Conditional Statements

If Statement and Boolean Expressions

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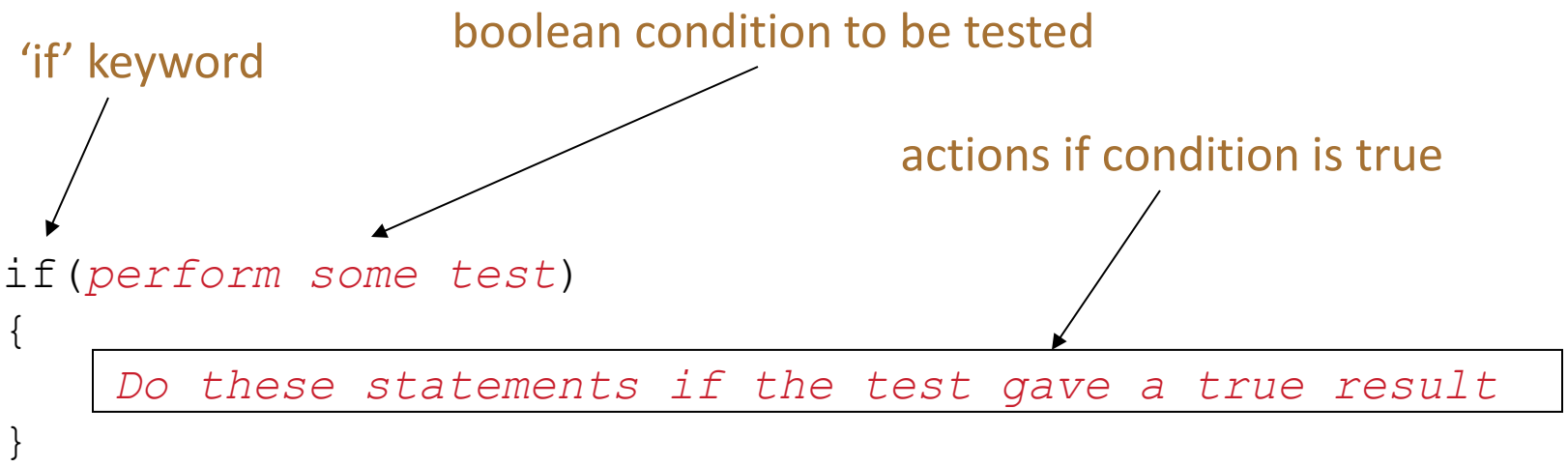
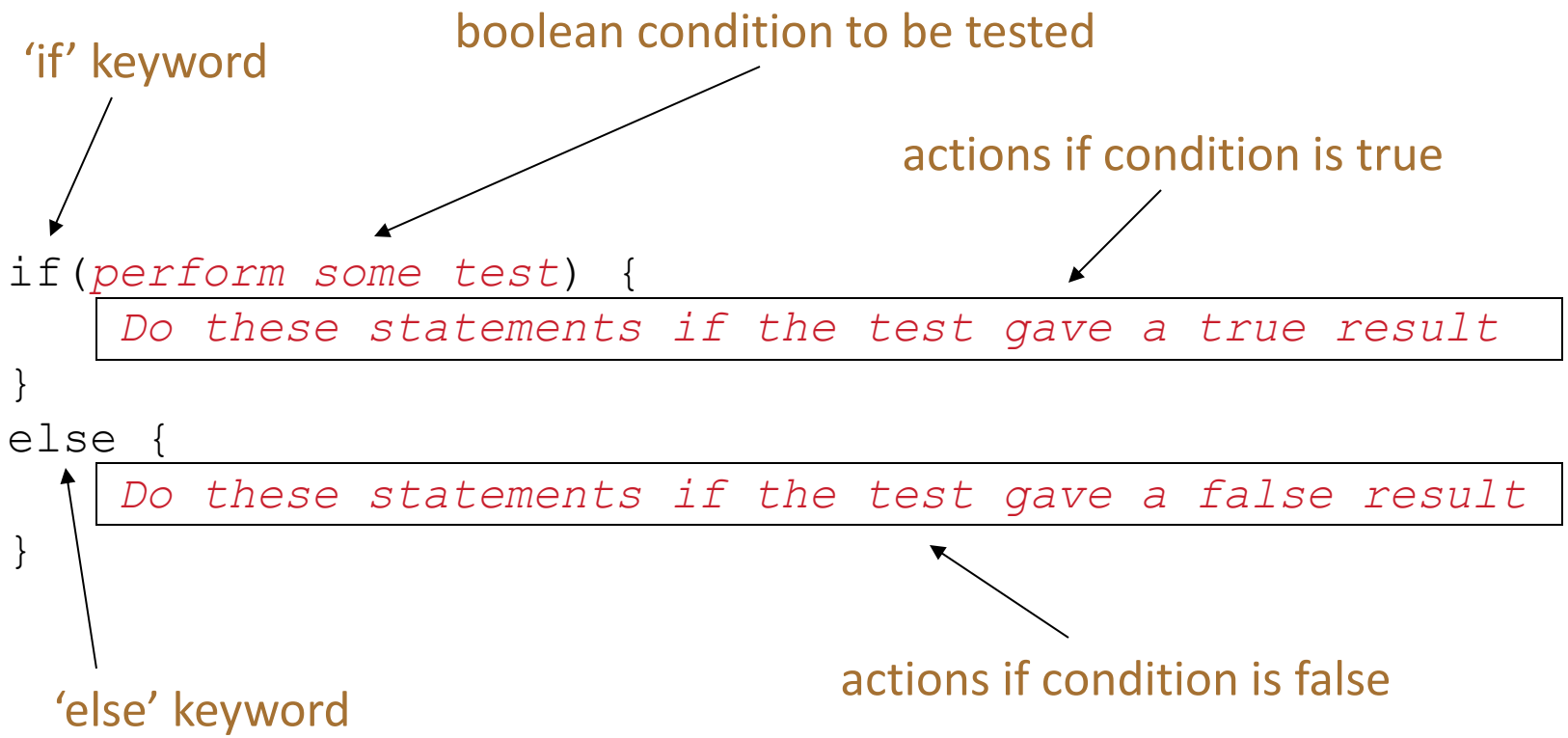
Topics list

