Informatics Institute of Technology

School of Computing

Software Development II Coursework Report

Module	: 4COSC010C.2: Software Development II (2023)
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Tutorial group (day, time, and tutor/s): Group - 14

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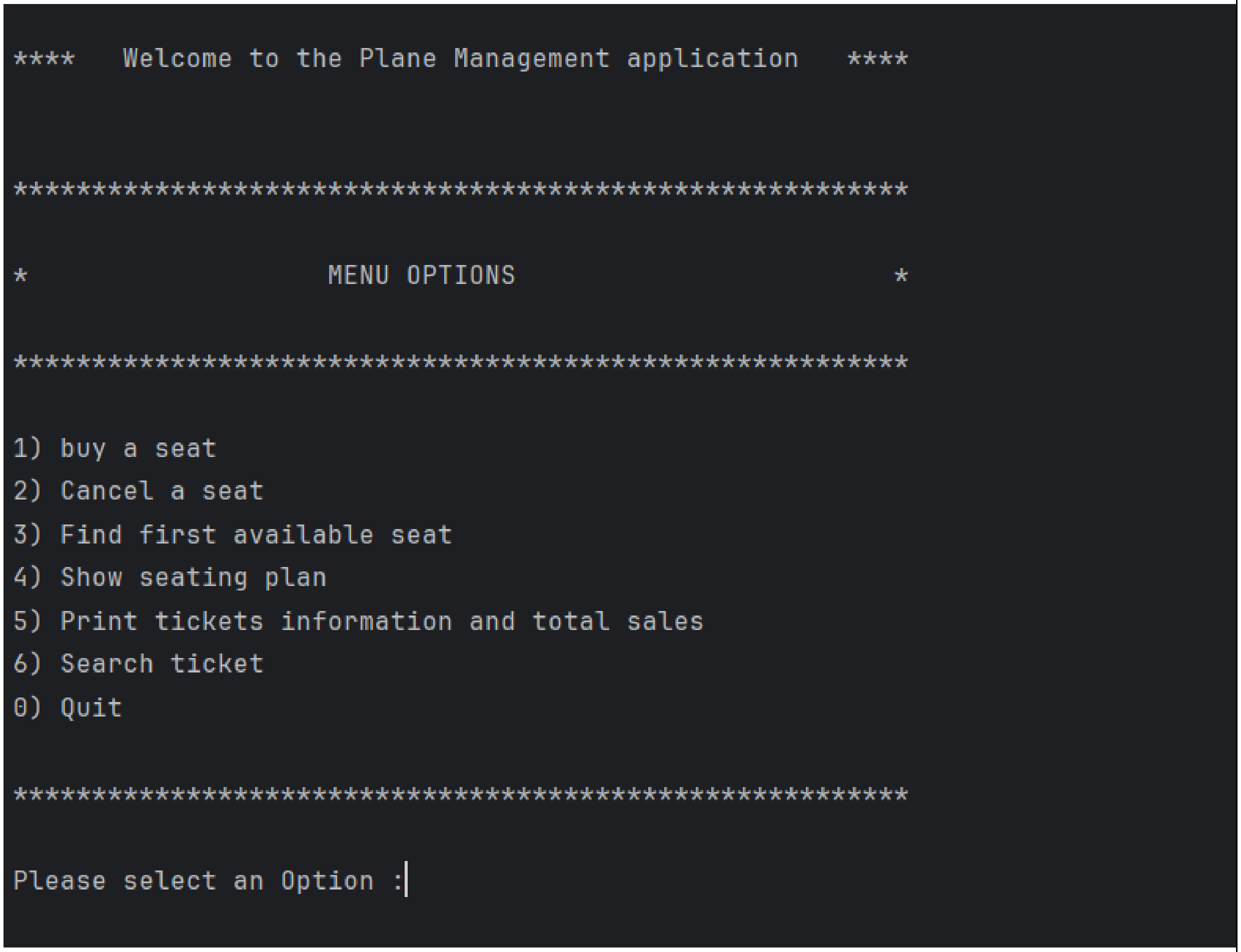
Self-assessment form and test plan

