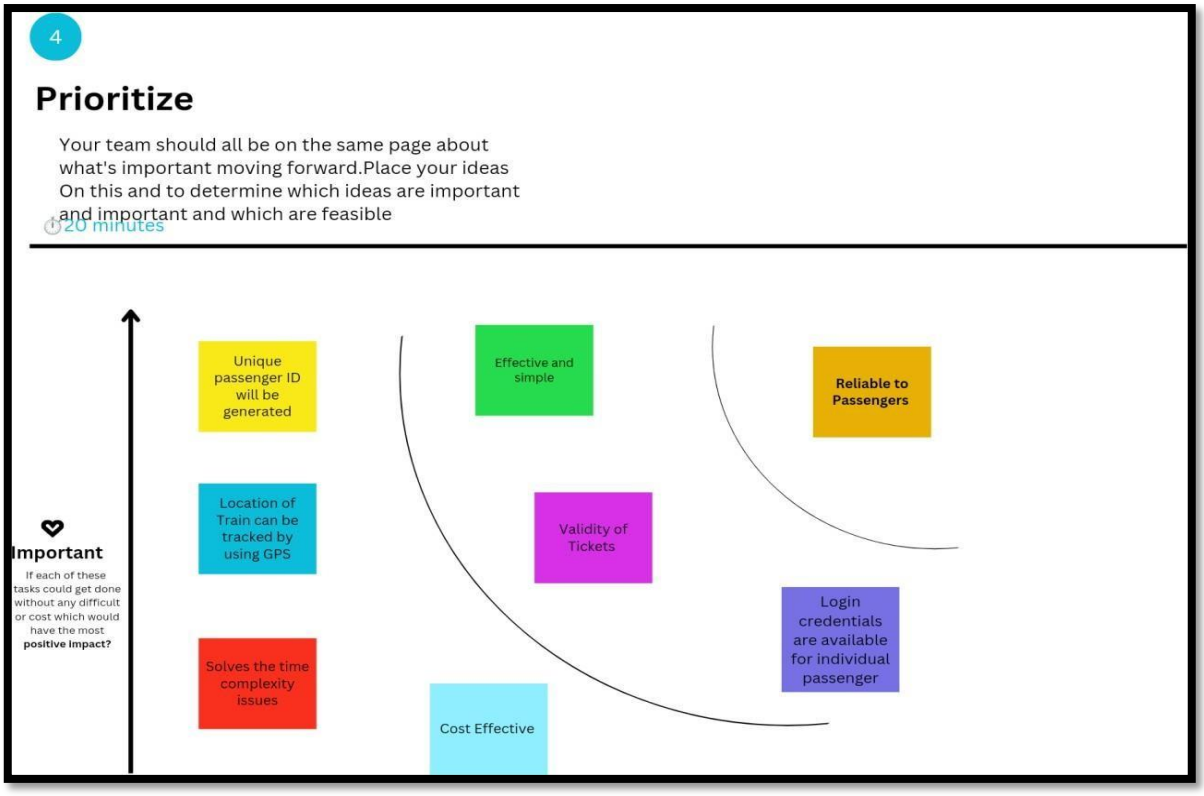
Step-1: Team Gathering, Collaboration and Select the Problem Statement



Step-2: Brainstorm, Idea Listing and Grouping



Step-3: Idea Prioritization



3.2 PROPOSED SOLUTION

S.NO	PARAMETERS	DESCRIPTIONS
1	Problem Statement (Problem to be solved)	In order to satisfy the passengers, the Railways provides various services to its passengers But, the passengers can face some problems.
2	Idea / Solution description	The idea is to minimize the ticket booking problems among the passengers by providing Online mode of booking rather than papers. . In queues in front of the ticket counters in railway stations have been drastically increased over the time.
3	Novelty / Uniqueness	Online mode of booking is most common and so ease of access to everyone that makes more efficient uniqueness of utilizing the technique. People can booktheir ticket through online and they get a QR code through SMS
4	Social Impact / Customer Satisfaction	Customers for sure they get satisfied as they are in the fast roaming world this technique makes more easier for travelling passengers. A web page is designed in which the user can book tickets and will be provided with the QR code, which will be shown to the ticket collector and by scanning the QR code the ticket collector will get the passenger details

