# Iteration in Programming

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## for Loops

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# Topics List

- while loops (covered in previous section):
- for loops
- do while loops (covered in next section)
- Comparative use of while and for loops

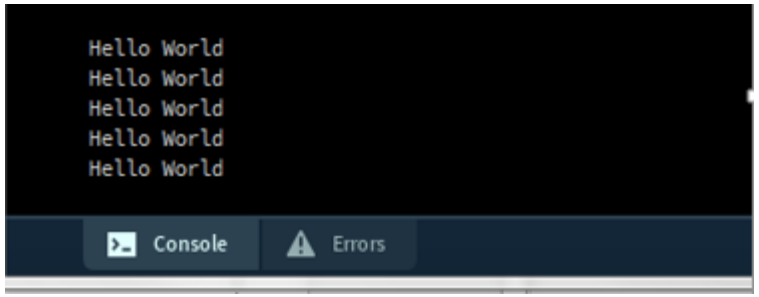
# For loop pseudo-code

General form of a for loop

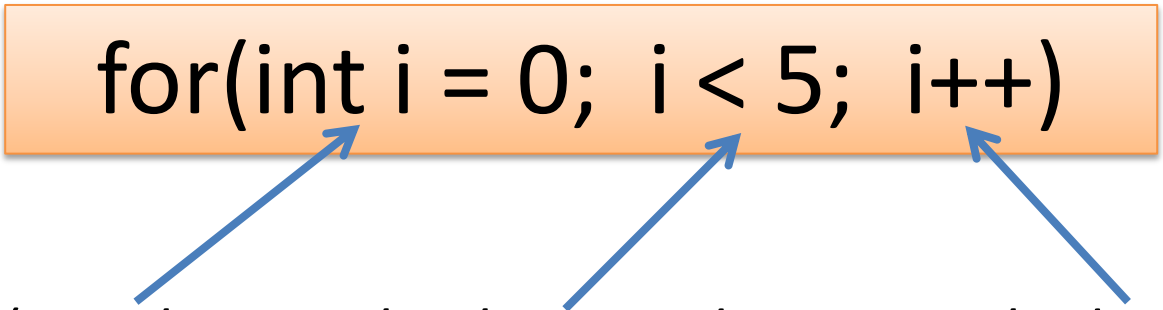
for(*initialization*; *boolean condition*; *post-body action*)
{
    *statements to be repeated*
}

