Java Control Statements

An introduction to the Java Programming Language

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Essential Java

- **Overview**
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  - Syntax
  - Basics
  - Arrays
- **Classes**
  - Classes Structure
  - Static Members
  - Commonly used Classes
- **Control Statements**
  - Control Statement Types
  - If, else, switch
  - For, while, do-while

- **Inheritance**
  - Class hierarchies
  - Method lookup in Java
  - Use of this and super
  - Constructors and inheritance
  - Abstract classes and methods

  Interfaces
- **Collections**
  - ArrayList
  - HashMap
  - Iterator
  - Vector
  - Enumeration
  - Hashtable

- **Exceptions**
  - Exception types
  - Exception Hierarchy
  - Catching exceptions
  - Throwing exceptions
  - Defining exceptions

  Common exceptions and errors
- **Streams**
  - Stream types
  - Character streams
  - Byte streams
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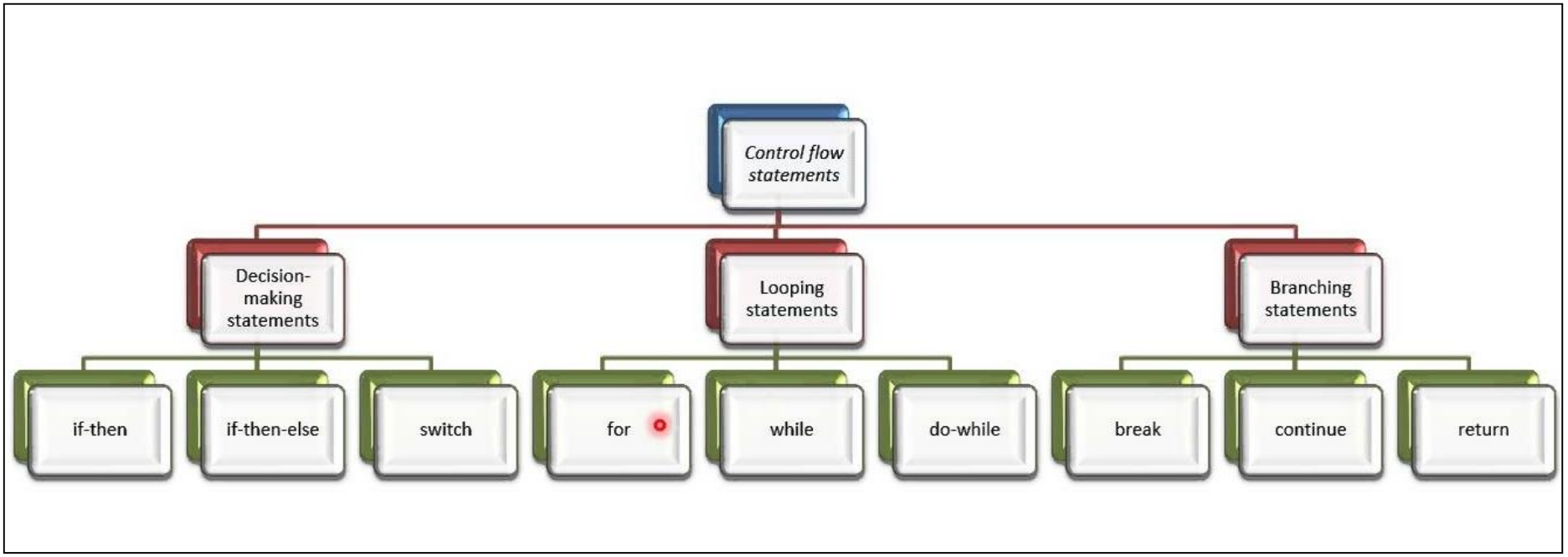
  - Object Serialization

Overview: Road Map

- Control Statement Types
- If, else, switch
- For, while, do-while

What are Control Statements?

