

Assignment 2 777488
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I, the undersigned, hereby declare that this is my own and personal work, except where the work(s) or publications of others have been acknowledged by means of reference techniques. I have read and understood Tutorial Matter- Study Guide, Lessons 1 – 29 regarding technical and presentation requirements, referencing techniques and plagiarism.

DATE: 29th March 2025

A program that simulates a flight booking system.

INPUT

```
#include <iostream>
#include <string>
#include <vector>
#include <iomanip>
#include <cctype>
using namespace std;
// Constants
const int NUM_SEATS = 50;
const int FIRST_CLASS_ROWS = 4;
const double ECONOMY_COST = 1600.00;
const double FIRST_CLASS_MULTIPLIER = 1.20;
// Flight structure to hold flight details
struct Flight {
    string departureTime;
    vector<bool> seats;
    int bookings;
    Flight(string time) : departureTime(time), seats(NUM_SEATS, false),
bookings(0) {}
};
// Function prototypes
void displayMenu(const vector<Flight>& flights);
void displaySeating(const Flight& flight);
int getSeatNumber(const Flight& flight);
void bookSeat(Flight& flight, int seatNumber);
void displayBookingTicket(const string& fullName, const Flight& flight, int
seatNumber);
void displayBookingSummary(const vector<Flight>& flights);
int main() {
    // Initialize flight times
    vector<Flight> flights;
    flights.push_back(Flight("7:00"));
    flights.push_back(Flight("9:00"));
    flights.push_back(Flight("11:00"));
    flights.push_back(Flight("13:00"));
    flights.push_back(Flight("15:00"));
    string fullName;
    char continueBooking;
    cout << "*****" << endl;
    cout << "*" << endl;
```

```

cout << "*"   Welcome to COS1511 Flight Booking System   "*" << endl;
    cout << "*"                                     "*" << endl;
    cout << "*****" << endl;
    cout << "Enter full name\n";
    getline(cin, fullName);
    do {
        displayMenu(flights);
        int choice;
        cout << "Choose the time by entering the option number from the displayed"
<< "list: (1-5): ";
        cin >> choice;
        // Validate input range 1-5
        while (choice < 1 || choice > 5) {
            cout << "Incorrect option! Please choose from 1 - 5. ";
            cin >> choice;
        }
        Flight& selectedFlight = flights[choice - 1];
        displaySeating(selectedFlight);
        int seatNumber = getSeatNumber(selectedFlight);
        bookSeat(selectedFlight, seatNumber);
        displayBookingTicket(fullName, selectedFlight, seatNumber);
        selectedFlight.bookings++;
        cout << "Do you want to make another booking? (Y/N): ";
        cin >> continueBooking;
        cin.ignore();
    } while (toupper(continueBooking) == 'Y'); // Continue booking if the user
// enters 'Y' or 'y'
    displayBookingSummary(flights); // Display the total number of bookings for
// each flight time
    cout << "\nThank you for using the COS1511 Flight Booking System!\n";
    return 0;
}
// Function to display the flight menu
void displayMenu(const vector<Flight>& flights) {
    cout << "\nThe available travel times for flights are:\n";
    cout << setw(5) << "Option" << setw(10) << "Depart" << setw(10) <<
"Arrive\n";
    cout << setw(25) << setfill('-') << "" << endl;
    cout << setfill(' ');
    for (size_t i = 0; i < flights.size(); ++i) {
        int departureHour = stoi(flights[i].departureTime.substr(0, 2));
        int arrivalHour = (departureHour + 2) % 24;
        string arrivalTime = (arrivalHour < 10 ? "0" : "") +
to_string(arrivalHour) + ":30";
        cout << setw(5) << to_string(i + 1) + "." << setw(10) <<
flights[i].departureTime << setw(10) << arrivalTime << endl;
    }
}
// Function to display the seating arrangement
void displaySeating(const Flight& flight) {
    cout << "\nThe available seats are as follows:\n";
    cout << " First class (R1920.00)\n";
    char rowLabel = 'A';