# Simple for Statements

```
for(int i = 0; i < 5; i++)
 {
        println("Hello World");
}
```



# for Loop Syntax



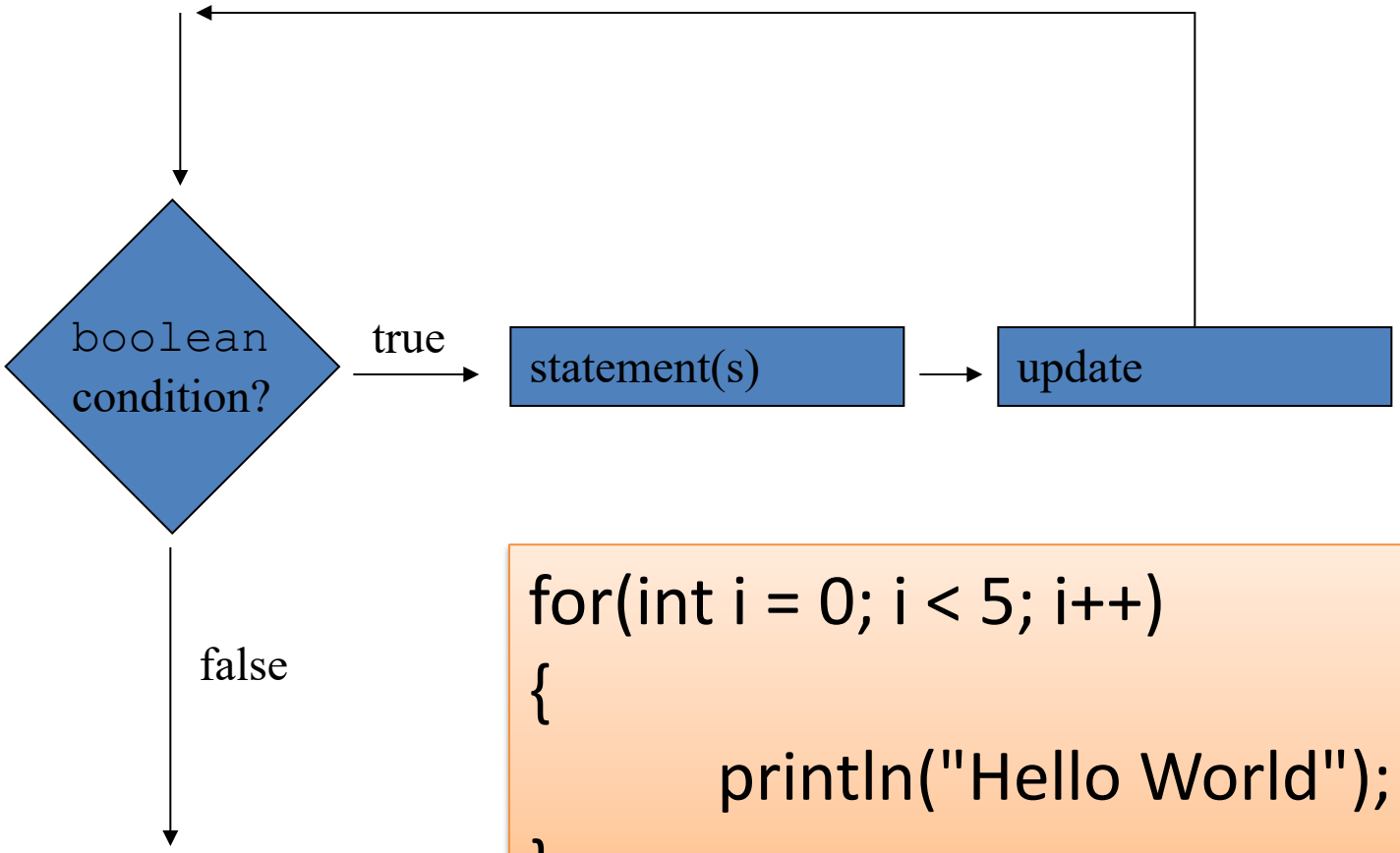

for(*initialization*; *boolean condition*; *post-body action*)
{
    *statements to be repeated*
}

# For loop syntax

```
for(int i = 0;  i < 5;  i++)
```

| | | |
|---|---|---|
| Initialization | int i = 0 | Initialise a loop control variable (LCV) e.g. i. It can include a variable declaration. |
| Boolean condition | i < 5 | 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. |

# `for` Loop Flowchart




```
for(int i = 0; i < 5; i++)
{
        println("Hello World");
}
```

# 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. |

# Exercises

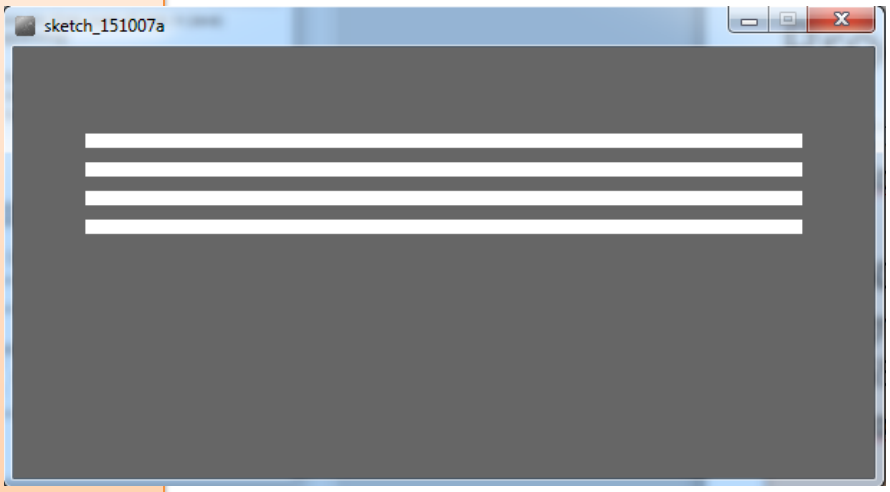
1. Change the code so that “Hello World” is printed out 10 times.
2. Change the code so that the numbers from 1 to 10 (inclusive) are printed out, one line at a time.
3. Change the code so that the numbers from 10 to 1 are printed out.

