Lab03 | Introduction to Computer Science
ICSI201
Fall 2012

Preliminary--Get Help in Lab

Get your lab and project directory set up:

1. You MUST have done the expanding of the BookClasses archive and the setting of DrJava's EXTRA CLASSPATH (directed in Lab 01) for your new work to be successful. If you did not, consult a TA or neighbor for help as soon as possible.
2. Make an new, empty directory (or folder) just for CSI201/Lab03.

   Eventually, your project work MUST be uploaded to the Lab03 item of Course Content on Blackboard **in the form of exactly one (1) archive file** (a .zip or equivalent) that expands to one (1) directory (or folder) named **`Lab03`** that contains four directories (or folders) named **`Original`**, **`Crasher`**, **`BestFlight`** and **`MyPurposes`**. These 4 directories should each contain their own version of a file named **`Picture.java`**.
3. Make sure ***each*** of the 4 **`Picture.java`** files ***compiles without error. Only then, WITHOUT ANY MORE EDITING, archive up your Lab03 directory and upload it to Lab03 under Course Content on Blackboard. This will maximize your Lab03 followup grade.***

Lab Activity

(1) Work to do under `Original`

Open `Picture.java` under your BookClasses directory and immediately Save As into the `Original` directory.

Edit `Picture.java` so that it's main method contains my code below. You do not have to type the `//Purpose` comments EXCEPT for those numbered ones that you will fill in for the follow-up homework. Then save, compile, fix typos, save, compile, ..., run and observe the digital image showing the path of a projectile, a thrown ball.

```
public static void main(String[] args)
  {
     //String fileName = FileChooser.pickAFile();
     //Picture pictObj = new Picture(fileName);
     //pictObj.explore();
     Picture ballFlight = new Picture(800,600);
     //Purpose: Make a new Picture to draw the ball flight upon, and store
     //a reference to that Picture in a new variable ballFlight, so Picture
     //methods may be called on that Picture in the future.  Also, specify
     //the new Picture's width and height in Pixel units.

     double yInitVel;//Purpose:Make a variable for the initial velocity.
     double yInitPos;//Purpose:(1)YOU FILL IN!
```

```
   double yAccel;//Purpose:Make a variable for the downward acceleration.

   yAccel = 0.001; //Purpose:Specify the value of acceleration to use.
   yInitVel = -0.5;//Purpose:Specify the initial velocity in the down direction.
   yInitPos = 300.0;//Purpose:Specify the initial position in the down
                    //direction.

   double time;//Purpose:Make a variable to keep track of time.
   time = 0.0;//Purpose:Program that time starts at zero.
   while( time < 800) //Purpose: Plot images of the ball as long as time is
                      //less than the simulation period.
   {
     double xPos;//Purpose:Make a variable for calculating current x position.
     double yPos;//Purpose:(2)YOU FILL IN!
     xPos = 1.0*time;
     //Purpose:(3)YOU FILL IN!
     yPos = (0.5*yAccel*time*time) + yInitVel*time + yInitPos;
     //Purpose:(4)YOU FILL IN!
     System.out.println("xPos=" + xPos + " yPos=" + yPos);
     //Purpose:Enable you to see the current positions in numeric form.
     Pixel pix = ballFlight.getPixel((int)xPos, (int) yPos);
     //Purpose: Retrieve a Pixel near the current position, and make a variable
     //you can use to refer to it, so you can call that Pixel's methods.
     pix.setRed(0);
     //Purpose: Set that Pixel's red intensity to zero.
     pix.setGreen(0);
     //Purpose: Set that Pixel's green intensity to zero.
     pix.setBlue(0);
     //Purpose: Set that Pixel's blue intensity to zero.
     //YOU ANSWER AND FILL IN:  (5) What is the purpose of the above
     //3 executable statements taken together, based on the fact that
     //Color black consists of zero intensity in
     //all three of red, green and blue?
     time = time + 1.0;
     //Purpose:AFTER plotting the ball's position at the current time, calculate
     //and write in the time variable WHAT? (6) YOU revise or rewrite this
     //sentence to express the purpose of the time=time+1.0; statement.
   }
   ballFlight.explore();
   //Purpose:(7)YOU FILL IN!
}
```

(2) **`Crasher`** The goal is for you to adjust the values of **`yAccel`** and **`yInitVel`** so that the ball first flies nearly to the top of the **`Picture`** and then flies nearly to the bottom right corner. As you experiment with different values you ask the computer to put in these two variables, you will make the program CRASH. The first time it crashes, you will have saved your work. So, after that first time crash, move on to step (3)!

(3) **`BestFlight`** Save As your crashing **`Picture.java`** file in your **`BestFlight`** directory. Use that version to, by trial and error, and figuring out what is happening, get the ball to fly nearly to the top of the Picture and then go near the lower right corner.

When you have achieved the best flight (without crashing), move on to the next step.

(4) **`MyPurposes`** Do Save As of your best flight **`Picture.java`** file into the **`MyPurposes`** directory. Edit it to fill in, in your own words, explanations of the PURPOSES of 7 of the statements or groups of statements.

Follow-up due date: 7 days after the last Lab03 session is Tuesday, Oct 2, 11:59PM.