5	Business Model (Revenue Model)	A web page is designed in which the user can book tickets and will be provided with the QR code, which will be shown to the ticket collector and by scanning the QR code the ticket collector will get the passenger details. The booking details of the user will be stored in the database, which can be retrieved any time
6	Scalability of the Solution	The scalability of this solution is most feasible among the passengers who are willing to travel. No need of taking printout Counter ticket has to be handled with care, but SMS on mobile is enough. No need to taking out wallet and showing your ticket to TTR just tell your name to TTR that you are a passenger with valid proof

3.3 PROBLEM SOLUTION FIT

4. REQUIREMENT ANALYSIS

4.1. FUNCTIONAL REQUIREMENTS

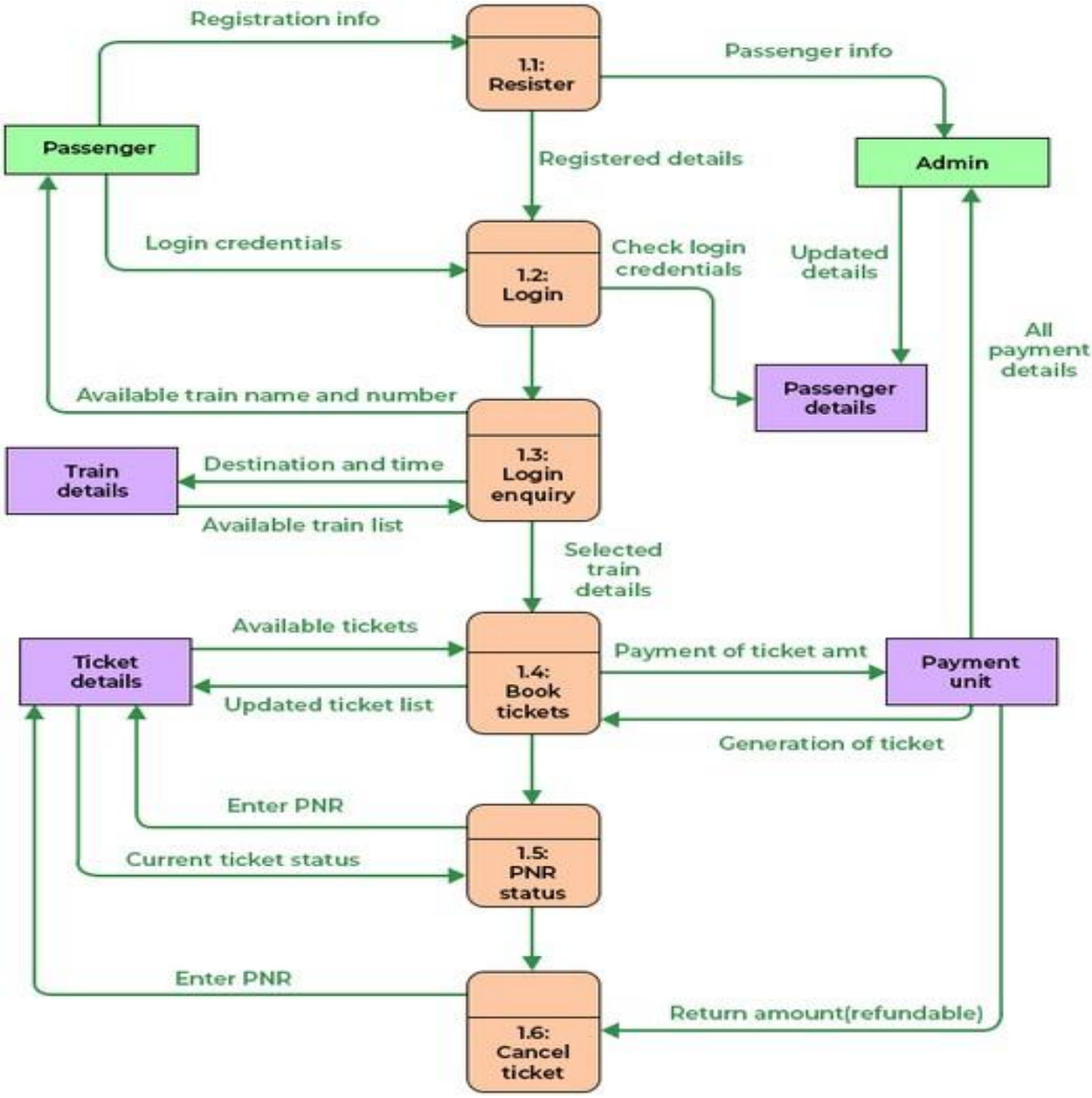
FR No.	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR-1	Unique accounts	• Every online booking needs to be associated with an account • One account cannot be associated with multiple users
FR-2	Booking options	• Search results should enable users to find the most recent and relevant booking options
FR-3	Mandatory fields	• System should only allow users to move to payment only when mandatory fields such as date, time, location has been mentioned
FR-4	Synchronization	• System should consider timezone synchronisation when accepting bookings from different timezones
FR-5	Authentication	• Booking confirmation should be sent to user to the specified contact details