# for Loop Example 1

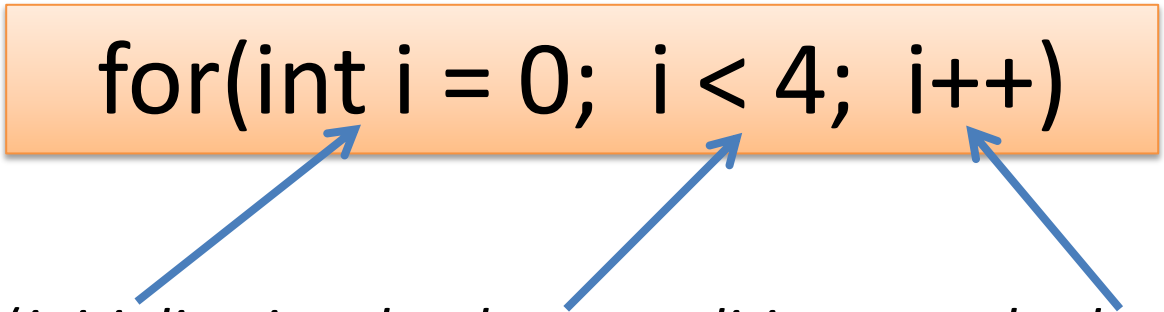
```
int yCoordinate = 60;

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

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

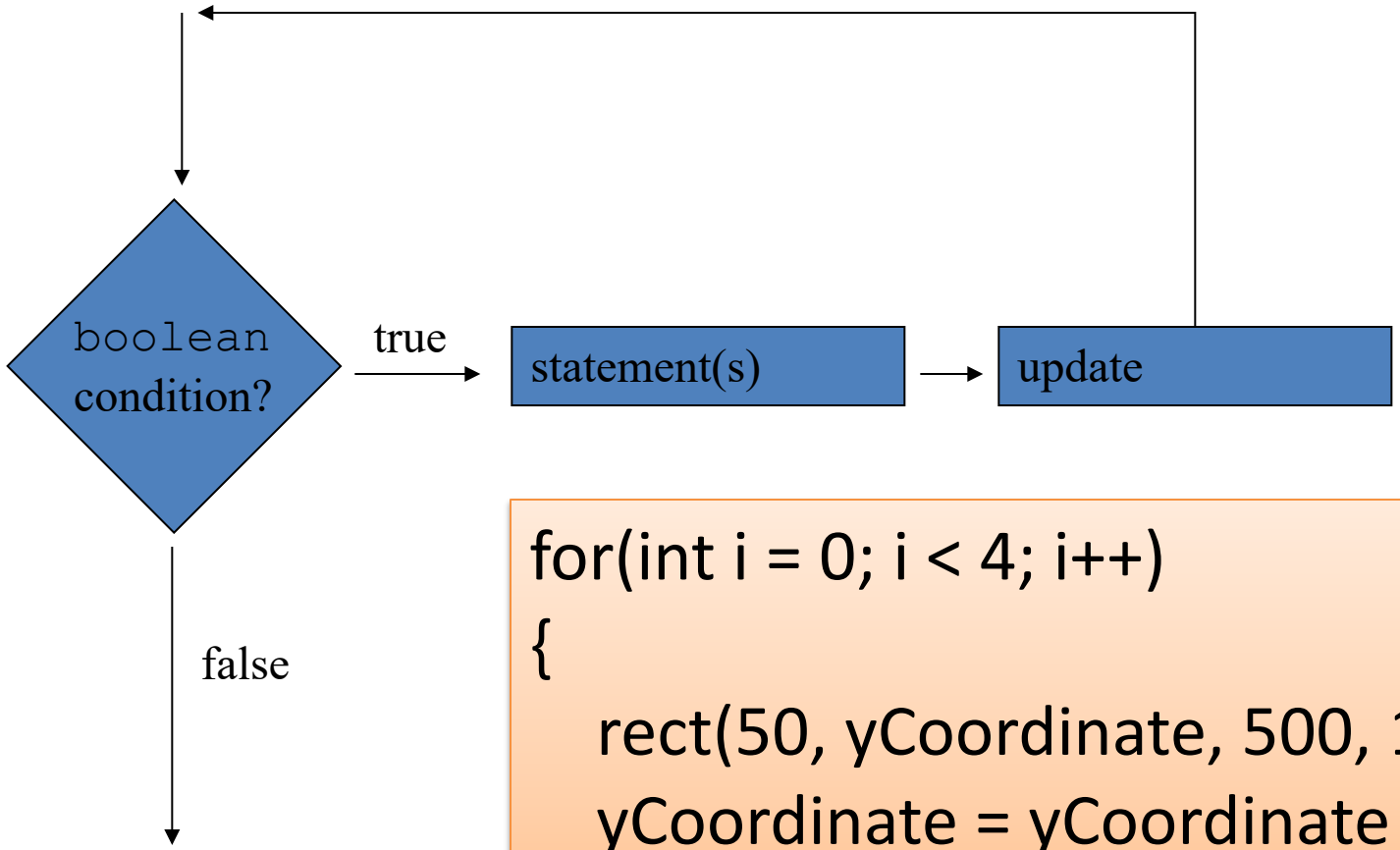


# for Loop Syntax

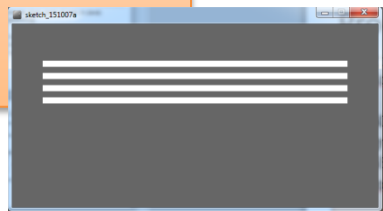



for(*initialization*; *boolean condition*; *post-body action*)
{
    *statements to be repeated*
}

# For Loop Flowchart




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



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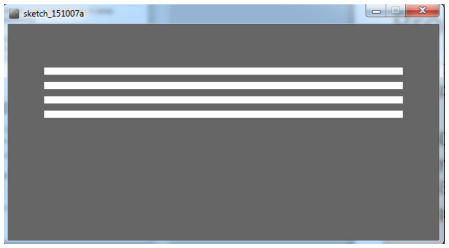

# for versus while

**for Loop Example 1 (for loop)**

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

**while Loop Example 1 (while loop)**

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

Variable **i** is the Loop Control Variable (LCV). It must be initialised, tested and changed.

**int i = 0** is the initialisation.

**i < 4** is the boolean Condition i.e. the test

**i++** is the post-body action i.e. the change.

# Questions?




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