```

```

for (int i = 0; i < NUM_SEATS; ++i) {
    int seatNum = (i % 6) + 1;
    string seatLabel = string(1, rowLabel) + to_string(seatNum);
    cout << " | " << (flight.seats[i] ? "***" : seatLabel) << " ";
    if (seatNum == 3) {
        cout << " | ----- ";
    }
    if (seatNum == 6) {
        cout << " |\n";
    }
    rowLabel++;
    if (rowLabel == 'E') {
        cout << " | Economy class (R1600.00)\n";
    }
}

}

// Function to get the seat number from the user
int getSeatNumber(const Flight& flight) {
    string seatInput;
    bool validSeat = false;
    int seatNumber = 0;
    while (!validSeat) {
        cout << "\nSeats that are already taken are indicated with an"
<< " asterisk";
        cout << "\nPlease key in a seat number to choose a seat (e.g., A1): ";
        cin >> seatInput;
        cin.ignore();

        // Validate input format (e.g., A1, B2, etc.)
        if (seatInput.length() != 2) {
            cout << "Invalid format! Please enter a seat number like A1, B2, "
<< " etc.\n";
            continue;
        }
        char row = toupper(seatInput[0]);
        int column = seatInput[1] - '0';
        // Validate row (A-I) and column (1-6)
        if (row < 'A' || row > 'I') {
            cout << "Invalid row! Please choose from A to I.\n";
            continue;
        }
        if (column < 1 || column > 6) {
            cout << "Invalid column! Please choose from 1 to 6.\n";
            continue;
        }
        // Calculate the seat index in the vector
        int rowIndex = row - 'A';
        seatNumber = rowIndex * 6 + (column - 1);
        // Check if seat number exceeds total seats (0-49)
        if (seatNumber >= NUM_SEATS) {
            cout << "Invalid seat! This seat does not exist.\n";
            continue;
        }
    }
}

```

```

    }
    // Check if the seat is already booked
    if (flight.seats[seatNumber]) {
        cout << "That seat is already booked. Please choose another.\n";
    } else {
        validSeat = true;
    }
}
return seatNumber + 1;
}
// Function to book the seat
void bookSeat(Flight& flight, int seatNumber) {
    flight.seats[seatNumber - 1] = true;
}
// Function to display the booking ticket
void displayBookingTicket(const string& fullName, const Flight& flight, int
seatNumber) {
    double ticketPrice;
    string seatClass;
    // Convert seat number to letter + number format
    char row = 'A' + (seatNumber - 1) / 6;
    int column = ((seatNumber - 1) % 6) + 1;
    string seatLabel = string(1, row) + to_string(column);

    if (seatNumber <= FIRST_CLASS_ROWS * 6) {
        ticketPrice = ECONOMY_COST * FIRST_CLASS_MULTIPLIER;
        seatClass = "First class";
    } else {
        ticketPrice = ECONOMY_COST;
        seatClass = "Economy";
    }
    int departureHour = stoi(flight.departureTime.substr(0, 2));
    int arrivalHour = (departureHour + 2) % 24;
    cout << "\n*****\n";
    cout << "Travel ticket for FLIGHT";
    cout << "\n*****\n";
    cout << left << setw(20) << "Name:" << setw(30) << fullName
        << "Travel Ticket class\t: " << seatClass << endl;
    cout << left << setw(20) << "Departure:" << setw(30) << "Johannesburg"
        << "Seat Number\t\t: " << seatLabel << endl;
    cout << left << setw(20) << "Destination:" << setw(30) << "Cape Town"
        << "Departure Time\t: " << flight.departureTime << endl;
    cout << left << setw(20) << "" << setw(30) << ""
        << "Arrival Time\t\t: " << setw(2) << setfill('0') << arrivalHour <<
":30" << setfill(' ') << endl;
    cout.setf(ios::fixed);
    cout.precision(2);
    cout << "*****\n";
    cout << "Amount: R" << ticketPrice << " Thank you for booking with"
<< " COS1511."
        << " Your travel agent for this query is Hussein Madan"
<< endl;
    cout << "*****\n";

```

```

}
// Function to display the booking summary
void displayBookingSummary(const vector<Flight>& flights) {
    cout << "\nBooking Summary:\n";
    cout << "-----" << endl;
    for (size_t i = 0; i < flights.size(); ++i) {
        cout << "Number of bookings made for " << flights[i].departureTime <<
": " << flights[i].bookings << " \n";
    }
}
}

```

OUTPUT

```

h - main - 114x31
Last login: Fri Apr 11 18:13:10 on ttys000
'/Volumes/Data/Dev/helloWorld/main'
h@Husseins-MBP ~ % './main'
*****
*
*   Welcome to COS1511 Flight Booking System   *
*
*****
Enter full name
Hussein Migadde

The available travel times for flights are:
Option   Depart   Arrive
-----
1.       7:00    09:30
2.       9:00    11:30
3.      11:00    13:30
4.      13:00    15:30
5.      15:00    17:30
Choose the time by entering the option number from the displayed list: (1-5): 7
Incorrect option! Please choose from 1 - 5.