4.2 NON-FUNCTIONAL REQUIREMENTS

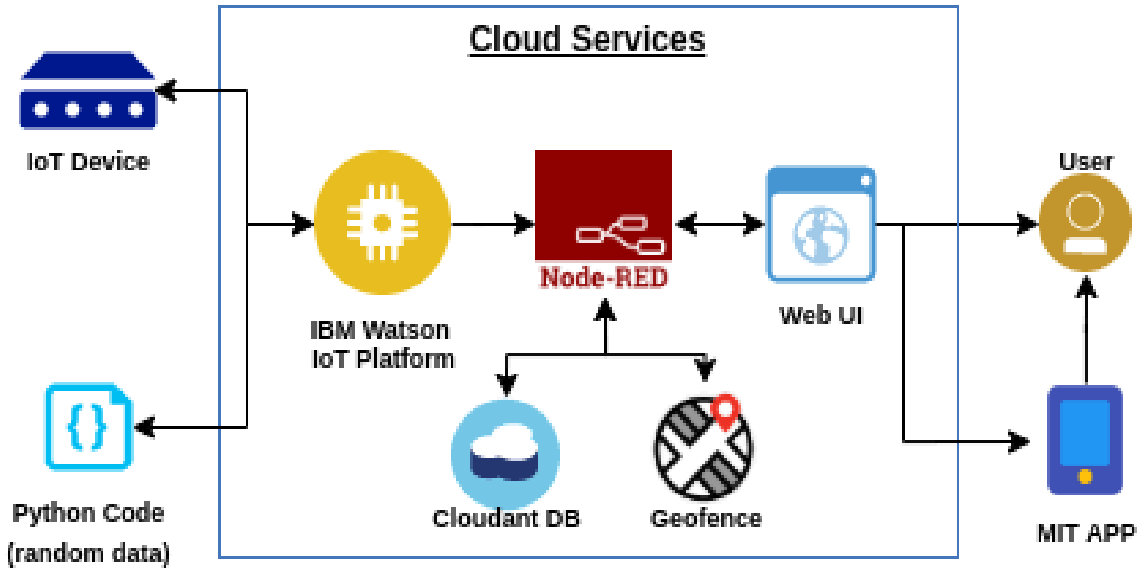
FR No.	Non-Functional Requirement	Description
NFR-1	**Usability**	• Search results should populate within acceptable time limits
NFR-2	**Security**	• System should visually confirm as well as send booking confirmation to the user's contact
NFR-3	**Reliability**	• System should accept payments via different payment methods, like PayPal, wallets, cards, vouchers, etc
NFR-4	**Performance**	• Search results should populate within acceptable time limits
NFR-5	**Availability**	• User should be helped appropriately to fill in the mandatory fields, incase of invalid input
NFR-6	**Scalability**	• Use of captcha and encryption to avoid bots from booking tickets

