One Armed Bandit

Project ID: 5984

Forked from an inaccessible project.

Updated name of startButton in PrimaryController.java to match README
Jonas Solhaug Kaad authored 1 week ago

Name	Last commit	Last update
assets	One Armed Bandit exercise	2 weeks ago
src/main	Updated name of startButton in PrimaryCon...	1 week ago
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readme.md

One Armed Bandit

The term "one-armed bandit" is slang for the old-fashioned machines, where you could stand for hours, stuffing money in with one hand and pulling a handle with the other. In this task, such a bandit will be implemented, but without the betting and winning part. A possible layout is shown below:

The system consists of:

- 3 `ImageViews` for changing sequences of images.
- 3 `Buttons` to stop the sequences individually.
- 1 start `Button`, which starts the sequences in all 3 image fields.
- 1 `Label`, which shows the result after all 3 sequences are finished

The easiest choice would be to use an implementation of javafx.animation.AnimationTimer, but that is forbidden in this task, as it is Threads in the context of JavaFX that we are training.

Resource files: contains 10 images of fruit. The images are 90*90 pixels.

Task 1

Define the user interface of the application. It is recommended to use SceneBuilder.

- Create 3 `ImageViews`
  - Name them `spin1`, `spin2`, `spin3`.
- Create 3 `Buttons` to stop the image sequence in each `ImageView`

- Create 1 `Button` to start the image sequences in all `ImageViews`
  - Name it `startButton` .
- Create a `Label` to display the result after all the image sequences are finished.
  - Name it `resultLabel` .

In the `PrimaryController` :

- Declare an Array of type `Image` , as a `javafx.scene.image.Image` , as follows `Image[] images`
- Declare 3 variables of type `Thread` as follows: `Thread t1, t2, t3;` :
- Declare a variable `spinsALive` of type `int`

Implement the `initialize()` method:

- Initialize the array declared earlier. The size of the array should be 10, as follows: `images= new Image[10]` ;
- Use a for loop and load the 10 supplied images into this array.
- Each image can be inserted into the array with the following statement `images[i]=new Image(getClass().getResource(filename).toURI().toString());`
  - ***Hint:*** *Remember to declare the filename, which is always "fruits" + some number + ".png"*
  - (Remember to catch relevant exceptions, using a `try-catch`)
- Outside the for loop, set any 3 images in the 3 `ImageViews` as follows: `spin1.setImage(images[1])` ;
- Disable the three stop buttons.
  - ***Hint:*** *You can use the `setDisable()` method*

Task 2

- A synchronized method `aliveCount` is already implemented. but it is commented. Uncomment it and study the code.

- An inner class `public class BanditRunnable implements Runnable` is already implemented, but it is commented. Uncomment it and study the code

Create an `ActionHandler` for the Start button:

- Create 3 instances of `BanditRunnable` . The constructor takes 3 arguments. Pass the appropriate arguments for each instance. (Remember to use all 3 `ImageViews`) ***Hint:*** *Different waiting times must be inserted in the three Threads between each image switch. For example 120, 100 and 140 milliseconds*
- Initialize the 3 threads you created earlier and pass each thread a different instance of `BanditRunnable` .
- Set each thread as a Daemon thread as follows: `t1.setDaemon(true)` .
- Start/execute each thread.
- Disable the Start button.
- Enable Stop buttons for each `ImageView` .
- Change the label to `"Running..."`

Create an `ActionHandler` for the Stop buttons:

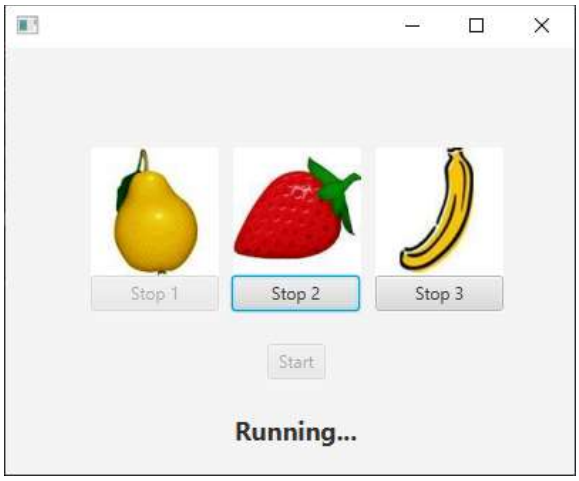
- Each button stops one sequence (e.g. with an interrupt of the corresponding Thread).
- And disable the stop button which called the `ActionHandler` .
  - *i.e. if the 2nd button called the ``ActionHandler , the 2nd ImageView` should be stopped (by interrupting the thread) and the 2nd button should be disabled.*