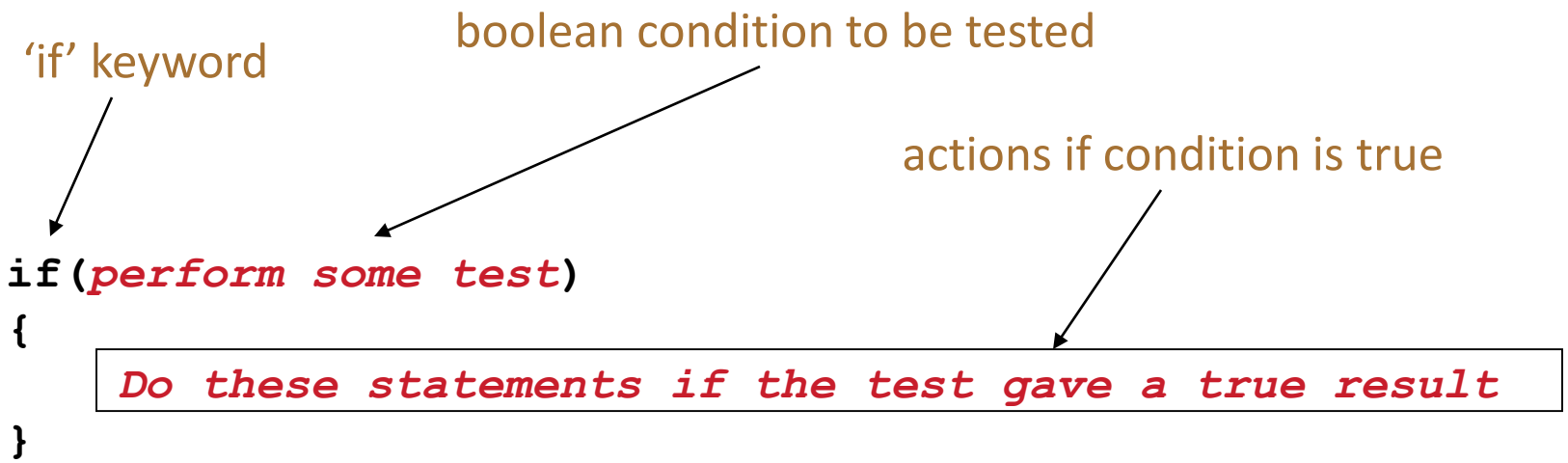


Control statements are statements that control execution of other statements

Overview: Road Map

- Control Statement Types
- If, else, switch
- For, while, do-while

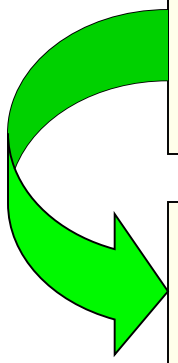
if statement syntax



Example if Statement

```
int i = 1;
if(i > 0)
{
   System.out.println("Greater than zero");
}
```

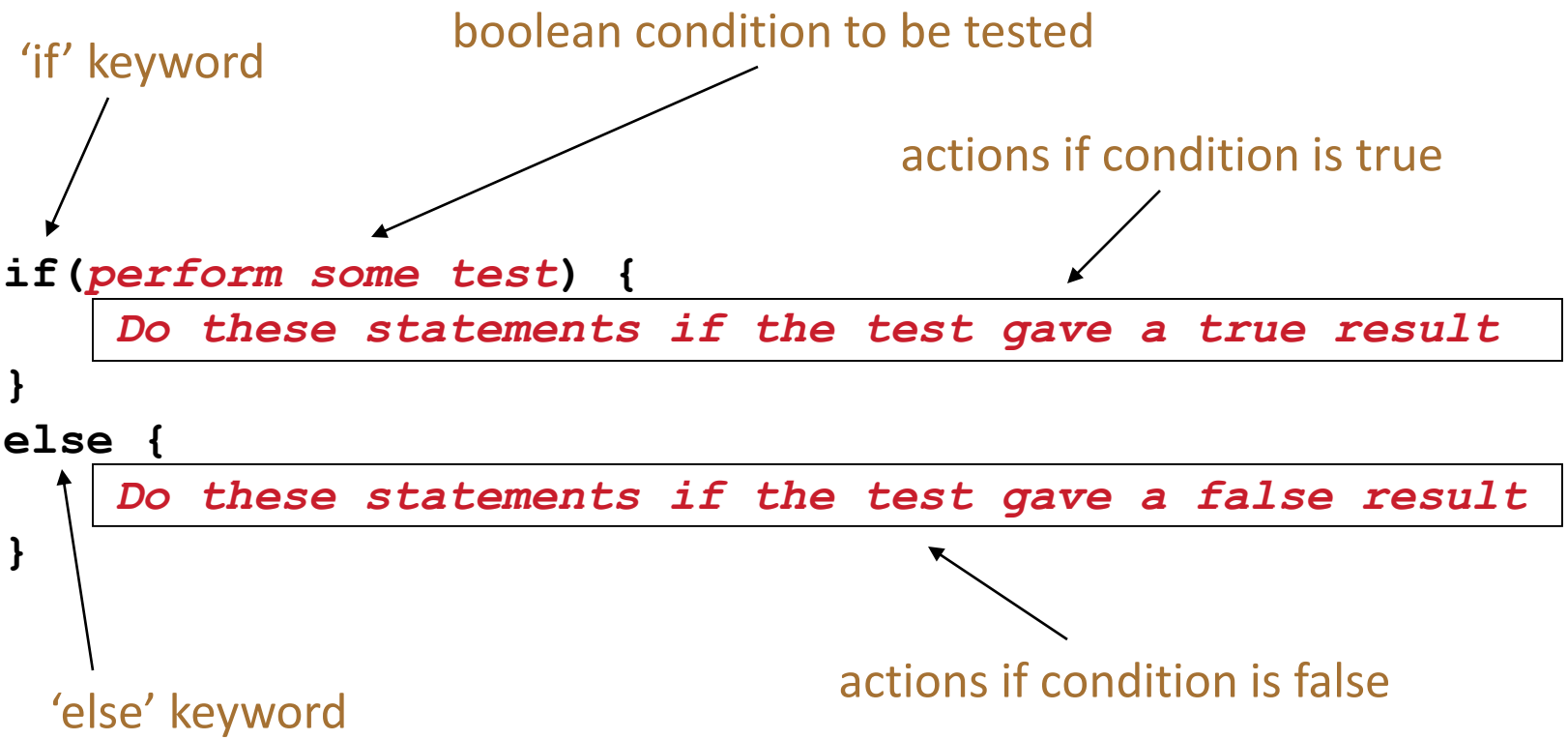
=



```
int i = 1;
if(i > 0)
   System.out.println("Greater than zero");
```

```
int i = 3;
if(i > 2)
{
   System.out.println("Greater than zero");
   System.out.println("Greater than one");
   System.out.println("Greater than two");
}
```