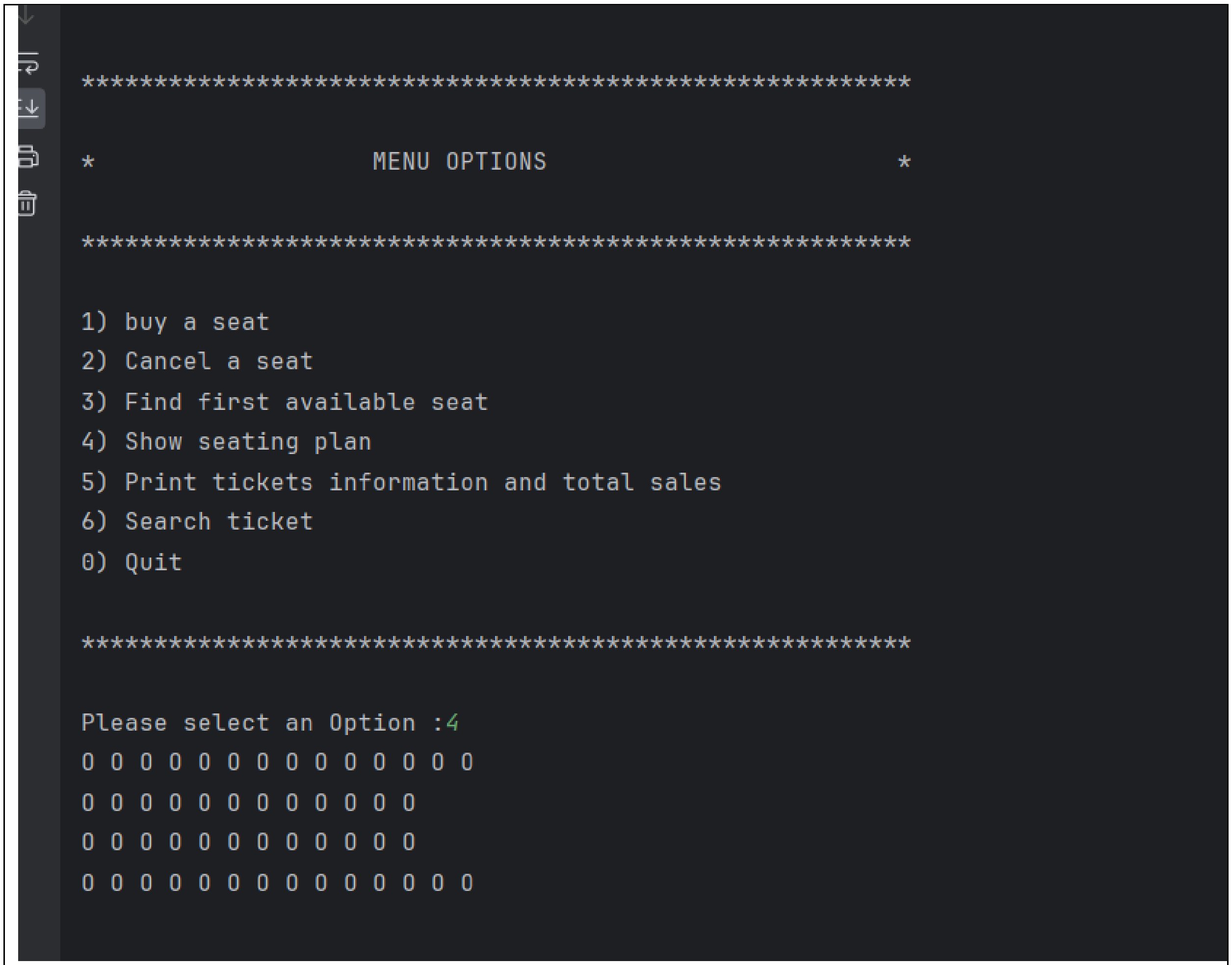
1) Self-assessment form

Task	Self-assessment (select one)	Comments
1	☒Fully implemented ☐Partially implemented ☐Not attempted	Project created with the given title and given class file names. Implemented the seat management system using standard arrays.
2	☒Fully implemented ☐Partially implemented ☐Not attempted	Added the user menu to the programme and call the methods.
Insert here a screenshot of your welcome message and menu:		



```
****   Welcome to the Plane Management application   ****


*********************************************************

*                   MENU OPTIONS                        *

*********************************************************

1) buy a seat
2) Cancel a seat
3) Find first available seat
4) Show seating plan
5) Print tickets information and total sales
6) Search ticket
0) Quit

*********************************************************

Please select an Option :
```

