

Week 2, Lecture 2

Iteration: for-loops



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This Week

Java Genesis:

–Ch3: Basic programming constructs

Lab Assessment 2 (deadline Week 5)

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A Scenario

1. Open window with circle at its centre.
2. Wait one second.
3. Select at random a new position in the window.
4. Move the circle to the new position.
5. Repeat fifty times steps 2 to 4.

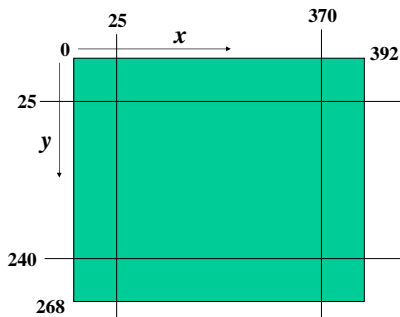
3

CircleFigure class

some messages:

- `create()`
- `moveTo(x, y)`
- `getXCentre()`
- `getYCentre()`

4



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Math class

some messages:

- `random()`
- `sqrt(x)`
- `max(x, y)`
- `round(x)`

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(For x-coordinate of circle's centre)

Random integer in range 25 to 370

$$370-25+1 = 346$$

$$0 < \text{Math.random()} < 1$$

$$0 < 346 * \text{Math.random()} < 346$$

(int)(346*Math.random()) int in range 0 to 345

(int)(346*Math.random()+25) in range 25 to 370

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(For y-coordinate of circle's centre)

Random integer in range 25 to 240

$$240-25+1 = 216$$

$$0 < \text{Math.random()} < 1$$

$$0 < 216 * \text{Math.random()} < 216$$

(int)(216*Math.random()) int in range 0 to 215

(int)(216*Math.random()+25) in range 25 to 240

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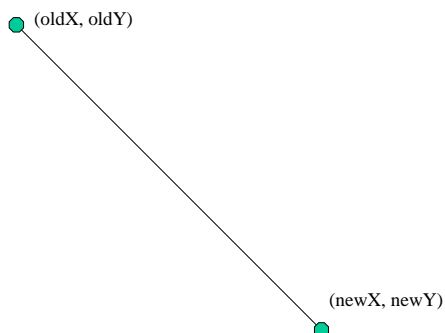
```
import genesis.*;
public class JumpingCircle {
    public static void main (String [ ] args) {
        CircleFigure.create();
        for (int i=1; i<=50; i++) {
            Delay.milliseconds(1000);
            int newX = (int)(346*Math.random()+25;
            int newY = (int)(216*Math.random()+25;
            CircleFigure.moveTo(newX, newY);
        }
    }
}
```

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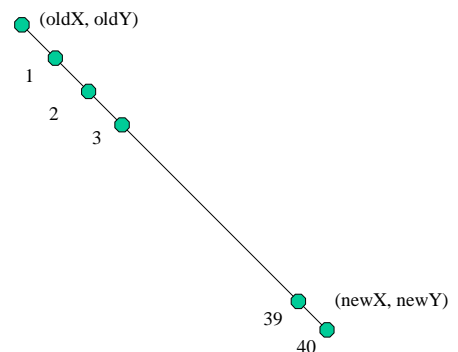
New Scenario

1. Open window with circle at its centre.
2. Select at random a new position in the window.
3. Move the circle to the new position by taking 40 equal steps waiting 25 milliseconds between steps.
4. Repeat fifty times steps 2 and 3.

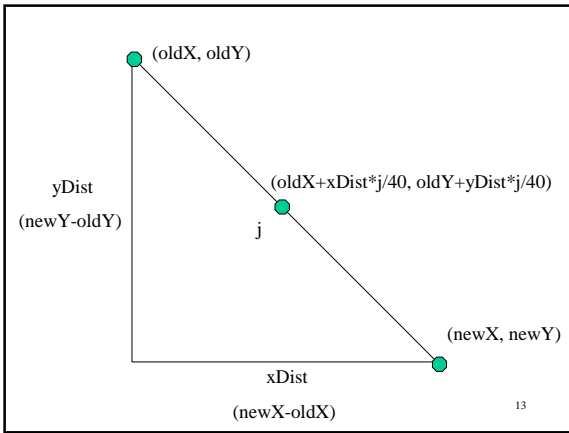
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```

import genesis.*;
public class LostCircle {
    public static void main (String [ ] args) {
        CircleFigure.create( );
        int newX, newY, oldX, oldY, xDist, yDist, currentX, currentY;
        for (int i=1; i<=50; i++) {
            newX = (int)(346*Math.random( ))+25;
            newY = (int)(216*Math.random( ))+25;
            oldX = CircleFigure.getXCentre( );
            oldY = CircleFigure.getYCentre( );
            xDist = newX - oldX;
            yDist = newY - oldY;
            for (int j=1; j<=40; j++) {
                Delay.milliseconds(25);
                currentX = (int)(oldX+xDist*j /40.0);
                currentY = (int)(oldY+yDist*j /40.0);
                CircleFigure.moveTo(currentX, currentY);
            }
        }
    }
}

```