```
/*
    I will mark ** if penalty imposed

    1. No images displayed from my sample testing images
        (-0.5, non refundable!!)
    2. Class Country (-0.5)
        instance variables
        constructors
        meaningful methods
        toString  method
    3. Main Frame class (Total -2 mark)
        : GUI (-0.5)
        : ranking (-0.5, if reverse -0.2)
        : event driven (-1)  ==> ranking issue on button -0.3 **
    4. Driven of tasks (Total -2 marks)
        : Frame: not able to close -0.2
        : Rank: should be clicked one by one -0.2
        :  button label should be extracted from toString -0.3 **

    Other penalty
    : compile time errors (-3.5)
    : Not able to execute due to image file names, for example
          not absolute path, stored in your directory,
          getResource.getClass issue, etc (non refundable) -0.5
    : no declaration (-0.3)
    : run time crashed (-1)

    6.4 / 7
    Marks allocated subject to demo
    - No demo -2.5
    - Demo no images -1
*/

// Full Name: Eldwin Koh Jun Hao
// Full Time
// Tutorial Group: T04
// JDK version: 11.0.20
// Declaration: The assignment is my own work and I have not passed my
// program to my friends.I am willing to accept whatever penalty given to me.
// File name: EldwinKoh_131_A3.java

import javax.swing.JFrame;
import javax.swing.JButton;
import javax.swing.Icon;
import javax.swing.ImageIcon;
import javax.swing.JOptionPane;

import java.awt.event.ActionListener;
import java.awt.event.ActionEvent;
import java.awt. *;
import java.util.*;


class Olympic
{
    private static final int NO = 5;
    private String country;
    private double[] score = new double[NO];
    private int rank;

//  Default Constructor
    public Olympic(String country)
    {
        this.country = country;
        processScores();
    }
```

```
67
68          // Copy Constructor
69          public Olympic(Olympic oly)
70          {
71              this.country = oly.country;
72          }
73
74      //  generate some scores (upon 100) for each judge
75          public void processScores()
76          {
77              for (int i = 0; i < NO; i++)
78              {
79                  score[i] = (double)(Math.random() * 100.00);
80              }
81          }
82
83          //  calculate the sum of the elements in the score array
84          public double totalScores()
85          {
86              double sum = 0.0;
87
88              for (double s : score) {
89                  sum += s;
90              }
91
92              return sum;
93          }
94
95          // Mutator methods
96          public void set(int rank)
97          {
98              this.rank = rank;
99          }
100
101         // Accessor methods
102         public int getRank()
103         {
104             return rank;
105         }
106
107         public String getName()
108         {
109             return country;
110         }
111
112         public double[] getScoreArray()
113         {
114             return score;
115         }
116
117         // toString method
118         public String toString()
119         {
120             return String.format("Rank %d: %s(%.2f)", getRank(), getName(),
    totalScores());
121         }
122     }
123
124     class OlympicFrame extends JFrame implements ActionListener
125     {
126         private JButton[] jbArray;
127
128         //  String of Array consisting countries
129         private final String[] countryArray = {"USA", "SPAIN", "CHINA", "JAPAN",
    "ITALY",
130                                                "GERMANY", "FRANCE", "BRAZIL",
```

```
130     "NETHERLAND",
131                                                 "POLAND", "RUSSIA", "UKRAINE"};
132         private ArrayList<Olympic> alist = new ArrayList<Olympic>();
133 
134         public OlympicFrame()
135         {
136             super ("Olympic 2023");
137             setLayout(new GridLayout(4, 3));    //Assign GridLayout to 4 columns
        3 per row
138 
139             constructAList();   //Call upon method to construct Country in
        contryArray
140 
141             for (int x = 0; x < alist.size(); x++)
142             {
143                 double score = getScores(alist,alist.get(x).getName());
144                 int rank = getRank(alist.get(x).getScoreArray(),score);
145                 String country = getCountry(alist,rank);
146                 System.out.println(country);
147             }
148 
149             // Initialize the array
150             jbArray = new JButton[countryArray.length];
151 
