TITLE PAGE

Course: CS1073

Section: FR03B

Assignment number: 5

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a) Graphics.java:

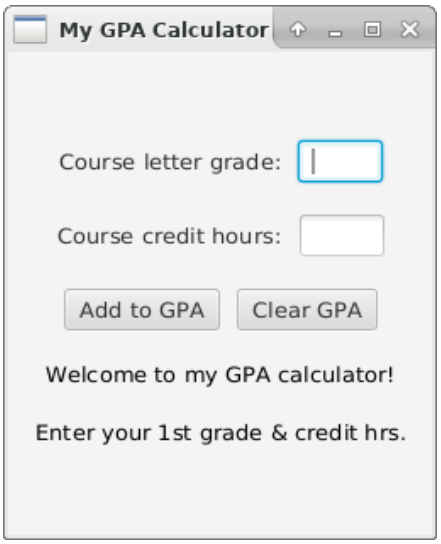
```
/**
 This class represents a gpa calculator.
 @author Zohaib Khan 3740572.
*/
import javafx.application.Application;
import javafx.stage.Stage;
import javafx.scene.Scene;
import javafx.scene.control.Label;
import javafx.scene.control.TextField;
import javafx.scene.control.Button;
import javafx.scene.text.Text;
import javafx.scene.layout.FlowPane;
import javafx.geometry.Pos;
import javafx.event.ActionEvent;
import java.text.NumberFormat;

public class Graphics extends Application {
   private TextField letterField;
   private TextField letterField2;
   private Text pointsResult;
   private Text gpaResult;
   private double totalPoints = 0;
   private int totalCreditHours = 0;
   private double points = 0;
   private double gpa = 0;

   public void start (Stage primaryStage) {
      primaryStage.setTitle ("My GPA Calculator");
      Label fieldLabel = new Label ("Course letter grade:");
      Label fieldLabel2 = new Label ("Course credit hours:");

      letterField = new TextField ();
      letterField2 = new TextField ();

      letterField.setPrefWidth (50);
      letterField2.setPrefWidth (50);

      letterField.setOnAction(this::addRequest);
      letterField2.setOnAction(this::addRequest);

      Button addButton = new Button ("Add to GPA");
      Button clearButton = new Button ("Clear GPA");

      addButton.setOnAction (this::addRequest);
      clearButton.setOnAction (this::clearRequest);

      pointsResult = new Text ("Welcome to my GPA calculator!");
```

```
   gpaResult = new Text ("Enter your 1st grade & credit hrs.");

   FlowPane pane = new FlowPane (fieldLabel, letterField,
                                 fieldLabel2, letterField2,
                                 addButton, clearButton,
                                 pointsResult, gpaResult);

   pane.setAlignment(Pos.CENTER);
   // pane.setStyle("-fx-background-color:palevioletred");
   pane.setHgap (10);
   pane.setVgap (20);

   Scene scene = new Scene (pane, 250, 300);
   primaryStage.setScene (scene);
   primaryStage.show ();

}

public void addRequest (ActionEvent event) {
   String grade = letterField.getText();
   int creditHours = Integer.parseInt(letterField2.getText());

   NumberFormat formatter = NumberFormat.getNumberInstance();
   formatter.setMaximumFractionDigits(1);
   formatter.setMinimumFractionDigits(1);

   switch (grade) {
      case "A+": points = Double.parseDouble(formatter.format
                                          (4.3*creditHours));
                 pointsResult.setText ("Points for this course: " +
                                       formatter.format(points));
                 totalPoints += points;
                 totalCreditHours += creditHours;
                 break;

      case "A": points Double.parseDouble(formatter.format
                                        (4.0*creditHours));
                totalPoints += points;
                pointsResult.setText ("Points for this course: " +
                                      formatter.format(points));
                totalCreditHours += creditHours;
                break;

      case "A-": points = Double.parseDouble(formatter.format
                                          (3.7*creditHours));
                 totalPoints += points;
                 pointsResult.setText ("Points for this course: " +
                                       formatter.format(points));
                 totalCreditHours += creditHours;
                 break;
```

```
case "B+": points = Double.parseDouble(formatter.format
                                    (3.3*creditHours));
           totalPoints += points;
           pointsResult.setText ("Points for this course: " +
                                 formatter.format(points));
           totalCreditHours += creditHours;
           break;

case "B": points = Double.parseDouble(formatter.format
                                    (3.0*creditHours));
          totalPoints += points;
          pointsResult.setText ("Points for this course: " +
                                formatter.format(points));
          totalCreditHours += creditHours;
          break;

case "B-": points = Double.parseDouble(formatter.format
                                    (2.7*creditHours));
           totalPoints += points;
           pointsResult.setText ("Points for this course: " +
                                 formatter.format(points));
           totalCreditHours += creditHours;
           break;

case "C+": points = Double.parseDouble(formatter.format
                                    (2.3*creditHours));
           totalPoints += points;
           pointsResult.setText ("Points for this course: " +
                                 formatter.format(points));
           totalCreditHours += creditHours;
           break;

case "C": points = Double.parseDouble(formatter.format
                                    (2.0*creditHours));
          totalPoints += points;
          pointsResult.setText ("Points for this course: " +
                                formatter.format(points));
          totalCreditHours += creditHours;
           break;

case "D": points = Double.parseDouble(formatter.format
                                    (1.0*creditHours));
          totalPoints += points;
          pointsResult.setText ("Points for this course: " +
                                formatter.format(points));
                totalCreditHours += creditHours;
                break;
```