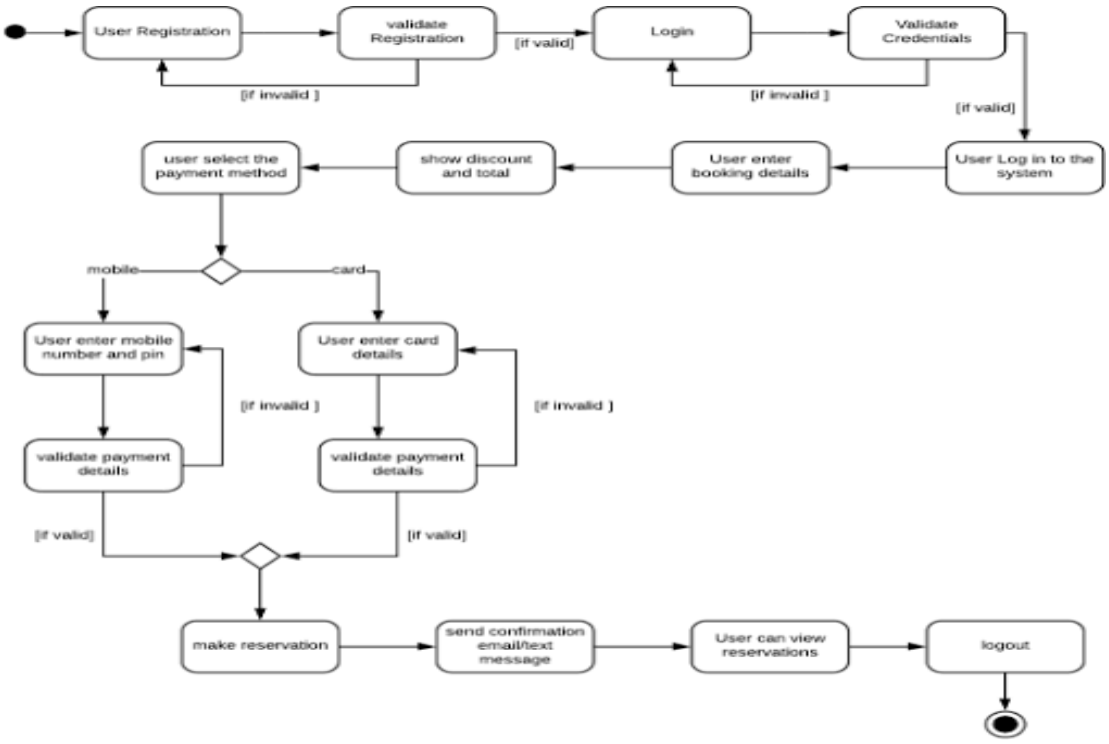
5. PROJECT DESIGN

5.1 DATA FLOW DIAGRAMS



5.2 SOLUTION & TECHNICAL ARCHITECTURE





5.3 USER STORIES

User Type	Functional Requirement (Epic)	User Story Number	User Story / Task	Acceptance criteria	Priority	Release
Customer (Mobile user, Web user)	Registration	USN-1	As a user, I can register through the form by Filling in 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 social sites	I can register & create my dashboard with Facebook login or other social sites	High	Sprint-2
	Conformation	USN-3	As a user, I will receive confirmation 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 login via login id and password or through OTP received on register phone number	I can login and access my account/dashboard	High	Sprint-1
	Display Train details	USN-5	As a user, I can enter the start and destinationto get the list of trains available connecting the above	I can view the train 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 basic details such as a name, age, gender etc…	I will view, modify or confirm the 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 based on the availability.	I will view, modify or confirm the seat/class berth selected	High	Sprint-1
	Payment	USN-8	As a user, I can chooseto pay through credit Card/debit card/UPI.	I can view the payment Options available and select my desirable choice To proceed with the payment	High	Sprint-1
		USN-9	As a user, I will be redirected to the selected Payment gateway and upon successful	I can pay through the payment portal and confirm the booking if any changes need to	High	Sprint-1

User Type	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 along with 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 get the 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't miss the journey because of the constant notifications.	Medium	Sprint-2
		USN-13	As a user, I can track the train using GPS andcan get information such as ETA, Current stop and delay.	I can track the 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 any Change 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
Customercare Executive	Answer the queries	USN-16	As a user, I will answer the questions/doubts Raised by the customers.	I can view the queries and make it once resolved	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