3	☒Fully implemented ☐Partially implemented ☐Not attempted	Implemented the method called “buy_seat” that asks the user to input a row letter and a seat Number. Checked that the row and seat entered are valid and that the seat is available. User can buy it and updated in the arrays.
4	☒Fully implemented ☐Partially implemented ☐Not attempted	Created a method called “cancel_seat” that cancel a seat. It should ask the user to input a row number and a seat number. Then cancelled the seat otherwise if it is available prompt user that “Seat is already Available”.
5	☒Fully implemented ☐Partially implemented ☐Not attempted	That find the first seat which is still available. Then the programme display the relevant row letter and the seat number.
6	☒Fully implemented ☐Partially implemented ☐Not attempted	Implemented the method called “show_seating_plan” that shows the seats that are available and the seats that have been sold. Display available seats with the character ‘O’ and the sold seats with ‘X’.
Insert here a screenshot of the seating plan:		



```
**********************************************************

*                   MENU OPTIONS                         *

**********************************************************

1) buy a seat
2) Cancel a seat
3) Find first available seat
4) Show seating plan
5) Print tickets information and total sales
6) Search ticket
0) Quit

**********************************************************

Please select an Option :4
0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0
```

7	☒Fully implemented ☐Partially implemented ☐Not attempted	Created the “Person” class with the name, surname, and email attributes. Added a constructor that takes the 3 variables as input to create an object Person. Added all the getters of the class Person.
8	☒Fully implemented ☐Partially implemented ☐Not attempted	Created a new class file called “Ticket” with the row, seat, price, and Person attributes to store ticket information.
9	☒Fully implemented ☐Partially implemented ☐Not attempted	Added a object array named tickets to store the sold tickets. Extended the “cancel_seat” method such that when cancelling a ticket, it removes, the ticket from the array list of tickets.

10	☒Fully implemented ☐Partially implemented ☐Not attempted	That prints the information of all tickets that have been sold. And calculates the total price of the tickets sold during the session.
11	☒Fully implemented ☐Partially implemented ☐Not attempted	Created a method called “search_ticket” that asks the user to input a row letter and a seat number and searches if someone has bought that seat. If someone has bought the seat, it will print the Ticket and Person information. Otherwise, will display “This seat is Available!”.
12	☒Fully implemented ☐Partially implemented ☐Not attempted	Added a method “save” in the class Ticket that saves the information of the Ticket including the Person’s information in a text file.

2) Test Plan

Complete the test plan describing which testing you have performed on your program.
Add as many rows as you need.

Part A Testing

Test case / scenario	Input	Expected Output	Output	Pass/Fail
buy a seat	Menu Option - 1 Row letter - A Seat num – 1	Sold the A1 seat	Expected Output	☒Pass ☐Fail
Cancel a seat	Menu Option – 2 Row letter – A Seat num - 1	Cancelling the sold seat	Expected Output	☒Pass ☐Fail
Find the first available seat	Menu Option - 3	Prompting the first available seat A1.	Expected Output	☒Pass ☐Fail
Show seating plan	Menu Option - 4	Showing the seat plan according to the plan.	Expected Output	☒Pass ☐Fail

buy a seat	Menu Option - 1 Row letter – A Seat num – 20	Display the user to incorrect seat number.	Expected Output	☒Pass ☐Fail
buy a seat	Menu Option - 1 Row letter – E	Display the user to incorrect seat Row.	Expected Output	☒Pass ☐Fail
Execute the programme	Menu Option - 0	Exiting the Programme.	Expected Output	☒Pass ☐Fail

Part B testing

Test case / scenario	**Input**	**Expected Output**	**Output**	**Pass/Fail**
buy a seat	Menu Option - 1 Row letter - A Seat num – 10 Firstname – Anjana Surname – Ranasinghe Email – anjana@gmail.com	Save the person information to the "Person" object and then to the "Ticket" object array.	Expected Output	☒Pass ☐Fail
Print ticket information	Menu option - 5	Display all the information relevant to the reserved seats.	Expected Output	☒Pass ☐Fail
Search ticket	After buying the seat A10 Menu option - 6 Seat row - A Seat number - 10	Display sold information relevant to the seat A10.	Expected Output	☒Pass ☐Fail
Search ticket	After buying the seat A10 Menu option - 6 Seat row - A Seat number - 5	Display seat is available.	Expected Output	☒Pass ☐Fail
buy a seat	Menu Option - 1 Row letter - A Seat num – 10 Firstname – Anjana Surname –	Display Incorrect email address format.	Expected Output	☒Pass ☐Fail