```

```
* Welcome to COS1511 Flight Booking System *
*
*****
Enter full name
Hussein Migadde
```

```
The available travel times for flights are:
Option  Depart  Arrive
```

```
-----
1.      7:00    09:30
2.      9:00    11:30
3.     11:00    13:30
4.     13:00    15:30
5.     15:00    17:30
```

```
Choose the time by entering the option number from the displayed list: (1-5): 7
Incorrect option! Please choose from 1 - 5. 5
```

```
The available seats are as follows:
```

```
First class (R1920.00)
```

```
| A1 | A2 | A3 | ----- | A4 | A5 | A6 |
| B1 | B2 | B3 | ----- | B4 | B5 | B6 |
| C1 | C2 | C3 | ----- | C4 | C5 | C6 |
| D1 | D2 | D3 | ----- | D4 | D5 | D6 |
```

```
Economy class (R1600.00)
```

```
| E1 | E2 | E3 | ----- | E4 | E5 | E6 |
| F1 | F2 | F3 | ----- | F4 | F5 | F6 |
| G1 | G2 | G3 | ----- | G4 | G5 | G6 |
| H1 | H2 | H3 | ----- | H4 | H5 | H6 |
| I1 | I2
```

```
Seats that are already taken are indicated with an asterisk
Please key in a seat number to choose a seat (e.g., A1):
```

```
4.      13:00    15:30
5.      15:00    17:30
```

```
Choose the time by entering the option number from the displayed list: (1-5): 7
Incorrect option! Please choose from 1 - 5. 5
```

```
The available seats are as follows:
```

```
First class (R1920.00)
```

```
| A1 | A2 | A3 | ----- | A4 | A5 | A6 |
| B1 | B2 | B3 | ----- | B4 | B5 | B6 |
| C1 | C2 | C3 | ----- | C4 | C5 | C6 |
| D1 | D2 | D3 | ----- | D4 | D5 | D6 |
```

```
Economy class (R1600.00)
```

```
| E1 | E2 | E3 | ----- | E4 | E5 | E6 |
| F1 | F2 | F3 | ----- | F4 | F5 | F6 |
| G1 | G2 | G3 | ----- | G4 | G5 | G6 |
| H1 | H2 | H3 | ----- | H4 | H5 | H6 |
| I1 | I2
```

```
Seats that are already taken are indicated with an asterisk
Please key in a seat number to choose a seat (e.g., A1): a1
```

```
*****
```

```
Travel ticket for FLIGHT
```

```
*****
```

```
Name: Hussein Migadde      Travel Ticket class : First class
Departure: Johannesburg    Seat Number       : A1
Destination: Cape Town     Departure Time    : 15:00
                          Arrival Time      : 17:30
```

```
*****
Amount: R1,920.00 Thank you for booking with COS1511. Your travel agent for this query is Hussein Madan
```

```
*****
```

```
Do you want to make another booking? (Y/N):
```

```

h — main — 114x31
Destination:      Cape Town      Departure Time    : 7:00
Arrival Time     : 90:30

*****
Amount: R1,920.00 Thank you for booking with COS1511. Your travel agent for this query is Hussein Madan
*****
Do you want to make another booking? (Y/N): y

The available travel times for flights are:
OptionDepart      Arrive
-----
1.  7:00          09:30
2.  9:00          11:30
3.  11:00         13:30
4.  13:00         15:30
5.  15:00         17:30
Choose the time by entering the option number from the displayed list: (1-5): 1

The available seats are as follows:
First class (R1920.00)
| ** | A2 | A3 | ----- | A4 | A5 | A6 |
| B1 | B2 | B3 | ----- | B4 | B5 | B6 |
| C1 | C2 | C3 | ----- | C4 | C5 | C6 |
| D1 | D2 | D3 | ----- | D4 | D5 | D6 |
Economy class (R1600.00)
| E1 | E2 | E3 | ----- | E4 | E5 | E6 |
| F1 | F2 | F3 | ----- | F4 | F5 | F6 |
| G1 | G2 | G3 | ----- | G4 | G5 | G6 |
| H1 | H2 | H3 | ----- | H4 | H5 | H6 |
| I1 | I2
Seats that are already taken are indicated with an asterisk
Please key in a seat number to choose a seat (e.g., A1): 