if-else statement syntax



Example if-else Statement

```
int i = 1;
if(i > 0)
   System.out.println("Greater than zero");
else
   System.out.println("Not greater than zero");
```

Braces can be omitted if single statements used.

```
int i = 3;
if(i > 2)
{
   System.out.println("Greater than zero");
   System.out.println("Greater than one");
   System.out.println("Greater than two");
}
else
{
   System.out.println("Either equal to two");
   System.out.println("Or less than two");
}
```

Nested if statements

- Any form of if statement can be nested
  - There can be other if statements within of if statements

```
if (condition)
{
  if(nested_condition1)
  {
    nested_action1;
  }
  else
  {
    if(nested_condition2)
    {
      nested_action2;
    }
    else
    {
      nested_action3;
    }
  }
}
else
{
  action2;
}
```

Example Nested Statement

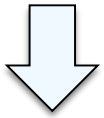
```
int i = 3;
if(i > 2)
{
  System.out.println("Greater than zero");
  System.out.println("Greater than one");
  System.out.println("Greater than two");
}
else
{
   if(i == 2)
     System.out.println("Equal to two");
   else
     System.out.println("Less than two");
}
```

More if statement syntax

```
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
}
```

The switch statement – pattern one

Pre Java 7: can switch on int and char.
Post Java 7: can also switch on String



```
switch(expression) {
    case value: statements;
                break;
    case value: statements;
                break;
    further cases possible
    default: statements;
             break;
}
```

A *switch* statement can have any number of **case** labels.

The switch statement – pattern two

```
switch(expression) {
      case value1:
      case value2:
      case value3:
          statements;
          break;
      case value4:
      case value5:
          statements;
          break;
      further cases possible
      default:
          statements;
          break;
 }
```

The **default** case is optional.

The **break** statement stops execution "falling through" into the next label's statements.

The switch statement – example 1

```
switch(day) {
    case 1:  dayString = "Monday";
             break;
    case 2:  dayString = "Tuesday";
             break;
    case 3:  dayString = "Wednesday";
             break;
    case 4:  dayString = "Thursday";
             break;
    case 5:  dayString = "Friday";
             break;
    case 6:  dayString = "Saturday";
             break;
    case 7:  dayString = "Sunday";
             break;
    default: dayString = "invalid day";
             break;
}
```

The switch statement – example 2

```
switch(dow.toLowerCase()) {
    case "mon":
    case "tue":
    case "wed":
    case "thu":
    case "fri":
        goToWork();
        break;
    case "sat":
    case "sun":
        stayInBed();
        break;
}
```

The switch statement – example 3

```
switch (group){
    case 'A':
            System.out.println("10.00 a.m ");
            break;
    case 'B':
            System.out.println("1.00 p.m ");
            break;
    case 'C':
            System.out.println("11.00 a.m ");
            break;
   default:
            System.out.println(“Enter option A, B or C only!");
}
```

Example switch statement…

```
int i = 2;
switch(i)
{
   case 1: System.out.println("1");
   case 2: System.out.println("2");
   case 3: System.out.println("3");
   default: System.out.println("default");
}
```