	Ranasinghe Email – anjanagmail.com			
Search ticket	After buying the seat A10 Menu option - 6 Seat row - A Seat number – g	Display seat number is invalid and ask user to again enter the correct value.	Expected Output	☐Pass ☐Fail
Save Files	Menu option - 1 Seat row - A Seat number - 5 Name - Anjana Surname –Senath Email – anjana@gmail.com	Already saved the file by "A5.txt" with ticket and person's information.	Expected Output	☒Pass ☐Fail

Are there any specific parts of the coursework which you would like to get feedback?

You will need to demonstrate your understanding of the submitted code. Your tutor will arrange a coursework demonstration. During the coursework demonstration, your tutor will ask you to execute your program and questions on your code.

Failure to attend the demonstration will result in 0 for the coursework.

3) Code :

PlanManagement.java

```
import java.util.Scanner;   //import the Scanner class to read inputs


public class PlanManagement {
    private static int[][] array = new int[4][];    //Array to store seat availability
    private static Ticket[] tickets = new Ticket[52];   //Array to store sold tickets


    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);

        //initialize arrays for seat availability
        array[0] = new int[14];
        array[1] = new int[12];
        array[2] = new int[12];
        array[3] = new int[14];


        boolean True = true;
        while (True) {
            try{
                int option;
                do{
                    displayMenu();  //To display the main menu
                    System.out.print("Please select an Option :");
                    option = scanner.nextInt();
                    True = false;
```

```
          //Switch statement to handle user options
          switch (option) {
            case 1 -> buy_seat(scanner);         //To buy a seat
            case 2 -> cancel_seat(scanner);      //To cancel a seat
            case 3 -> find_first_available();    //Find the first available seat
            case 4 -> show_seating_plan();       //Shows the seats that are
available(O) and the seats that have been sold(X)
            case 5 -> print_tickets_info();      //Prints the information of all
tickets that have been sold
            case 6 -> search_ticket(scanner);    //Search the ticket from
person's information
          }

          System.out.println();

        }while(option !=0);

        System.out.println("****  THANK YOU ! ****");

      } catch(Exception ex){
        System.out.println("Invalid choice. Please try again. ");
        scanner.next();  //Clear the buffer
        True = true;
      }

    }

  }


  //Method to display the main menu
```

```
    private static void displayMenu(){
        System.out.println("");
        System.out.println("****   Welcome to the Plane Management application ****");
        System.out.println("");
        System.out.println("");
        System.out.println("********************************************************");
        System.out.println("");
        System.out.println("*                   MENU OPTIONS                        *");
        System.out.println("");
        System.out.println("********************************************************");
        System.out.println("");
        System.out.println("1) buy a seat");
        System.out.println("2) Cancel a seat");
        System.out.println("3) Find first available seat");
        System.out.println("4) Show seating plan");
        System.out.println("5) Print tickets information and total sales");
        System.out.println("6) Search ticket");
        System.out.println("0) Quit");
        System.out.println("");
        System.out.println("********************************************************");
        System.out.println("");
    }


    //Method to buy a seat
    public static void buy_seat(Scanner scanner){
        //asks the user to input a row letter
        System.out.print("Enter row letter (A,B,C or D): ");
        char rowletter = scanner.next().toUpperCase().charAt(0);
        int rownum = (int) (rowletter - 'A');
```

```
//check the row letter is correct or not
if (rownum < 0 || rownum >= array.length) {
    System.out.println("Invalid row letter!");
    buy_seat(scanner);   //Call to allow the user to input the row letter again
    return;
}


int seatnum = 0;
boolean correct = true;
while (correct) {
    try{
        //asks the user to input a seat number
        System.out.print("Enter seat number : ");
        seatnum = scanner.nextInt();
        correct = false;

        //validation
        if (seatnum<0 || seatnum > array[rownum].length) {
            System.out.println("Invaild seat number!");
            correct = true;
        }

    } catch(Exception x){
        System.out.println("Invaild seat number!");
        scanner.next();   //Clear the buffer
    }
}
```

```
if (array[rownum][seatnum-1] == 1) {
    System.out.println("\nSeat is already Sold.");
} else{
    //Prompt user to confirm seat purchase
    System.out.print("\nSeat is available! Do you want to buy it? (yes or no): ");
    String confirm = scanner.next().toLowerCase();
    if (confirm.equals("yes")) {
        array[rownum][seatnum-1] = 1;
        // asks the user to input personal details
        System.out.print("Enter your first name: ");
        String firstname = scanner.next();
        System.out.print("Enter your sure name: ");
        String surname = scanner.next();
        String email = null;
        boolean True = true;
        while (True) {
            System.out.print("Enter your valid email address: ");
            email = scanner.next();
            //check the email address format
            if (email.contains("@") && email.contains(".")) {
                True = false;
            } else{
                System.out.println("Incorrect email address format!(e.g-example@example.com) ");
            }
        }



        //Create a Person object with user input
```

```
                Person person = new Person(firstname, surname, email);


                //check the ticket price based on seat number
                double price = 0;