```

```

h — main — 114x31
*****
Do you want to make another booking? (Y/N): y

The available travel times for flights are:
OptionDepart      Arrive
-----
1.  7:00          09:30
2.  9:00          11:30
3.  11:00         13:30
4.  13:00         15:30
5.  15:00         17:30
Choose the time by entering the option number from the displayed list: (1-5): 1

The available seats are as follows:
First class (R1920.00)
| ** | A2 | A3 | ----- | A4 | A5 | A6 |
| B1 | B2 | B3 | ----- | B4 | B5 | B6 |
| C1 | C2 | C3 | ----- | C4 | C5 | C6 |
| D1 | D2 | D3 | ----- | D4 | D5 | D6 |
Economy class (R1600.00)
| E1 | E2 | E3 | ----- | E4 | E5 | E6 |
| F1 | F2 | F3 | ----- | F4 | F5 | F6 |
| G1 | G2 | G3 | ----- | G4 | G5 | G6 |
| H1 | H2 | H3 | ----- | H4 | H5 | H6 |
| I1 | I2
Seats that are already taken are indicated with an asterisk
Please key in a seat number to choose a seat (e.g., A1): a1
That seat is already booked. Please choose another.

Seats that are already taken are indicated with an asterisk
Please key in a seat number to choose a seat (e.g., A1): 

```

```

h — main — 114x31
Destination:      Cape Town      Departure Time    : 7:00
Arrival Time     : 90:30

*****
Amount: R1,600.00 Thank you for booking with COS1511. Your travel agent for this query is Hussein Madan
*****
Do you want to make another booking? (Y/N): y

The available travel times for flights are:
OptionDepart      Arrive
-----
1.  7:00          09:30
2.  9:00          11:30
3.  11:00         13:30
4.  13:00         15:30
5.  15:00         17:30
Choose the time by entering the option number from the displayed list: (1-5): 1

The available seats are as follows:
First class (R1920.00)
| ** | A2 | A3 | ----- | A4 | A5 | A6 |
| B1 | B2 | B3 | ----- | B4 | B5 | B6 |
| C1 | C2 | C3 | ----- | C4 | C5 | C6 |
| D1 | D2 | D3 | ----- | D4 | D5 | D6 |
Economy class (R1600.00)
| E1 | E2 | E3 | ----- | E4 | E5 | E6 |
| F1 | F2 | F3 | ----- | F4 | F5 | F6 |
| G1 | G2 | ** | ----- | G4 | G5 | G6 |
| H1 | H2 | H3 | ----- | H4 | H5 | H6 |
| I1 | I2 |
Seats that are already taken are indicated with an asterisk
Please key in a seat number to choose a seat (e.g., A1): 

```

```

h — main — 114x31
*****
Do you want to make another booking? (Y/N): y

The available travel times for flights are:
OptionDepart      Arrive
-----
1.  7:00          09:30
2.  9:00          11:30
3.  11:00         13:30
4.  13:00         15:30
5.  15:00         17:30
Choose the time by entering the option number from the displayed list: (1-5): 1

The available seats are as follows:
First class (R1920.00)
| ** | A2 | A3 | ----- | A4 | A5 | A6 |
| B1 | B2 | B3 | ----- | B4 | B5 | B6 |
| C1 | C2 | C3 | ----- | C4 | C5 | C6 |
| D1 | D2 | D3 | ----- | D4 | D5 | D6 |
Economy class (R1600.00)
| E1 | E2 | E3 | ----- | E4 | E5 | E6 |
| F1 | F2 | F3 | ----- | F4 | F5 | F6 |
| G1 | G2 | ** | ----- | G4 | G5 | G6 |
| H1 | H2 | H3 | ----- | H4 | H5 | H6 |
| I1 | I2 |
Seats that are already taken are indicated with an asterisk
Please key in a seat number to choose a seat (e.g., A1): g3
That seat is already booked. Please choose another.

Seats that are already taken are indicated with an asterisk
Please key in a seat number to choose a seat (e.g., A1): 