Console

```
2
3
default
```

```
int i = 2;
switch(i)
{
   case 1: System.out.println("1"); break;
   case 2: System.out.println("2"); break;
   case 3: System.out.println("3"); break;
   default: System.out.println("default");
}
```

Console

```
2
```

…Example switch statement

```
int i = 2;
switch(i)
{
   case 1:
        System.out.println("1");
        break;
   case 2:
   case 3:
        System.out.println("2");
        System.out.println("or");
        System.out.println("3");
        break;
   default:
        System.out.println("default");
}
```

Console

```
2
or
3
```

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for loop - pseudo-code

General form of a for loop

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

for loop - syntax

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

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

for loop - example

```
for(int i=1; i<5; i++)
{
   System.out.println("Index is equal to " + i);
}
```

Console

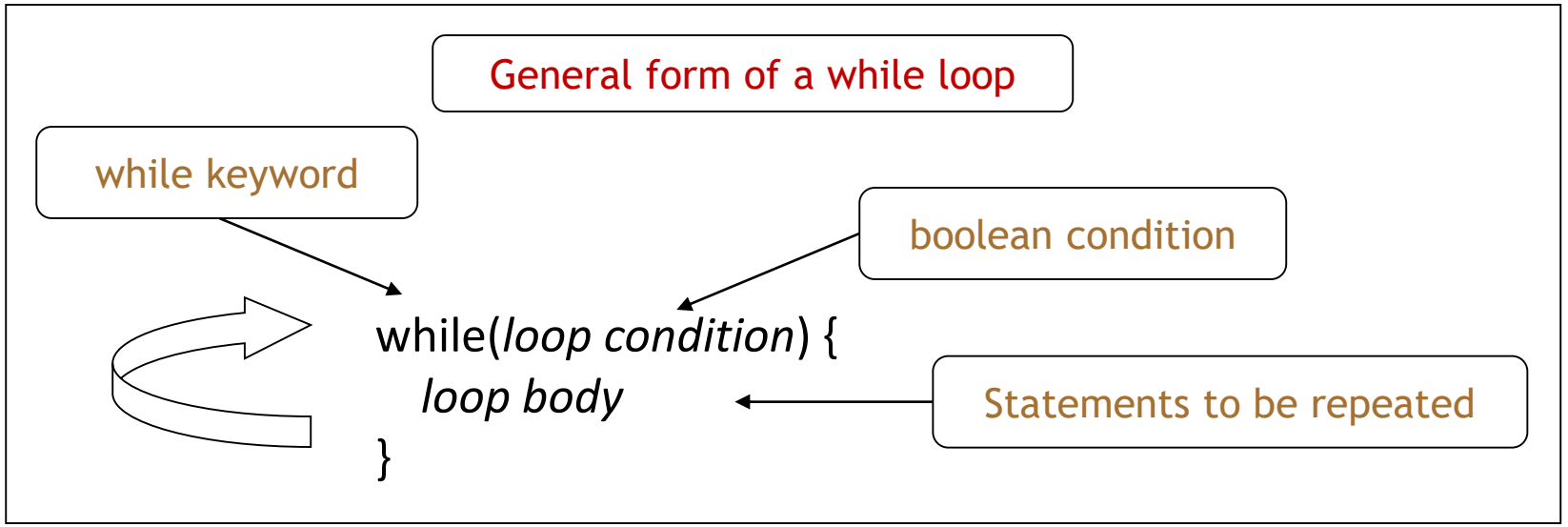
```
Index is equal to 1
Index is equal to 2
Index is equal to 3
Index is equal to 4
```

```
int i=1;
for(;;)
{
   System.out.println("Infinite loop");
   if(i==2) break;
   i++;
}
```

Console

```
Infinite loop
Infinite loop
```

while loop - pseudo code



Pseudo-code expression of the actions of a while loop

while we wish to continue, do the things in the loop body

while loop

Declare and initialise loop control variable (LCV)

while(condition based on LCV)

{

“do the job to be repeated”

“update the LCV”

}

This structure should always be used

while - example

```
int i=1;
while(i < 5)
{
   System.out.println(i);
   i++;
}
```

Console

```
1
2
3
4
```

```
int i=5;
while(i < 5)
{
   System.out.println(i);
   i++;
}
```

Console

do-while

- Similar to the while statement:
  - Condition is evaluated at the end of the statement
  - block is executed at least once

```
do
{
   statement;
} while(condition);
```

Example do-while Statement

```
int i=1;
do
{
   System.out.println(i);
   i++;
}while(i < 5);
```

Console

```
1
2
3
4
```

```
int i=5;
do
{
   System.out.println(i);
   i++;
}while(i < 5);
```

Console

```
5
```

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