                if (seatnum >= 1 && seatnum <=5 ) {
                    price = 200;
                }
                else if (seatnum >= 6 && seatnum <=9 ) {
                    price = 150;
                }
                else{
                    price = 180;
                }

                //adding the ticket array to find available slot and creat ticket object
                for(int i = 0; i< tickets.length; i++){
                    if (tickets[i] == null) {
                        tickets[i] = new Ticket(rowletter, seatnum, price, person);
                        tickets[i].save();  //Save ticket information to file
                        break;
                    }
                }

                System.out.println("\nYour seat reservation Successfully Sold. Safe Flight! ");
            } else{
                System.out.println("\nSeat not Sold. ");
            }
        }
```

```
    }


    //Method to cancel a seat
    private static void cancel_seat(Scanner scanner){
        //asks the user to input a row letter
        System.out.print("Enter row letter (A,B,C or D): ");
        char rowletter = scanner.next().toUpperCase().charAt(0);
        int rownum = (int) (rowletter - 'A');

        //validation
        if (rownum < 0 || rownum >= array.length) {
            System.out.println("Invalid row letter!");
            cancel_seat(scanner);   //Call to allow the user to input the row letter
again
            return;
        }


        int seatnum = 0;
        boolean correct = true;
        while (correct) {
            try{
                //asks the user to input a seat number
                System.out.print("Enter seat number : ");
                seatnum = scanner.nextInt();
                correct = false;

                //validation
                if (seatnum<0 || seatnum >= array[rownum].length) {
                    System.out.println("Invaild seat number!");
                    correct = true;
                }

            } catch(Exception x){
                System.out.println("Invaild seat number!");
                scanner.next();   //Clear the buffer
            }
        }


        if (array[rownum][seatnum-1] == 0) {
            System.out.println("\nSeat is already Available.");
        } else{
            array[rownum][seatnum-1] = 0;

            //tickets array to find and cancel the corresponding ticket
            for(int i = 0; i < tickets.length; i++){
                if (tickets[i] != null && tickets[i].getRow() == rowletter && tickets[i].getSeat() == seatnum) {
                    tickets[i] = null; //Remove the ticket
                    break;
                }
            }
            System.out.println("\nSeat Successfully Canceled.");
        }
    }


    //Find the first available seat in the array
    private static void find_first_available(){
        for(int i = 0; i < array.length; i++){
            for(int j = 0; j < array[i].length; j++){
                if (array[i][j] == 0) {
                    char row = (char) ('A' + i);
                    System.out.println("\nFirst available seat is: " + row + (j + 1));
                    return;    //return the value when the first available seat is found
                }
            }

        }
    }


    //Method to shows the seats that are available(O) and the seats that have been sold(X)
    private static void show_seating_plan(){
        for (int i = 0; i < array.length; i++) {
            for (int j = 0; j < array[i].length; j++) {
                if (array[i][j] == 0) {
                    System.out.print("O ");   //represent an available seat
                } else {
                    System.out.print("X ");   //represent a sold seat
                }
            }
            System.out.println();  //Move to the next line after printing seats of the current row
        }
    }


    //Method to prints the information of all tickets that have been sold
    public static void print_tickets_info(){
        int total = 0;
        for(Ticket element: tickets){
            if (element != null) {
                element.printInfo();
                total += element.getPrice();
                System.out.println();
            }
        }
        System.out.println("Total Price:  £" + total);   //Print the total price of the tickets sold
    }


    //Method to search the ticket from person's information
    private static void search_ticket(Scanner scanner){
        //asks the user to input a row letter
        System.out.print("Enter row letter (A,B,C or D): ");
        char rowletter = scanner.next().toUpperCase().charAt(0);
        int rownum = (int) (rowletter - 'A');

        //validation
        if (rownum < 0 || rownum >= array.length) {
            System.out.println("Invalid row letter!");
            search_ticket(scanner);  //Call to allow the user to input the row letter again
            return;
        }


        int seatnum = 0;
        boolean correct = true;
        while (correct) {
            try{
                //asks the user to input a seat number
                System.out.print("Enter seat number : ");
                seatnum = scanner.nextInt();
                correct = false;

                //validation
                if (seatnum<0 || seatnum >= array[rownum].length) {
                    System.out.println("Invaild seat number!");
                    correct = true;
                }

            } catch(Exception x){
                System.out.println("Invaild seat number!");
                scanner.next();  //Clear the buffer
            }
        }



        if (array[rownum][seatnum-1] == 0) {
            System.out.println("\nThis seat is Available! ");
        } else{
            //Search for the ticket corresponding to the provided row letter and
seat number
            for(int i = 0; i < tickets.length; i++){
                if (tickets[i].getRow() == rowletter && tickets[i].getSeat() ==
seatnum){
                    tickets[i].printInfo();     //Print ticket & person informations
                    break;
                }
            }
        }
    }

}
```