In the same `ActionHandler` , when all 3 Threads are stopped:

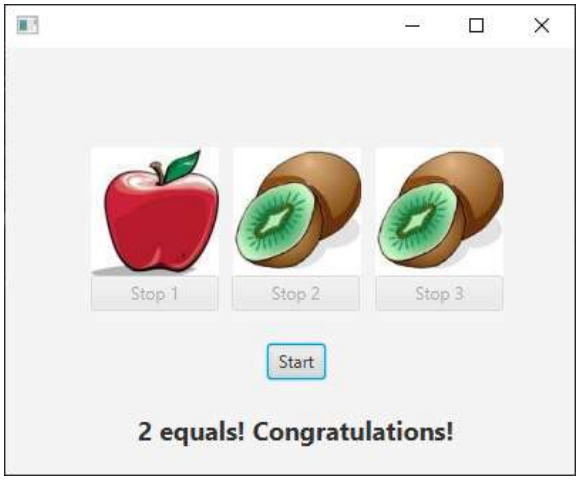
- Enable the Start button.

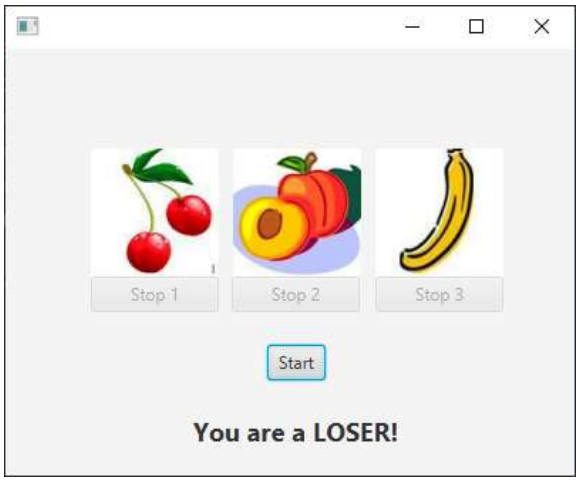
Hint: *You can use `event.getSource()` , to determine which button called the `ActionHandler`*