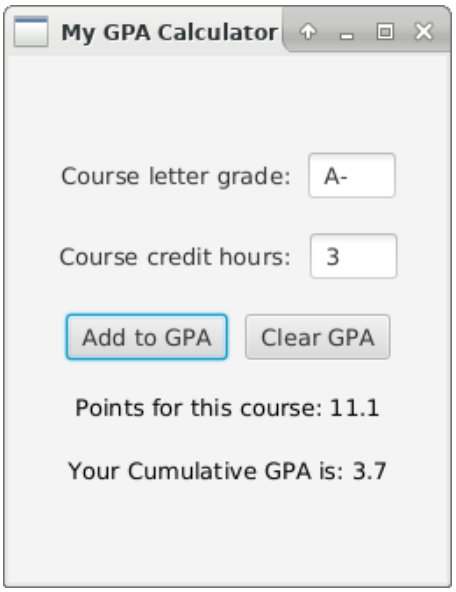
```
        case "F": points = Double.parseDouble(formatter.format
                                        (0.0*creditHours));
                  totalPoints += points;
                  pointsResult.setText ("Points for this course: " +
                                        formatter.format(points));
                  totalCreditHours += creditHours;
                  break;

        case "WF": points = Double.parseDouble(formatter.format
                                        (0.0*creditHours));
                  totalPoints += points;
                  pointsResult.setText ("Points for this course: " +
                                        formatter.format(points));

                  totalCreditHours += creditHours;
                  break;

        default: pointsResult.setText ("Invalid grade - GPA not
                                        changed.");
      }

      gpaResult.setText("Your Cumulative GPA is: " +
                formatter.format(totalPoints/totalCreditHours));
   }

   public void clearRequest (ActionEvent event) {
      pointsResult.setText ("Total points are reset");
      letterField.setText("");
      letterField2.setText("");
      gpaResult.setText("Enter your 1st grade & credit hrs.");
      totalPoints = 0;
      totalCreditHours = 0;
   }

}
```

B)



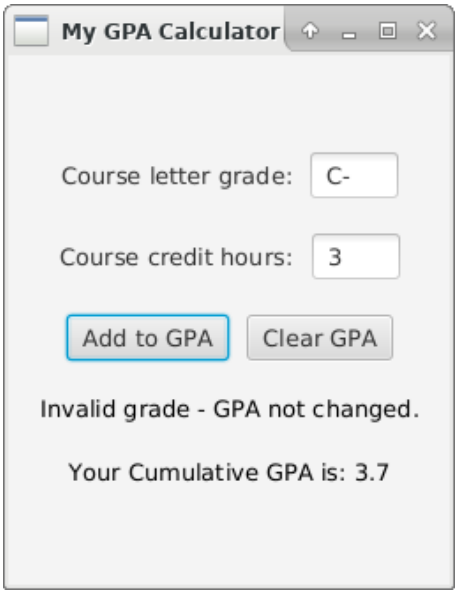
As5_Q1_Output1.png:

GPA calculator before any user input.



