Iteration

For Loops

Produced
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Recap: Boolean conditions

- A boolean condition is an expression that evaluates to either true or false e.g.
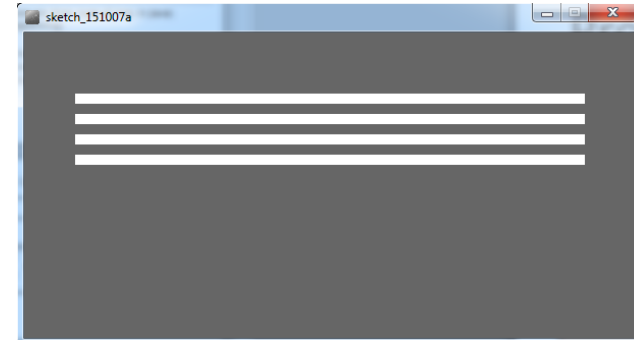
  mouseX < 50

- Boolean conditions can be used to control:
  - Selection i.e. if statements and
  - Iteration i.e. loops (we will look at these now).

Repetition in Programming

- Computers are very good at repetition.

- Draw a rectangle 4 times that has a gap of 10 pixels between each one:

  - Without loop:
    rect(50, 60, 500, 10);
    rect(50, 80, 500, 10);
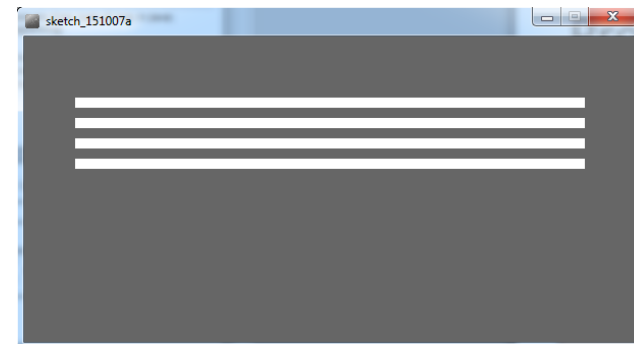   rect(50, 100, 500, 10);
    rect(50, 120, 500, 10);

Repetition in Programming

- Draw a rectangle 4 times that has a gap of 10 pixels between each one:

    - With a loop:

        - do this 4 times (adding 20 onto the yCoordinate variable each time).

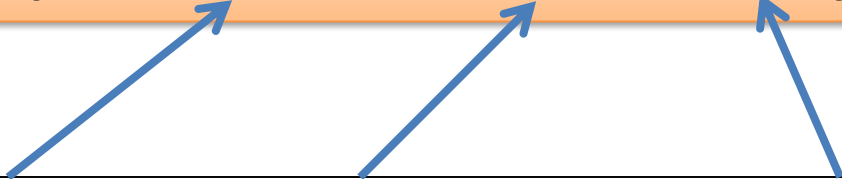   rect(50, yCoordinate, 500, 10);

Looping in Programming - **For** loop

for(int i = 0; i < 4; i++)

for(*initialization*; *boolean condition*; *post-body action*)
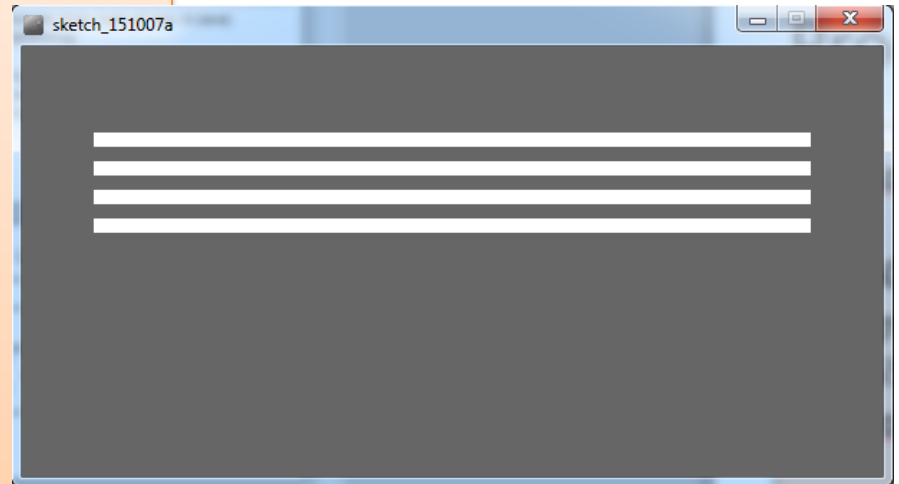{
        statements to be repeated
}

Processing Example 7.4


```
int yCoordinate = 60;

size(600, 300);
background(102);
fill(255);
noStroke();

for(int i = 0; i < 4; i++)
{
    rect(50, yCoordinate, 500, 10);
    yCoordinate = yCoordinate + 20;
}
```

For loop syntax

for(int i = 0; i < 4; i++)