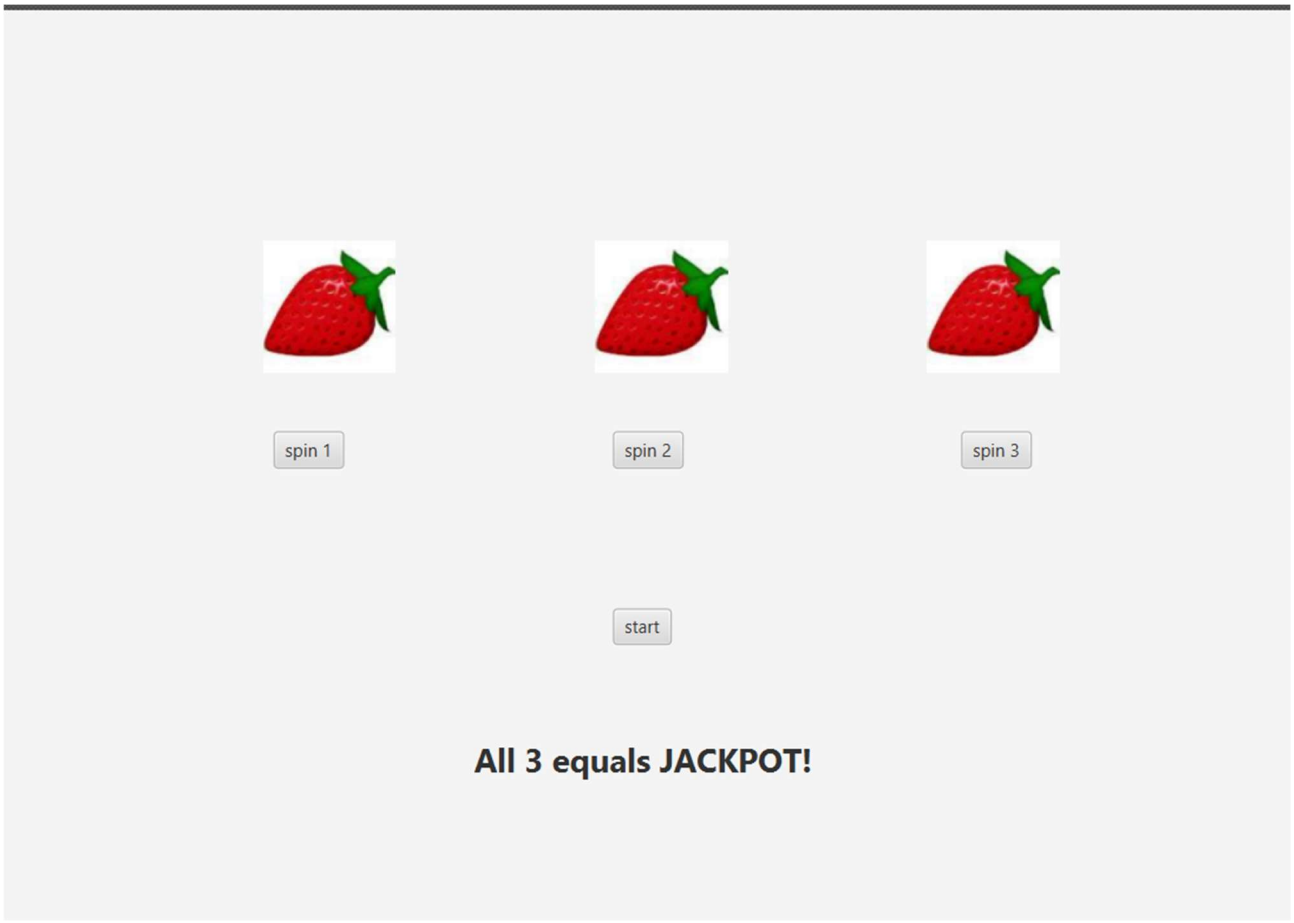
For reference here is an example of how the UI could look while running:



For reference here is an example of how the UI could look for all 3 results:



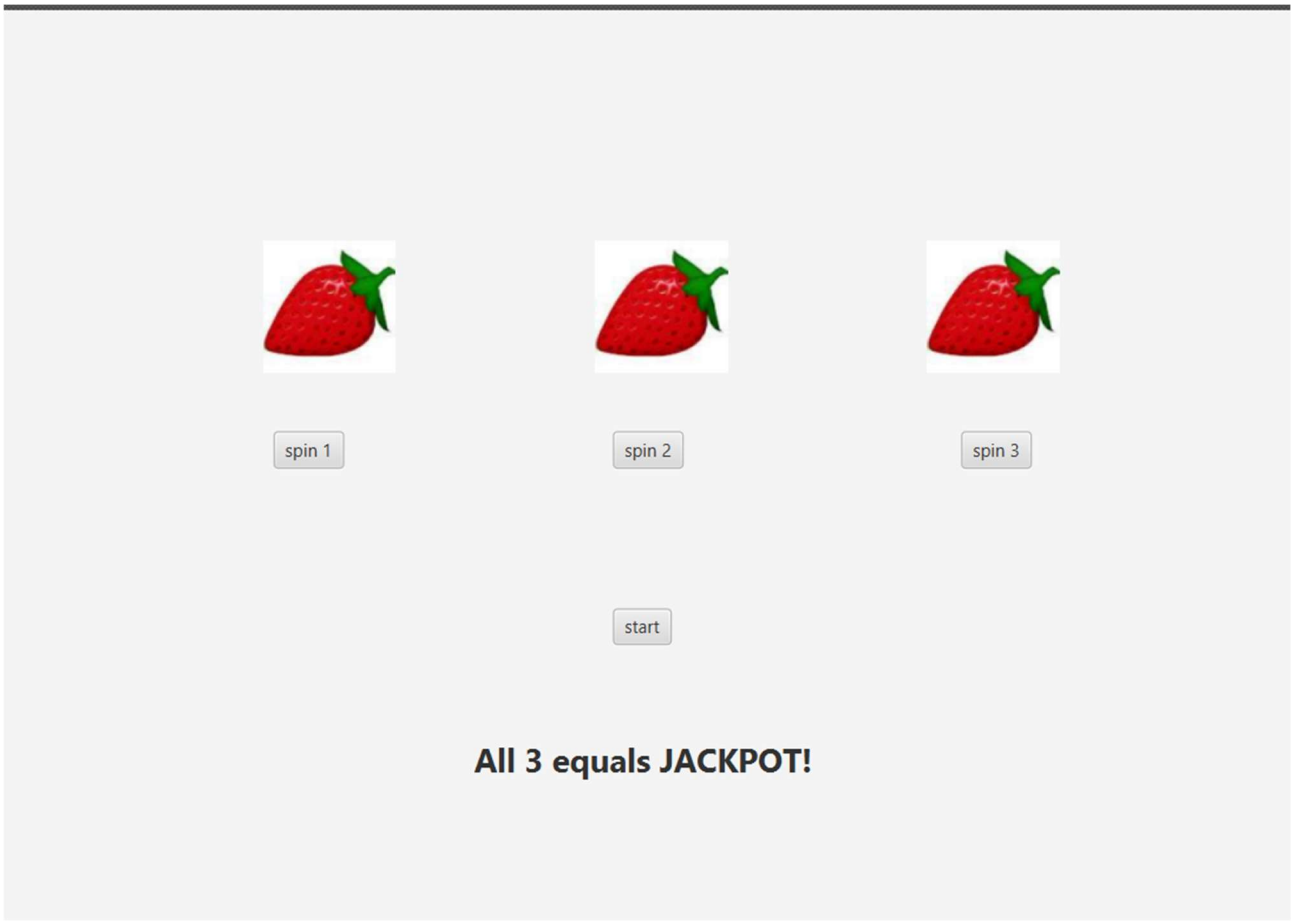




Ovenpå, kan det ses at jeg har lavet de forskellige komponenter for JavaFX i SceneBuilder.

I kan ignorere størrelsen på scenen, det vigtigste er bare at indsætte de rigtige knapper, figurer og labeler med tekst og id.

```
69 //Her er Opgave 2 løst, hvor kommanterene fra toppen
       og bunden er blevet fjernet.
```



Ovenpå, kan det ses at jeg har lavet de forskellige komponenter for JavaFX i SceneBuilder.

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```java
package vop;


import javafx.application.Platform;
import javafx.event.ActionEvent;
import javafx.fxml.FXML;
import javafx.scene.control.Button;
import javafx.scene.control.Label;
import javafx.scene.image.Image;
import javafx.scene.image.ImageView;

import java.io.FileNotFoundException;
import java.io.IOException;
import java.net.URISyntaxException;

public class PrimaryController {
    //Hele tegningen og figuropsætningen skal foregå på Scenebuilder.
    //Jeg har brugt Skeleton under View i Scenebuilder, til at få overblik over Controls, Labels og ActionEvents.
    Image[] images;
    Thread t1;
    Thread t2;
    Thread t3;
    int spinsAlive;
    @FXML
    private Label resultLabel;

    @FXML
    private ImageView spin1;

    @FXML
    private ImageView spin2;

    @FXML
    private ImageView spin3;

    @FXML
    private Button startButton;

```

```
39      @FXML
40      private Button stop1;
41
42      @FXML
43      private Button stop2;
44
45      @FXML
46      private Button stop3;
47
48
49      //Her har vi løst den anden del og sidste del af
   Opgave 1.
50      @FXML
51      public void initialize() {
52          images = new Image[10];
53          try{
54              for(int i = 0; i < images.length; i++){
55                  images[i]=new Image(getClass().
   getResource("fruits" + i + ".png").toURI().toString
   ());
56              }
57              spin1.setImage(images[1]);
58              spin2.setImage(images[2]);
59              spin3.setImage(images[3]);
60              stop1.setDisable(true);
61              stop2.setDisable(true);
62              stop3.setDisable(true);
63          }catch (URISyntaxException e){
64              System.out.println("Images not found");
65          }
66
67      }
68
69      //Her er Opgave 2 løst, hvor kommanterene fra
   toppen og bunden er blevet fjernet.
70      private synchronized void aliveCount(boolean up
   ) {
71          if (up) {
72              spinsAlive++;
73          } else {
74              spinsAlive--;
```

