Python programming Lab(23CP301P)

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Lab 3:

Experiment No: 3

Railway Ticket Reservation System using Python

Objective: To implement a Python program that simulates a basic railway ticket reservation system by loading train and passenger data from CSV files, checking seat availability, booking tickets, updating train data, calculating fare, and generating reports.

Code:

```python
import csv

import sys


def load_trains(filename):
  trains = {}
  try:
    with open(filename, mode="r", newline="") as file:
      reader = csv.DictReader(file)
      for row in reader:
        trains[row['Train ID']] = {
          "TrainName": row['Train Name'],
          "Source": row['Source Station'],
          "Destination": row['Destination Station'],
          "Seats": int(row['Total Seats']),
          "FarePerSeat": int(row['fareperseat'])
        }
  except FileNotFoundError:
    print(f"Error: {filename} not found.")
```

```python
        sys.exit(1)

    except KeyError as e:

        print(f"CSV format error: Missing column {e}")

        sys.exit(1)

    return trains


def load_passengers(filename):

    passengers = []

    try:

        with open(filename, mode="r", newline="") as file:

            reader = csv.DictReader(file)

            for row in reader:

                passengers.append({

                    "Name": row['Passenger Name'],

                    "TrainID": row['Train ID'],

                    "Tickets": int(row['Number of Tickets'])

                })

    except FileNotFoundError:

        print(f"Error: {filename} not found.")

        sys.exit(1)

    except KeyError as e:

        print(f"CSV format error: Missing column {e}")

        sys.exit(1)

    return passengers
```

```python
def check_availability(train, requested_tickets):

    return train["Seats"] >= requested_tickets


def calculate_fare(tickets, fare_per_seat):

    return tickets * fare_per_seat


def book_ticket(trains, passenger, revenue):

    train_id = passenger["TrainID"]

    if train_id not in trains:

        print(f"Booking Error for {passenger['Name']}: Invalid Train ID {train_id}")

        return

    train = trains[train_id]

    requested_tickets = passenger["Tickets"]

    if check_availability(train, requested_tickets):

        fare = calculate_fare(requested_tickets, train["FarePerSeat"])

        train["Seats"] -= requested_tickets

        revenue[train_id] = revenue.get(train_id, 0) + fare

        print(f"Booking confirmed for {passenger['Name']} on Train {train_id} |
Fare: Rs.{fare}")

    else:

        print(f"Booking Error for {passenger['Name']}: Not enough seats
available.")


def generate_report1(trains):

    print("\n--- Report 1: Train Details & Seat Availability ---")
```

```python
    print(f"{'Train ID':<10}{'Train Name':<20}{'Source':<15}{'Destination':<15}{'Seats Available'}")
    for tid, details in trains.items():
        print(f"{tid:<10}{details['TrainName']:<20}{details['Source']:<15}{details['Destination']:<15}{details['Seats']}")


def generate_report2(revenue, trains):
    print("\n--- Report 2: Train Revenue ---")
    print(f"{'Train ID':<10}{'Train Name':<20}{'Revenue (Rs.)'}")
    for tid, rev in revenue.items():
        print(f"{tid:<10}{trains[tid]['TrainName']:<20}{rev}")


def main():
    trains_file = "Train.csv"
    passengers_file = "Passenger.csv"
    trains = load_trains(trains_file)
    passengers = load_passengers(passengers_file)
    revenue = {}
    for passenger in passengers:
        book_ticket(trains, passenger, revenue)
    generate_report1(trains)
    generate_report2(revenue, trains)


if __name__ == "__main__":
    main()
```

Output:

```
UnicodeEncodeError: 'charmap' codec can't encode character '\u20b9' in position 4

[Done] exited with code=1 in 0.063 seconds

[Running] python -u "c:\Users\Admin\OneDrive\Desktop\python\lab3.py"
Booking confirmed for John on Train T123 | Fare: Rs.1000
Booking confirmed for Alice on Train T321 | Fare: Rs.200
Booking confirmed for Bob on Train T789 | Fare: Rs.5600
Booking confirmed for Eve on Train T456 | Fare: Rs.3600

--- Report 1: Train Details & Seat Availability ---
Train ID    Train Name          Source          Destination     Seats Available
T123        Express 123         City A          City B          198
T456        Superfast 456       City B          City C          147
T789        Shatabdi 789        City C          City D          96
T321        Intercity 321       City D          City E          179
T654        Rajdhani 654        City E          City F          250

--- Report 2: Train Revenue ---
Train ID    Train Name          Revenue (Rs.)
T123        Express 123         1000
T321        Intercity 321       200
T789        Shatabdi 789        5600
T456        Superfast 456       3600

[Done] exited with code=0 in 0.059 seconds
```