

Workshop 2: Start programming in Java (part 2)

Worksheet 4: Shapes with `while` statements

In this worksheet, we will revisit the loop statements in Java using the shapes file that you have used in [Workshop 1](#). In a loop, we can repeat something as well as testing for a condition.

One way to do this in Java is using *while* statements:

```
while (condition) {  
    do some stuff  
}
```

This is very similar to an *if* statement, except it is done repeatedly until the condition is NOT true anymore (this means that the condition needs to be changed within the "do some stuff" part, or you will never exit the loop).

Now, we want to be able to randomly move a circle around the canvas 10 times. The pseudo-code for one possible solution can be as follows:

```
get the width and height of the canvas  
set count = 0 currentXPos = 0 currentYPos = 0  
while (count less than 5){  
    xPos = get random number in range 0 to width  
    yPos = get random number in range 0 to height  
    currentXPos = get circle1 X position  
    currentYPos = get circle1 Y position  
    move circle1 slowly horizontally by (xPos - currentXPos)  
    move circle1 slowly vertically by (yPos - currentYPos)  
    count = count + 1  
}
```

Let's run the provided implementation (*loopy-circles.txt*) in the *shapes.zip* file that can be found in [Workshop 1](#) on Blackboard.

General Steps

1. Within JShell /open the shapes code again (*load-shapes.txt*).
2. Open (NOT /open) the file *loopy-circles.txt* in notepad++ and study the code.
3. Now /open the *loopy-circles.txt* file.
 - a. You should see the ball (circle) moving slowly 10 times (horizontally and vertically each 5 times).

The `Canvas` class has a method called `getCanvas()`. This is another way of getting the `Canvas` object. Here, we need the canvas to find its width and height.

We have also used a pre-defined class (`java.util.Random`) for getting pseudo-random numbers. Then used `nextInt(width)` function to get a pseudo-random number in range 0 to width-1. This is the same for the height.

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Tasks:

- Try changing the logic by removing the line that increments the `count` variable (at Line 22). Then run again. What is happening?
 - You will also have to force the program to stop by clicking on the close window button in the canvas. This will cause what is called an exception. Don't worry about this now. But if you want to run again you will have to `/open` the two files again. Remember to add back the code for incrementing the `count` variable.
- Try changing the logic in other ways:
 - Perhaps have two circles of different colors.
 - Change the size of the circle so that it shrinks as it moves towards the top left-hand corner of the canvas.
 - Can you think of a way to randomly select between different shapes, and to keep creating more shapes on each iteration? You do not need to implement this, but just think about how you might do it. Discuss with a demonstrator.