6. PROJECT PLANNING AND SCHEDULING

6.1. SPRINT PLANNING& ESTIMATION

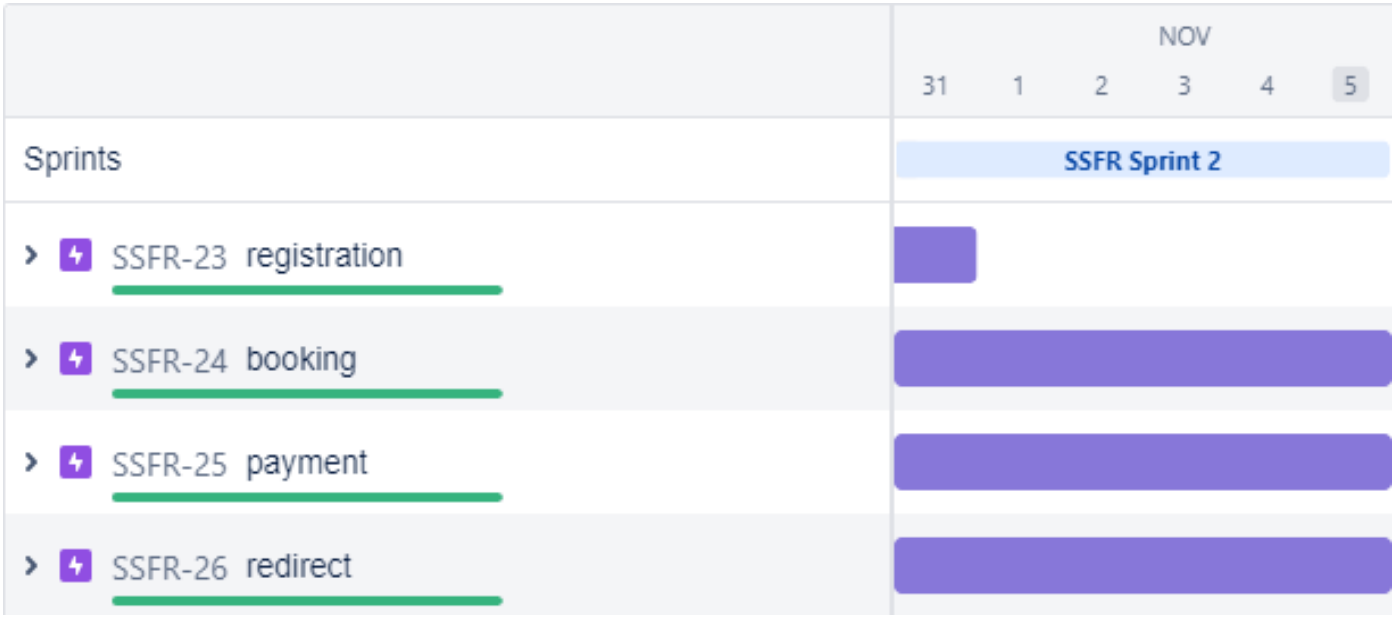
Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
Sprint-1	Registration	USN-1	As a user, I can register through the form by Filling in my details	2	High	Keerthika
Sprint-1		USN-2	As a user, I can register through phone numbers, Gmail, Facebook or other social sites	1	High	Pandiselvi
Sprint-1	Conformation	USN-3	As a user, I will receive confirmation through email or OTP once registration is successful	2	Low	Buvaneshwari
Sprint-1	login	USN-4	As a user, I can login via login id and password or through OTP received on register phonenumber	2	Medium	Viji
Sprint-1	Display Train details	USN-5	As a user, I can enter the start and destination to get the list of trains available connecting the above	1	High	Priya
Sprint-2	Booking	USN-6	As a use, I can provide the basic details such as a name, age, gender etc…	2	High	Keerthika
Sprint-2		USN-7	As a user, I can choose the class, seat/berth. If apreferred seat/berth isn't available I can be allocated based on the availability	1	Low	Pandiselvi
Sprint-2	Payment	USN-8	As a user, I can choose to pay through credit Card/debit card/UPI.	1	High	Viji
Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
Sprint-2		USN-9	As a user, I will be redirected to the selected	2	High	
Sprint-3	Ticket generation	USN-10	As a user, I can download the generated e- ticket for my journey along with the QR code which is used for authentication during my journey.	1	High	Pandiselvi
Sprint-3	Ticket status	USN-11	As a user, I can see the status of my ticket	2	High	Viji