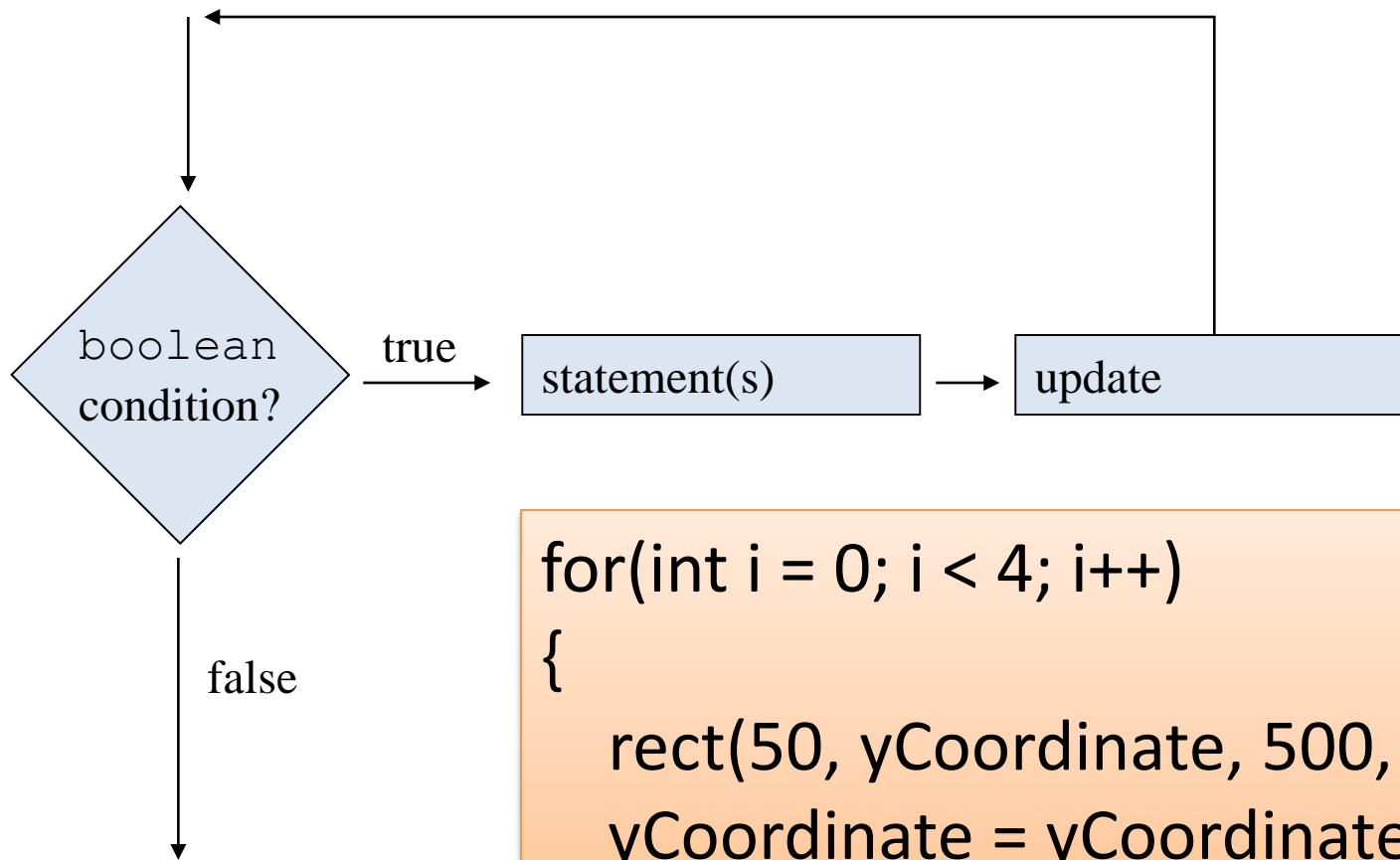| Initialization	int i = 0	Initialise a loop control variable (LCV) e.g. i. It can include a variable declaration.
Boolean condition	i < 4	Is a valid boolean condition that typically tests the loop control variable (LCV).
Post-body action	i++	A change to the loop control variable (LCV). Contains an assignment statement.

A note on i++

- The **post-body action** in this for loop is i++.
- This is called a compound assignment statement.
- It is a shortcut for i = i + 1.

```
for(int i = 0; i < 4; i++)
{
    rect(50, yCoordinate, 500, 10);
    yCoordinate = yCoordinate + 20;
}
```
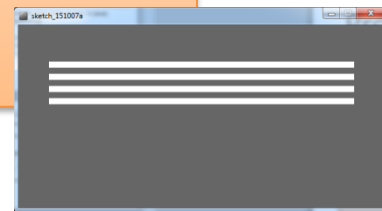
`for` Loop Flowchart


```
boolean
condition?
```

true

statement(s)

update

false

```
for(int i = 0; i < 4; i++)
{
    rect(50, yCoordinate, 500, 10);
    yCoordinate = yCoordinate + 20;
}
```

Questions?

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