152             // Initialize each of the buttons with imageIcon and name
153             for (int x = 0; x < jbArray.length; x++)
154             {
155                 jbArray[x] = new JButton(alist.get(x).getName());
156                 Icon image = new ImageIcon(String.valueOf(x + 1) + ".jpg");
157                 jbArray[x].setIcon(image);
158             }
159 
160             // Add buttons to frame
161             for (JButton jb : jbArray)
162                 add(jb);
163 
164             // Register the event to each buttons
165             for (JButton jb : jbArray)
166                 jb.addActionListener(this);
167         }
168 
169         private void constructAList()
170         {
171             for (int i = 0; i < countryArray.length; i++)
172             {
173                 alist.add(new Olympic(countryArray[i]));    //Create new Olympic
        Object with String country name
174             }
175         }
176 
177         // Returns the country rank
178         private int getRank(double[] scoreArray, double d)
179         {
180             int rank = 1;  // Start the rank from 1
181 
182             for (int i = 0; i < scoreArray.length; i++) {
183                 if (d > scoreArray[i]) {
184                     rank += 1;
185                 }
186             }
187             return rank;
188         }
189 
190         // Constructs and return a string that you can display this string in the
        panel
191         private String getFinalRanking()
```

```
192         {
193             Collections.sort(alist,
        Comparator.comparingDouble(Olympic::totalScores).reversed());   //Return
        country rank from highest score to lowest
194 
195             int ranking = 1;
196 
197             for (Olympic oly : alist) {
198                 oly.set(ranking++);
199             }
200 
201             StringBuilder str = new StringBuilder("FINAL RANKING\n");
202 
203             for (Olympic oly : alist) {
204                 str.append(oly.toString()).append("\n");
205             }
206             return str.toString();
207         }
208 
209         // Returns the country name that has a rank n
210         private String getCountry(ArrayList<Olympic> alist, int n)
211         {
212             String country = "";
213 
214             for (int i = 0; i < alist.size(); i++)
215             {
216                 if(alist.get(i).getRank() == n)
217                 {
218                     country = alist.get(i).getName();
219                 }
220             }
221 
222             return country;
223         }
224 
225         // Returns the total scores of a country
226         private double getScores(ArrayList<Olympic> alist, String name)
227         {
228             double totalScore = 0.0;
229 
230             for(int i = 0; i < alist.size(); i++)
231             {
232                 if(alist.get(i).getName().equals(name))
233                 {
234                     alist.get(i).processScores();
235                     totalScore = alist.get(i).totalScores();
236                 }
237             }
238             return totalScore;
239         }
240 
241         @Override
242         public void actionPerformed (ActionEvent e)
243         {
244             for (int i = 0; i < jbArray.length; i++) {
245                 if (e.getSource() == jbArray[i]) {
246                     int rank = alist.get(i).getRank();
247                     String country = alist.get(i).getName();
248 
249                     // Update the text of the clicked button
250                     jbArray[i].setText(country + " ==> Rank: " + rank);
251 
252                     ImageIcon trophy = new ImageIcon("trophy.jpg");
253                     Image image = trophy.getImage();
254                     Image newTrophy = image.getScaledInstance(50, 70,
        java.awt.Image.SCALE_SMOOTH);
```

```
255                     trophy = new ImageIcon(newTrophy);
256
257                     // Note we display an image in JOptionPane
258                     JOptionPane.showMessageDialog(null, getFinalRanking(), "Olym
    2023",
259                             JOptionPane.PLAIN_MESSAGE, trophy);
260                 }
261             }
262
263         }
264     }
265
266     public class EldwinKoh_131_A3 {
267         public static void main(String[] args) {
268             OlympicFrame aFrame = new OlympicFrame();
269             aFrame.setSize (900, 700);
270             aFrame.setVisible (true);
271             aFrame.setDefaultCloseOperation (JFrame.EXIT_ON_CLOSE);
272         }
273     }
274
```