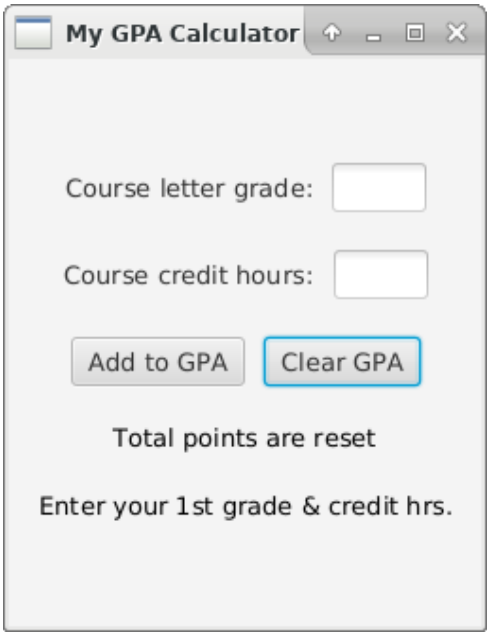
As5_Q1_Output2.png:

GPA calculator output after adding all of John Doe's information.



As5_Q1_Output3.png:

GPA calculator output after invalid grade entry.



As5_Q1_Output4.png:

GPA calculator output after pressing “Clear GPA” button.

c) ResortBooking.java:

```
/**
 This abstract class represents a resort booking.
 @author Zohaib Khan 3740572.
*/
public abstract class ResortBooking {

   /**
    The guest's name.
   */
   private String guestName;

   /**
    The number of meals the guest plans on taking in à la Carte.
   */
   private int numMeals;

   /**
    The number of spas the guest plans on taking.
   */
   private int numSpas;

   /**
    This constructor method initialises the instance variables.
    @param name the name of the guest.
    @numMeals the number of meals the guest will eat at à la Carte.
    @numSpas the number of spas the guest plans on taking.
   */
   public ResortBooking (String guestName, int numMeals, int numSpas){
      this.guestName = guestName;
      this.numMeals = numMeals;
      this.numSpas = numSpas;

   }

   /**
    This method gets the number of meals the guest plans on taking in
    à la Carte.
    @return the number of meals the guest on taking in à la Carte.
   */
   public int getMeals (){
      return numMeals;
   }
```

```
   /**
    The method gets the number of spas the guest plans on taking.
    @return the number of spas the guest plans on taking.
   */
   public int getSpas (){
      return numSpas;
   }

   /**
    This abstract method returns the total amount the guest has to
    pay.
   */
   public abstract double getCost ();
}
```

TouristPackageBooking.java:

```
/**
 This sub-class represents a tourist package booking.
 @author Zohaib Khan 3740572.
*/

public class TouristPackageBooking extends ResortBooking {

   /**
    This constructor method initialises the instance variables.
    @param name the name of the guest.
    @numMeals the number of meals the guest will eat at à la Carte.
    @numSpas the number of spas the guest plans on taking.
   */
   public TouristPackageBooking (String name, int numMeals, int
                                 numSpas){
      super (name, numMeals, numSpas);
   }

   /**
    This method calculates the total price that the guest has to pay.
    @return the total price that the guest has to pay.
   */

   public double getCost (){

      if(super.getSpas() == 1){
         return 1475 + (35* super.getMeals()) + (125);
      }
      else if(super.getSpas() > 1){
         return 1475 + (35 * super.getMeals()) + (125) +
                (100*(super.getSpas() - 1));
      }
      else {
         return 1475 + (35 * super.getMeals());
      }
   }

   /**
    This method returns the building number that the guest is
    assigned.
    @return the building number that the guest is assigned.
   */
   public int getBuilding (){
      return 2 + (int)(Math.random() * 4);
   }

}
```