```



```

h — main — 114x31
Destination:      Cape Town      Departure Time    : 7:00
Arrival Time     : 90:30

*****
Amount: R1,600.00 Thank you for booking with COS1511. Your travel agent for this query is Hussein Madan
*****
Do you want to make another booking? (Y/N): y

The available travel times for flights are:
OptionDepart      Arrive
-----
1.  7:00          09:30
2.  9:00          11:30
3.  11:00         13:30
4.  13:00         15:30
5.  15:00         17:30
Choose the time by entering the option number from the displayed list: (1-5): 2

The available seats are as follows:
First class (R1920.00)
| A1 | A2 | A3 | ----- | A4 | A5 | A6 |
| B1 | B2 | B3 | ----- | B4 | B5 | B6 |
| C1 | C2 | C3 | ----- | C4 | C5 | C6 |
| D1 | D2 | D3 | ----- | D4 | D5 | D6 |
Economy class (R1600.00)
| E1 | E2 | E3 | ----- | E4 | E5 | E6 |
| F1 | F2 | F3 | ----- | F4 | F5 | F6 |
| G1 | G2 | G3 | ----- | G4 | G5 | G6 |
| H1 | H2 | H3 | ----- | H4 | H5 | H6 |
| I1 | I2
Seats that are already taken are indicated with an asterisk
Please key in a seat number to choose a seat (e.g., A1):

```

```

h — main — 114x31
3.  11:00         13:30
4.  13:00         15:30
5.  15:00         17:30
Choose the time by entering the option number from the displayed list: (1-5): 2

The available seats are as follows:
First class (R1920.00)
| A1 | A2 | A3 | ----- | A4 | A5 | A6 |
| B1 | B2 | B3 | ----- | B4 | B5 | B6 |
| C1 | C2 | C3 | ----- | C4 | C5 | C6 |
| D1 | D2 | D3 | ----- | D4 | D5 | D6 |
Economy class (R1600.00)
| E1 | E2 | E3 | ----- | E4 | E5 | E6 |
| F1 | F2 | F3 | ----- | F4 | F5 | F6 |
| G1 | G2 | G3 | ----- | G4 | G5 | G6 |
| H1 | H2 | H3 | ----- | H4 | H5 | H6 |
| I1 | I2
Seats that are already taken are indicated with an asterisk
Please key in a seat number to choose a seat (e.g., A1): a3

*****
Travel ticket for FLIGHT
*****
Name:      Hussein Migadde      Travel Ticket class : First class
Departure: Johannesburg      Seat Number          : A3
Destination: Cape Town      Departure Time       : 9:00
Arrival Time : 11:30

*****
Amount: R1,920.00 Thank you for booking with COS1511. Your travel agent for this query is Hussein Madan
*****
Do you want to make another booking? (Y/N):

```

```

h -- zsh -- 114x31
| Economy class (R1600.00)
| E1 | E2 | E3 | ----- | E4 | E5 | E6 |
| F1 | F2 | F3 | ----- | F4 | F5 | F6 |
| G1 | G2 | G3 | ----- | G4 | G5 | G6 |
| H1 | H2 | H3 | ----- | H4 | H5 | H6 |
| I1 | I2 |
Seats that are already taken are indicated with an asterisk
Please key in a seat number to choose a seat (e.g., A1): a3

*****
Travel ticket for FLIGHT
*****
Name: Hussein Migadde Travel Ticket class : First class
Departure: Johannesburg Seat Number : A3
Destination: Cape Town Departure Time : 9:00
Arrival Time : 11:30

*****
Amount: R1,920.00 Thank you for booking with COS1511. Your travel agent for this query is Hussein Madan
*****
Do you want to make another booking? (Y/N): n

Booking Summary:
-----
Number of bookings made for 7:00: 3
Number of bookings made for 9:00: 1
Number of bookings made for 11:00: 0
Number of bookings made for 13:00: 0
Number of bookings made for 15:00: 1

Thank you for using the COS1511 Flight Booking System!
h@Husseins-MBP ~ %

```