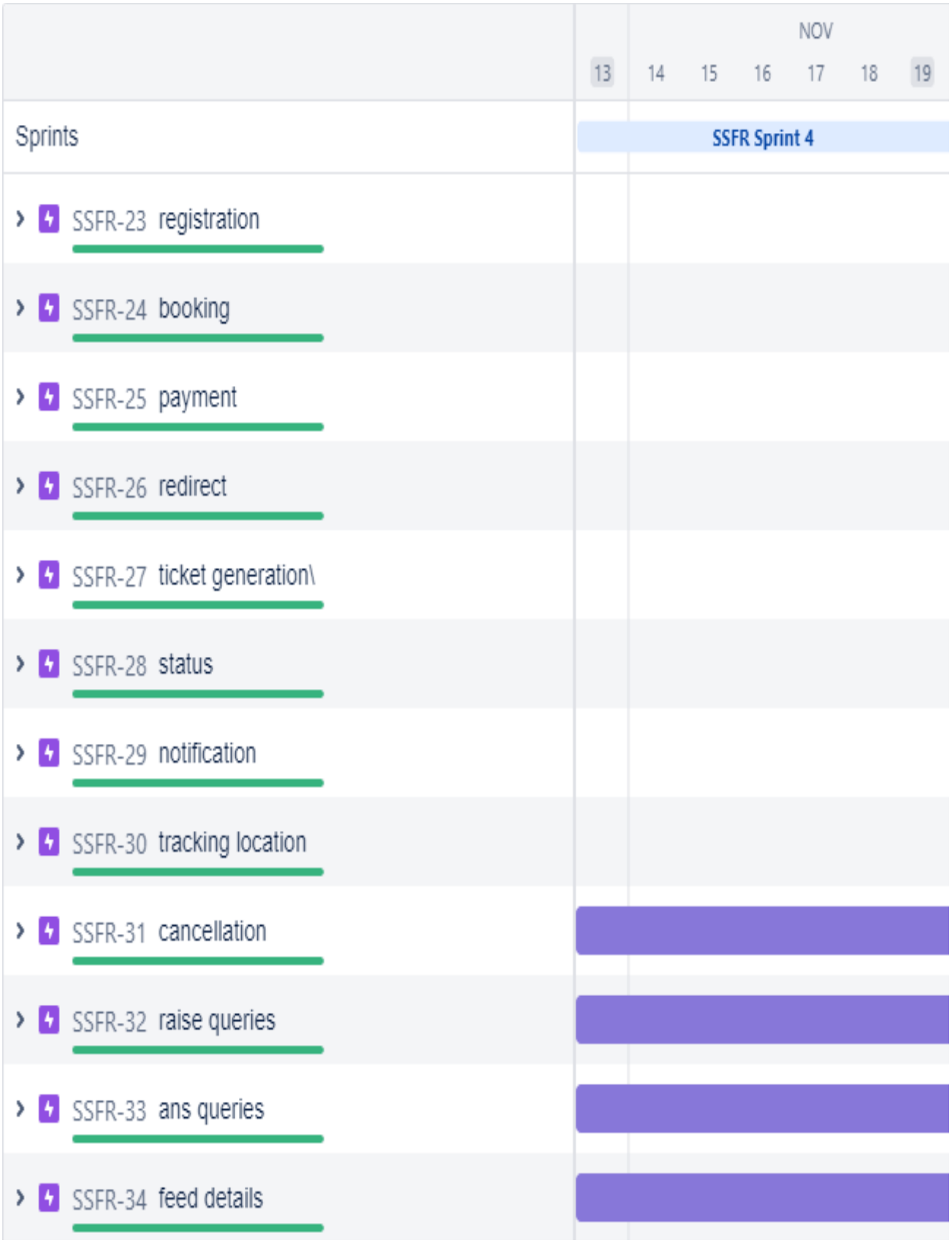
			Whether it's confirmed/waiting/RAC.			
Sprint-3	Remainders notification	USN-12	As a user, I get remainders about my journey A day before my actual journey.	1	High	Buvaneshwari
Sprint-3	Ticket cancellation	USN-13	As a user, I can track the train using GPS and can get information such as ETA, Current stop and delay	2	High	Keerthika
Sprint-4		USN-14	As a user, I can cancel my tickets if there's any Change of plan	1	High	Priya
Sprint-4	Raise queries	USN-15	As a user, I can raise queries through the query box or via mail.	2	Medium	Pandiselvi
Sprint-4	Answer the queries	USN-16	As a user, I will answer the questions/doubts Raised by the customers.	2	High	Buvaneshwari
Sprint-4	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.	1	High	Keerthika