ElitePackageBooking.java:

```
/**
 This sub-class represents the elite package booking.
 @author Zohaib Khan 3740572.
*/

public class ElitePackageBooking extends ResortBooking {

   /**
    This constructor method initialises the instance variables.
    @param name the name of the guest.
    @numMeals the number of meals the guest will eat at à la Carte.
    @numSpas the number of spas the guest plans on taking.
   */

   public ElitePackageBooking (String name, int numMeals, int
                               numSpas){
      super (name, numMeals, numSpas);
   }

   /**
    This method calculates the total price that the guest has to pay.
    @return the total price that the guest has to pay.
   */
   public double getCost (){
      if(super.getMeals() > 3){
         return 2250 + (75* super.getSpas()) + ((super.getMeals() - 3)
                * 35);
      }
      else{
         return 2250 + (75 * super.getSpas());
      }
   }

   /**
    This method returns the building number that the guest is
    assigned.
    @return the building number that the guest is assigned.
   */
   public int getBuilding (){
      return 1;
   }
}
```

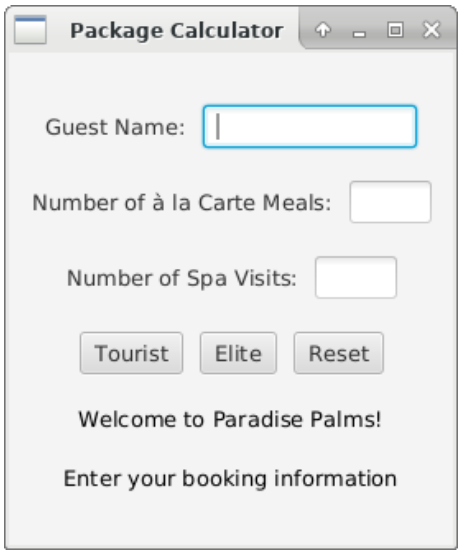
d) Booking.java:

```
/**
 This class represents a resort booking application.
 @author Zohaib Khan 3740572.
*/
import javafx.application.Application;
import javafx.stage.Stage;
import javafx.scene.Scene;
import javafx.scene.control.Label;
import javafx.scene.control.TextField;
import javafx.scene.control.Button;
import javafx.scene.text.Text;
import javafx.scene.layout.FlowPane;
import javafx.geometry.Pos;
import javafx.event.ActionEvent;
import java.text.NumberFormat;

public class Booking extends Application {
   private TextField letterField;
   private TextField letterField2;
   private TextField letterField3;

   private Text buildingResult;
   private Text priceResult;

   public void start (Stage primaryStage) {

      primaryStage.setTitle ("Package Calculator");

      Label fieldLabel = new Label ("Guest Name:");
      Label fieldLabel2 = new Label ("Number of à la Carte Meals:");
      Label fieldLabel3 = new Label ("Number of Spa Visits:");

      letterField = new TextField ();
      letterField2 = new TextField ();
      letterField3 = new TextField ();

      letterField.setPrefWidth (130);
      letterField2.setPrefWidth (50);
      letterField3.setPrefWidth (50);

      letterField.setOnAction(this::touristRequest);
      letterField2.setOnAction(this::touristRequest);
      letterField3.setOnAction(this::touristRequest);

      letterField.setOnAction(this::eliteRequest);
      letterField2.setOnAction(this::eliteRequest);
      letterField3.setOnAction(this::eliteRequest);
```

```
   Button touristButton = new Button ("Tourist");
   Button eliteButton = new Button ("Elite");
   Button resetButton = new Button ("Reset");


   touristButton.setOnAction (this::touristRequest);
   eliteButton.setOnAction (this::eliteRequest);
   resetButton.setOnAction (this::resetRequest);

   buildingResult =
   new Text ("Welcome to Paradise Palms!");

   priceResult =
   new Text ("Enter your booking information");

   //start method continued on the next slide...

   FlowPane pane = new FlowPane
   (fieldLabel, letterField, fieldLabel2, letterField2,
    fieldLabel3, letterField3, touristButton, eliteButton,
    resetButton, buildingResult, priceResult);

   pane.setAlignment(Pos.CENTER);

   pane.setHgap (10);
   pane.setVgap (20);
   Scene scene = new Scene (pane, 270, 300);
   primaryStage.setScene (scene);
   primaryStage.show ();

}

public void touristRequest (ActionEvent event) {
   String name = letterField.getText();
   int meals = Integer.parseInt(letterField2.getText());
   int spas = Integer.parseInt(letterField3.getText());

   NumberFormat formatter = NumberFormat.getCurrencyInstance();

   TouristPackageBooking tourist =
   new TouristPackageBooking (name, meals, spas);

   buildingResult.setText("Building Number: " +
                          tourist.getBuilding());

   priceResult.setText("Total price for this package: " +
                       formatter.format(tourist.getCost()));
}


public void eliteRequest (ActionEvent event) {
   String name = letterField.getText();
```