```
 75          }
 76          //Kode herværket for Opgave 2 er lavet her.
 77          System.out.println("Alive: " + spinsAlive);
 78          if (spinsAlive == 0) {
 79              startButton.setDisable(false);
 80              Platform.runLater(new Runnable() {
 81                  @Override
 82                  public void run() {
 83                      if (spin1.getImage() == spin2.
    getImage() && spin1.getImage() == spin3.getImage
    ()) {
 84                          resultLabel.setText("All 3
    equals! JACKPOT!");
 85                      } else if (spin1.getImage() ==
    spin2.getImage()
 86                              || spin1.getImage() ==
    spin3.getImage()
 87                              || spin2.getImage() ==
    spin3.getImage()) {
 88                          resultLabel.setText("2
    equals! Congratulations!");
 89                      } else {
 90                          resultLabel.setText("You are
     a LOSER!");
 91
 92                      }
 93                  }
 94              });
 95          }
 96      }
 97      //Det her er en af de sidste dele af Opgaven.
 98      //Vi har lavet Threads som der blev snakket i
    Opgave 2.
 99      @FXML
100      void startButton(ActionEvent event) {
101          BanditRunnable runnable1 = new
    BanditRunnable(1,100,spin1);
102          BanditRunnable runnable2 = new
    BanditRunnable(2,120,spin2);
103          BanditRunnable runnable3 = new
    BanditRunnable(3,140,spin3);
```

```
104         t1 = new Thread(runnable1);
105         t2 = new Thread(runnable2);
106         t3 = new Thread(runnable3);
107         t1.setDaemon(true);
108         t2.setDaemon(true);
109         t3.setDaemon(true);
110         t1.start();
111         t2.start();
112         t3.start();
113         startButton.setDisable(true);
114         stop1.setDisable(false);
115         stop2.setDisable(false);
116         stop3.setDisable(false);
117         resultLabel.setText("Running....");
118 
119     }
120 
121     //Vi har reduceret Kode herhenne, hvor vi bare
    lavet kode til at stoppe 1 billede med den samme
    knap mens de andre fortsætter.
122     @FXML
123     void stop1method(ActionEvent event) {
124         if(event.getSource()==stop1){
125             stop1.setDisable(true);
126             t1.interrupt();
127         }else if(event.getSource()==stop2){
128             stop2.setDisable(true);
129             t2.interrupt();
130         }else if(event.getSource()==stop3){
131             stop3.setDisable(true);
132             t3.interrupt();
133         }
134         if(stop1.isDisabled()&stop2.isDisabled()&
    stop3.isDisabled()){
135             startButton.setDisable(false);
136         }
137 
138     }
139 
140     //Kodet under stop1method er brugt til at undgå
    skrivning af lang kode i stop2method og stop3method.
```

```
141     @FXML
142     void stop2method(ActionEvent event) {
143 
144     }
145 
146     @FXML
147     void stop3method(ActionEvent event) {
148 
149     }
150 
151 
152 
153 
154     public class BanditRunnable implements Runnable
     {
155 
156         private int i;
157         private long sleepTime;
158         private boolean running;
159         private ImageView iw;
160 
161         public BanditRunnable(int i, long sleepTime
    , ImageView iw) {
162             this.i = i;
163             this.sleepTime = sleepTime;
164             this.iw = iw;
165         }
166 
167         @Override
168         public void run() {
169             running = true;
170             aliveCount(true);
171             System.out.println("Thread started: " +
    Thread.currentThread());
172 
173             while (running) {
174                 Platform.runLater(new Runnable() {
175                     @Override
176                     public void run() {
177 
178                         iw.setImage(images[i]);
```

```
179                         i = (i + 1) % images.length;
180                     }
181                 });
182                 synchronized (this) {
183                     try {
184                         //Thread.sleep(sleepTime);
185                         wait(sleepTime);
186                     } catch (InterruptedException ex
    ) {
187                         System.out.println("
    Interrupted: " + Thread.currentThread());
188                         running = false;
189                         aliveCount(false);
190                     }
191                 }
192             }
193         }
194     }
195 
196 
197 }
198 
```