6.2 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	5 Nov 2022
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-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 Nov2022

6.3 REPORTS FROM JIRA




NOV
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Sprints
SSFR Sprint 4
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

7.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

```
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()
```

```
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())digits="0123456789"
OTP=""
for i in range(6):
    OTP+=digits[math.floor(random.random()*10)]
otp = OTP + " is your OTP"
msg= otp
s = smtplib.SMTP('smtp.gmail.com', 587)
s.starttls()
s.login("Your Gmail Account", "You app password")
emailid = input("Enter your email: ")


s.sendmail('&&&&&&&&&&&',emailid,msg)  a
= input("Enter Your OTP >>: ")
if a == OTP:
    print("Verified")
else:
    print("Please Check your OTP again")
```

8.TESTING

8.1.TEST CASES

Test case ID	Feature Type	Component	Test Scenario	Pre-Requisite	Steps To Execute	Test Data	Expected Result	Actual Result	Status	Commnets	TC for Automati	BUG	Executed By
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	Working as expected	Pass				keerthika
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	Working as expected	pass				Pandiselvi
3	Functional	OTP verification	Verify user otp using mail		1.Enter gmail id and enter password 2.click submit	Username: abc@gmail.com password: Testing123	OTP verifed is to be displayed	Working as expected	pass				Buvaneshwari
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	Username: abc@gmail password: Testing123	Application should show 'Incorrect email or password' validation message.	Working as expected	pass				viji
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	Username: abc@gmail.com password: Testing123678686786876876	A user can view about the available trains to enter start and destination details	Working as expected	fail				priya

Feature Type	Component	Test Scenario	Pre-Requisite	Steps To Execute	Test Data	Expected Result	Actual Result	Status	Commnets	TC for Automation(Y/N	BUG ID	Executed By
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	Working as expected	Pass				Buvaneshwari
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	Working as expected	pass				Viji
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.	Working as expected	pass				keerthika
Functional	Redirection	user can be redirected to the selected		1.After payment the usre will be redirected to the previous		After payment the usre will be redirected to the previous page	Working as expected	pass				priya

Test case ID	Feature Type	Component	Test Scenario	Pre-Requisit	Steps To Execute	Test Data	Expected Result	Actual Result	Status	Commnets	TC for Autom	BUG ID	Executed By
10	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	Working as expected	Pass				pandiselvi
11	UI	Ticket status	a usercan 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 tivkets booked	Working as expected	pass				Viji
12	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	Working as expected	pass				buvaneshwari
13	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	Working as expected	pass				keerthi

Test case ID	Feature Type	Component	Test Scenario	Pre-Requisite	Steps To Execute	Test Data	Expected Result	Actual Result	Status	Commnets	TC for Automation(Y	BUG ID	Executed By
14	Functional	Ticket cancellation	user can cancel my tickets there's any Change of plan		1.tickets to be cancelled		Tickets booked to be cancelled	Working as expected	Pass				priya
15	UI	Raise queries	user can raise queries through the query box or via		1,raise the queries		raise the queries	Working as expected	pass				pandiselvi
16	Functional	Answer the queries	user will answer the questions/doubts Raised by the customers.		1.answer the queries		answer the queries	Working as expected	pass				bhuvaneshwari
17	Functional	Feed details	a user will feed information about the trains delays and add extra seats if a new compartment is added.		1.information feeding on trains		information feeding on trains	Working as expected	pass				keerthika

9. RESULTS

9.1. PERFORMANCE METRICS

10. 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;
- Automation – ability to automate parts of the system monitoring application, leading to better performance and lower operation costs.

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;
- Online data processing systems, for real-time monitoring, using emerging communication technologies;
- Integrated, interoperable, and scalable solutions for railway systems preventive maintenance.