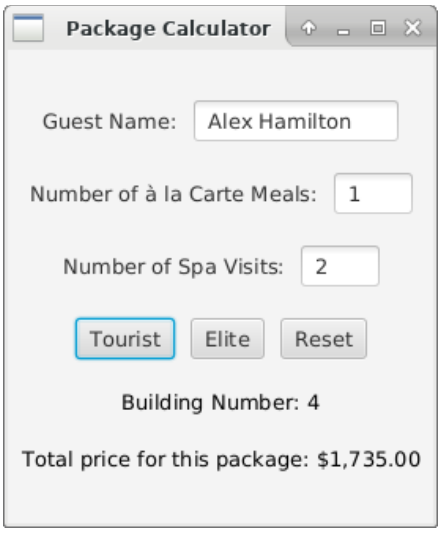
```
      int meals = Integer.parseInt(letterField2.getText());
      int spas = Integer.parseInt(letterField3.getText());

      NumberFormat formatter = NumberFormat.getCurrencyInstance();

      ElitePackageBooking elite =
      new ElitePackageBooking (name, meals, spas);

      buildingResult.setText("Building Number: " +
                             elite.getBuilding());

      priceResult.setText("Total price for this package: " +
                          formatter.format(elite.getCost()));

   }

   public void resetRequest (ActionEvent event) {
      buildingResult.setText ("Welcome to Paradise Palms!");
      letterField.setText("");
      letterField2.setText("");
      letterField3.setText("");
      priceResult.setText("Enter your booking information");
   }
} //end class
```

E)



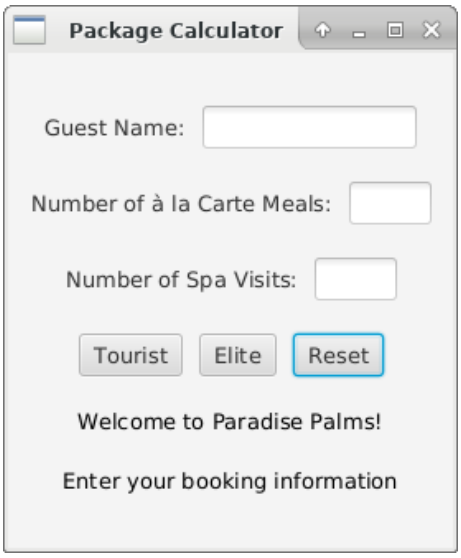
As5_Q2_Output1.png:

Package Calculator before any user input.



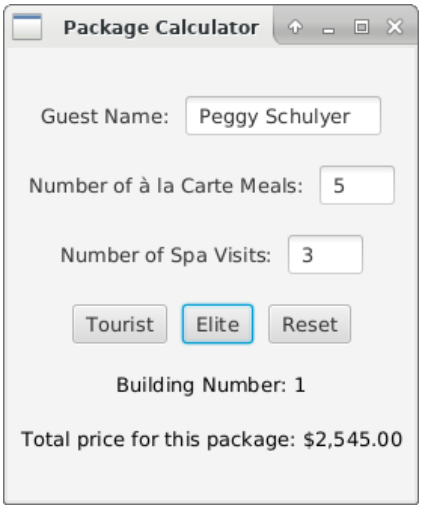
As5_Q2_Output2.png:

Package Calculator output using tourist package.



As5_Q2_Output3.png:

Package Calculator output after pressing the “Reset” button.



As5_Q2_Output4.png:

Package Calculator output using the elite package.