Person.java

```
public class Person {

    private String firstname;
    private String surname;
    private String email;

    //Contructor to initialize Person object
    public Person(String firstname, String surname, String email){
        this.firstname = firstname;
        this.surname = surname;
        this.email = email;
    }

    //getter methods
    public String getfirstname(){
        return firstname;
    }

    public String getsurname(){
        return surname;
    }
```

```
        public String getemail(){
            return email;
        }



        //method to print person informations
        public void printperson(){
            System.out.println("Full Name: "+ firstname +" "+ surname);
            System.out.println("Email: "+ email);
        }

}
```

Ticket.java

```
    import java.io.File;    //Import the File class
    import java.io.FileWriter;    //Import the filewriter class
    import java.io.IOException;    //Import the IOException class to handle errors

    public class Ticket {
        private char row;
        private int seat;
        public double price;
        private Person person;

        //Contructor to initialize Ticket object
        public Ticket(char row, int seat, double price, Person person) {
            this.row = row;
            this.seat = seat;
            this.price = price;
            this.person = person;
        }
        //Getter methods
        public char getRow() {
            return row;
        }

        public int getSeat() {
            return seat;
        }

        public double getPrice() {
            return price;
        }

        public Person getPerson() {
            return person;
        }

        //Method to print ticket informations
        public void printInfo() {
            System.out.println();
            System.out.println("Row: " + row + "\t Seat: " + seat);
            System.out.println("Price:  £" + price );
            System.out.println("Personal Details -");
            person.printperson();       //Method in the Person class to print person details
        }


        //Method to save ticket information to files
        public void save(){
            String FileName = String.valueOf(row) + String.valueOf(seat) + ".txt";
//Constructing File name
        File myObj = new File(FileName);        //Creating a File object

        try {
            FileWriter myWriter = new FileWriter(FileName);            //Creating
FileWriter object to write to the File
            myWriter.write("Row: "+ row + "\t Seat: " + seat + "\n");
            myWriter.write("Price:  £" + price + "\n");
            myWriter.write("Personal Details - "+ "\n");
            myWriter.write("Full Name: "+ person.getfirstname() + "" +
person.getsurname() + "\n");
            myWriter.write("Email: " + person.getemail() + "\n");
            myWriter.close();
            System.out.println("Ticket information saved to " + FileName);
        } catch (IOException e) {
            System.out.println("An error occurred while saving ticket
Information! ");
            e.printStackTrace();       //Return some details about error
        }
    }

}
```

<<END>>