- Conditional Statements
- Boolean conditions and Relational Operators
- Logical Operators

Conditional Statement Syntax (1)



Conditional Statement Syntax (2)



Conditional Statement Syntax (3)

```
if(condition1…perform some test)
{
    Do these statements if condition1 gave a true result
}
else if(condition2…perform some test)
{
    Do these statements if condition1 gave a false
    result and condition2 gave a true result
}
else
{
    Do these statements if both condition1 and
    condition2 gave a false result
}
```

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Boolean conditions

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

  mouseX < 50

- An if statement evaluates a boolean condition and its result will determine which portion of the if statement is executed.

Boolean conditions

```
// Do these statements before.

if (boolean condition)
{
     // Perform this clause if the condition
     //is true.
}

// Do these statements after.
```

Java Relational Operators

Operator	Use	Returns true if
>	op1 > op2	op1 is greater than op2
>=	op1 >= op2	op1 is greater than or equal to op2
<	op1 < op2	op1 is less than to op2
<=	op1 <= op2	op1 is less than or equal to op2
==	op1 == op2	op1 and op2 are equal
!=	op1 != op2	op1 and op2 are not equal

Source: http://www.freejavaguide.com/relational_operators.htm

Some notes on the if statement

- An if statement IS a statement; it is only executed once.
- When your if statement only has one statement inside it, you do not need to use the curly braces.
- For example, both of these are the same:

```
if (mouseX < 50)
{
    rect(0, 0, 50, 100);
}
```

```
if (mouseX < 50)
    rect(0, 0, 50, 100);
```

Some notes on the if statement

- The semi-colon (;) is a statement terminator.
- One is circled in the code example below:

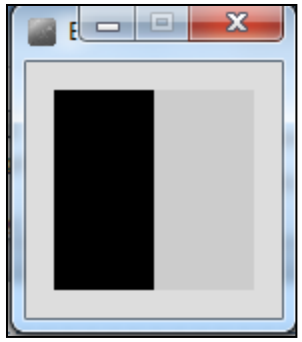
```
if (mouseX < 50)
{
    rect(0, 0, 50, 100);
}
```

- Your if statement does not need a statement terminator.

Conditional Example 5.1

```
void setup() {
    size(100, 100);
    noStroke();
    fill(0);
}

void draw() {
    background(204);
    if (mouseX < 50)
    {
       rect(0, 0, 50, 100);
    }
    else
    {
       rect(50, 0, 50, 100);
    }
}
```



Source: Reas & Fry (2014)

Conditional Example 5.2

```
void setup() {
    size(100, 100);
    noStroke();
    fill(0);
}

void draw() {
    background(204);
    if (mouseX < 33) {
        rect(0, 0, 33, 100);
    }
    else if (mouseX < 66) {
        rect(33, 0, 33, 100);
    }
    else {
        rect(66, 0, 33, 100);
    }
}
```

Source: Reas & Fry (2014)

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Logical operators

- Logic operators operate on boolean values.
- They produce a new boolean value as a result.
- The ones that we will use are:

&&	(and)
||	(or)
!	(not)

Logical operators

a && b *(and)*

- This evaluates to true if both ***a*** and ***b*** are true.
- It is false in all other cases.

a || b *(or)*

- This evaluates to true if either ***a*** or ***b*** or both are true, and false if they are both false.

!a *(not)*

- This evaluates to true of ***a*** is false, and false if ***a*** is true.

Logical operators - quiz

```
int a = 5;
int b = 10;
int c = 7;
```

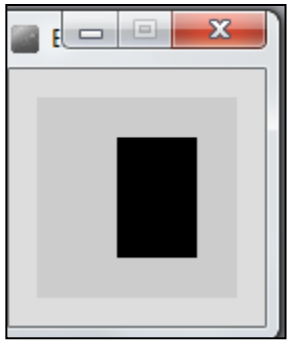
What is the result of each of these boolean expressions:

```
(a > b) && (a < c)
(a < b) || (c < a)
!(b < a) && (c > b)
```

Conditional Example 5.3

```
void setup() {
  size(100, 100);
  noStroke();
  fill(0);
}

void draw() {
  background(204);
  if ((mouseX > 40) && (mouseX < 80) &&
      (mouseY > 20) && (mouseY < 80)) {
      fill(255);
  } else {
      fill(0);
  }
  rect(40, 20, 40, 60);
}
```



Source: Reas & Fry (2014)

Conditional Example 5.4

```
void setup() {
  size(100, 100);
  noStroke();
  fill(0);
}
```

```
void draw() {
  background(204);
  if ((mouseX <= 50) && (mouseY <= 50)) {
    rect(0, 0, 50, 50);           // upper-left
  } else if ((mouseX <= 50) && (mouseY > 50)) {
    rect(0, 50, 50, 50);          // lower-left
  } else if ((mouseX > 50) && (mouseY <= 50)) {
    rect(50, 0, 50, 50);          // upper-right
  } else {
    rect(50, 50, 50, 50);         // lower-right
  }
}
```

Source: Reas & Fry (2014)

Questions?

References

- Reas, C. & Fry, B. (2014) Processing – A Programming Handbook for Visual Designers and Artists, 2nd Edition, MIT Press, London.

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