11. CONCLUSION

Accidents occurring in Railway transportation system cost a large number of lives. So thissystem helps us to prevent accidents and giving information about faults or cracks in advance to railway authorities. So that they can fix them and accidents cases becomes less. This project is cost effective. By using more techniques they can be modified and developed according to their applications. By this system many lives can be saved by avoiding accidents. The idea can be implemented in large scale in the long run to facilitate better safety standards for rail tracks and provide effective testing infrastructure for achieving better results in the future.

12.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 canalso be used to show fault with the help of video. Locations on Google maps with the helpof sensors can be used to detect in which area track is broken.

13.APPENDIX

13.1. SOURCE PROGRAM

```
import math, random
import os
import smtplib
import sqlite3
import requests
from bs4 import BeautifulSoup
from django.contrib.auth.base_user import AbstractBaseUser
from django.db import models
import logging
import pandas as pd
import pyttsx3
from plyer import notification
import time
import numpy as np
import matplotlib.pyplot as plt
from PIL import Image, ImageDraw
from pickle import load,dump
import smtplib, ssl
from email.mime.text import MIMEText
from email.mime.multipart import MIMEMultipart
import email

from email import encoders
from email.mime.base import MIMEBase
```

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

```
from pluggy import HookimplMarker

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()

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())

digits="0123456789"
OTP=""
for i in range(6):
    OTP+=digits[math.floor(random.random()*10)]
otp = OTP + " is your OTP"
msg= otp
s = smtplib.SMTP('smtp.gmail.com', 587)
s.starttls()
s.login("Your Gmail Account", "You app password")
emailid = input("Enter your email: ")
s.sendmail('&&&&&&&&&&&',emailid,msg)
a = input("Enter Your OTP >>: ")
```

```
if a == OTP:
    print("Verified")
else:
    print("Please Check your OTP again")
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()
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_Stat
ion_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)
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
```

7.2. FEATURE 2

```
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")
@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"))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 type
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
       # 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'])
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()
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()
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.resnoprint
     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\n\n\t\t\t\t\t\tLOADI NG.
.",
        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\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
            printclass 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.nameprint
print "PASSENGER'S AGE :",tick.ageprint
print "PNR NO :",tick.resnoprint
print "STATUS :",tick.statusprint
print "NO OF SEATS BOOKED : ",tick.no_ofticketsprint
except:
pass fin1.close()
if(f==0):
print
print "WRONG PNR NUMBER..!!"
print
def pending(self):
self.status="WAITING LIST" print
"PNR NUMBER :",self.resnoprint
time.sleep(1.2)
print "STATUS = ",self.statusprint
print "NO OF SEATS BOOKED : ",self.no_ofticketsprint
def confirmation (self):
self.status="CONFIRMED"
print "PNR NUMBER : ",self.resnoprint
```

```
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_OFFIRST 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 "="*80print
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\n\n\n\n\n\n\t\t\t\t\t\tLOADI
NG. .",
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 LISTPLEASE
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 MORETRAINS
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"tick.display()
elif ch==6:quit()

raw_input("PRESS ENTER TO GO TO BACK
MENU".center(80))
os.system('cls')

menu()
sender_email = "my@gmail.com"
receiver_email = "your@gmail.com"
password = input("Type your password and press enter:")

message = MIMEMultipart("alternative")
message["Subject"] = "multipart test"
message["From"] = sender_email
message["To"] = receiver_email

# Create the plain-text and HTML version of your messagetext
= """\
Hi,
How are you?
Real Python has many great tutorials:
www.realpython.com"""
html = """\
<html>
<body>
<p>Hi,<br>
How are you?<br>
```

```
<a href="http://www.realpython.com">Real Python</a>has
many great tutorials.
</p>
</body>
</html>
"""

# Turn these into plain/html MIMEText objects
part1 = MIMEText(text, "plain")
part2 = MIMEText(html, "html")

# Add HTML/plain-text parts to MIMEMultipart message#
The email client will try to render the last part first
message.attach(part1)
message.attach(part2)

# Create secure connection with server 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, message.as_string()
)
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 attachmentpart =
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)
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 datareservation_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 variabledate_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")
```

13.2. GIT HUB LINK

https://github.com/IBM-EPBL/IBM-Project-41051-1660638