

Iteration in Programming

Help – Bouncing Ball

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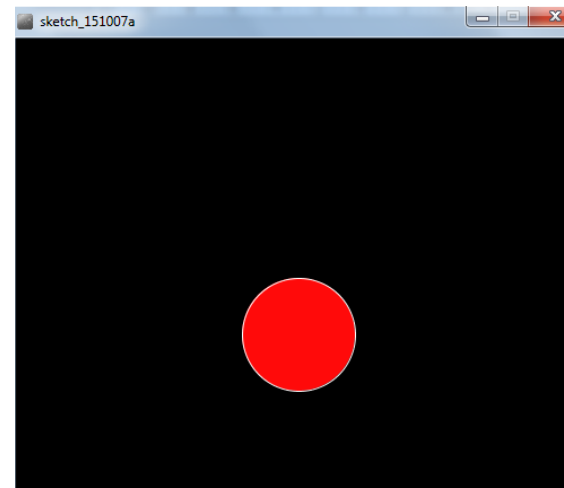


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Topics list

- There are three types of loop in programming:
 - While loops:
 - Counter controlled (n times) - covered in previous talk
 - Sentinel based (covered later in the course)
 - Flag based (covered later in the course)
 - For loops (this slide deck)
 - Do While loops (covered later in the course)
- Comparative use of **while** and **for** loops
- Challenges
 - Lab02a - Challenge 1 - Bouncing Ball
 - Lab02a - Challenge 3 – Moving Line



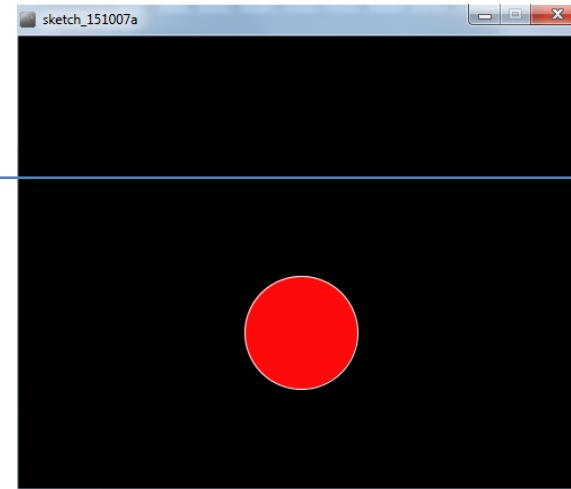
Lab02a - Challenge 1 – bouncing ball

Draw a continuously bouncing ball. (vertical only)

- the **xCoordinate** remains the **same** value
the **yCoordinate** will **change**.

Assumptions:

- display window is **500 x 400**
- ball is **100** in diameter.
- static **xCoordinate** is 250.
- **background** is called in the draw() method.
- starting **yCoordinate** is **300**.



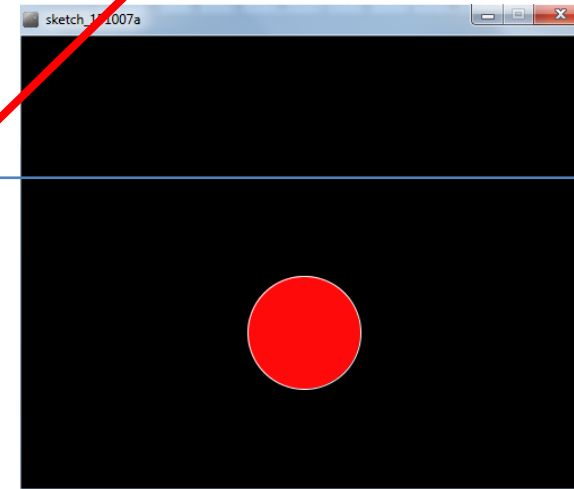
Lab02a - Challenge 1

```
float yCoordinate = 300;  
  
void setup() {  
  size(500,400);  
  fill(255, 10, 10);  
  stroke(255);  
}
```

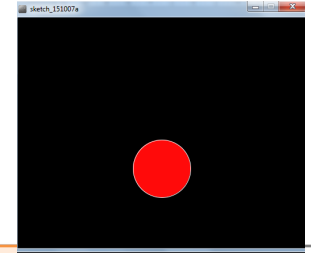
```
void draw() {  
  background(0);  
  ellipse(250, yCoordinate, 100, 100);  
}
```

Assumptions:

- display window is **500 x 400**
- ball is **100** in diameter.
- static **xCoordinate** is 250.
- **background** is called in the draw() method.
- starting **yCoordinate** is **300**.



Lab02a - Challenge 1



```
float yCoordinate = 300;
boolean bounceUp = false;

void setup() {
  size(500,400);
  fill(255, 10, 10);
  stroke(255);
}
```

```
void draw() {
  background(0);
  ellipse(250, yCoordinate, 100, 100);
  if (bounceUp)
    // code to bounce the ball up
  if (!bounceUp)
    // code when ball is falling
}
```

- We need to track whether the ball is bouncing up or falling.
- To do this, we will use a boolean variable **bounceUp**. It will be:
 - **true** if the ball is bouncing up
 - **false** if the ball is falling and

```
float yCoordinate = 300;
boolean bounceUp = false;

void setup() {
  size(500,400);
  fill(255, 10, 10);
  stroke(255);
}
```

```
void draw() {
  background(0);
  ellipse(250, yCoordinate, 100, 100);
```

```
//ball is bouncing up
if (bounceUp){
  if (yCoordinate > 100)
    yCoordinate = yCoordinate - 1;
  else
    bounceUp = false;
}
```

```
//ball is falling down
if (!bounceUp){
  if (yCoordinate <= 350)
    yCoordinate = yCoordinate + 1;
  else
    bounceUp = true;
}
```

```
}
```

