CSC212: Learning Java

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Types

- In Java, everything has a type, **variables** and **functions**:
  - `int`
  - `double`
  - `boolean`
  - `String`

Examples

```
class Example {
    public static void main(String[] args ) {
        int i, j, k;
        int year = 2014;
        double x = 1.5;
        double y = 0.00001;
        double z = 1E-10;
        boolean isValid = false;
        boolean isEmpty = true;
        String name = “Sophia”;
        String college = “Hampshire”;
    }
}
```

Examples

```
class Example {
   public static void main(String[] args ) {
      int i, j, k;
      int year = 2014;
      double x = 1.5;
      double y = 0.00001;
      double z = 1E-10;
      boolean isValid = false;
      boolean isEmpty = true;
      String name = “Sophia”;
      String college = “Hampshire”;

      // print various quantities
      System.out.println( name + “ likes “ + college );
      System.out.println( “x+y = “ + (x+y) );
   }
}
```

Functions have a type too!

Examples

```
class Example {
   public static int times2( int x ) {
      return x * 2;
   }
   public static double times3( double x ) {
      return x * 3;
   }
   public static void main(String[] args ) {
      int i = 3;
      double x = 1.5;
      double y = 0.00001;

      // print various quantities
      System.out.println( “2*i = “ + times2( i ) );
      System.out.println( “3*x = “ + times3( x ) );
   }
}
```

Examples

```
class Example {
    public static int times2( int x ) {
        return x * 2;
    }
    public static double times3( double x ) {
        return x * 3;
    }
    public static void main(String[] args ) {
        int i = 3;
        double x = 1.5;
        double y = 0.00001;

        // print various quantities
        System.out.println( “2*i = “ + times2( i ) );
        System.out.println( “3*x = “ + times3( x ) );

        // what do you think?
        System.out.println( “3*i = “ + times3( i ) );
        System.out.println( “2*x = “ + times2( x ) );
    }
}
```

For-Loops

3-Components For-Loop

```
for (int i=0; i<10; i++ ) {
    // body of loop

}
```

3-Components For-Loop

Initialize loop counter

Test exit condition

Update loop counter

```
for (int i=0; i<10; i++ ) {
   // body of loop

}
```

3-Components For-Loop

“start with…”

“repeat as long as…”

“after every loop, do…”

```
for (int i=0; i<10; i++ ) {
   // body of loop

}
```

Examples

```
for (int i=0; i<10; i++ ) {
    System.out.println( i );
}
```

prints 0 1 2 … 9

```
for (int i=10; i>=0; i=i-1 ) {
    System.out.println( i );
}
```

prints 10 9 8 7 … 3 2 1 0

```
for (int i=1; i<100; i=i*2 ) {
    System.out.println( i );
}
```

prints 1 2 4 8 16 32 64

```
for (int k=0; k<10; ) {
    System.out.println( k++ );
}
```

does it print? If so, what?

```
for (int k=100; ;k++ ) {
    System.out.println( k );
    break;
}
```

Same question..

Test

```
for ( ; ; ){
   System.out.println( “Hi!” );
}
```

If-Statements

Syntax: 2 forms

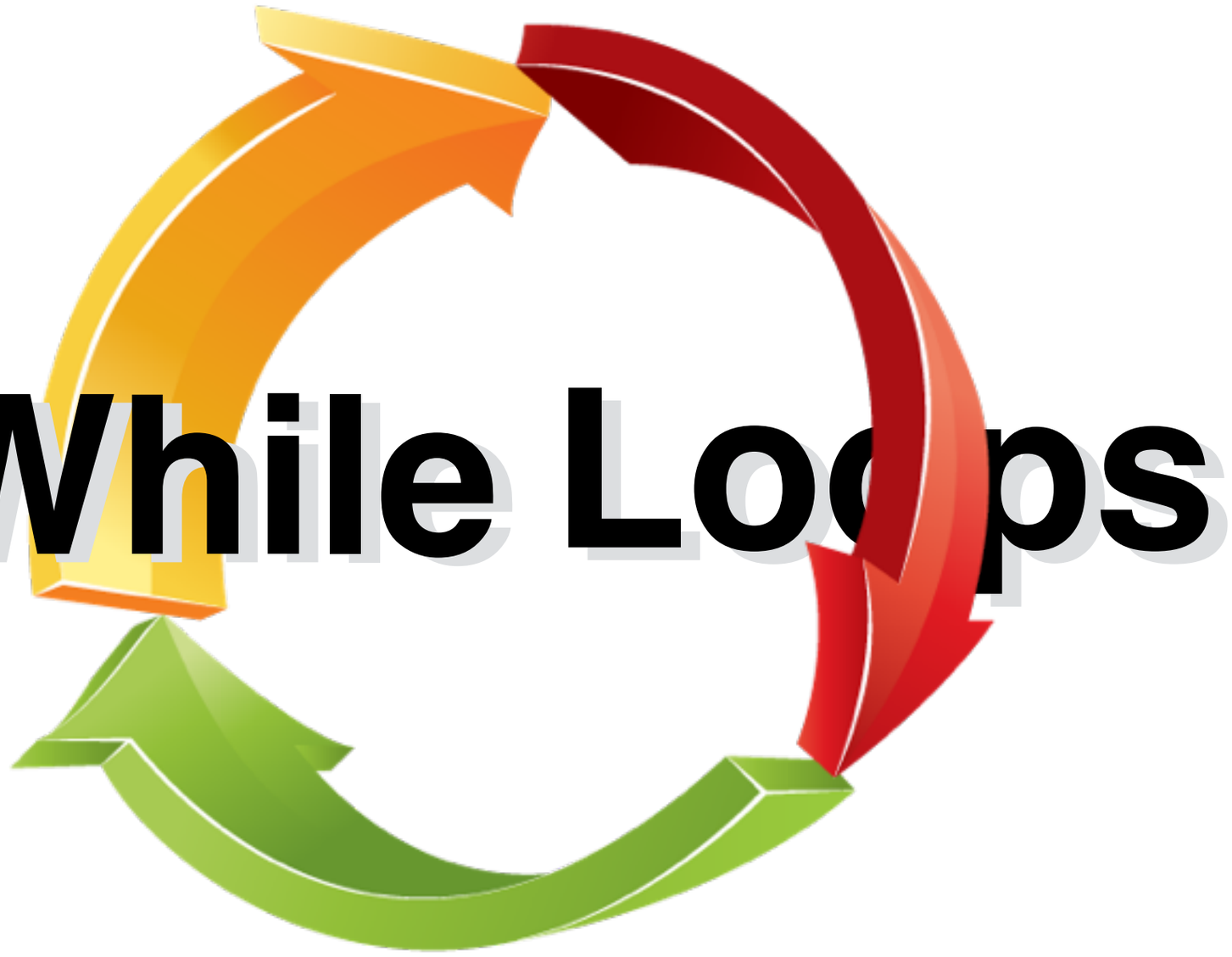
```
if ( some boolean expression is true ) {
   …
}
else {
   …
}
```

```
if ( some boolean expression is true ) {
   …
}
```

Examples

```
if ( x < 10 ) …

if ( x != 3 ) …

if ( x > 10 && x <= 100 )…     // and

if ( x != 0 || z == 3 )…       // or

if ( !(x == 0 && z != 3 ) )…  // de Morgan
```

While Loops



Syntax & Example

```
while ( some boolean expression is true ) {
   …
}
```

```
int i = 1;
while ( i < 100 ) {
   System.out.println( i );
   i = i * 2;
}
```

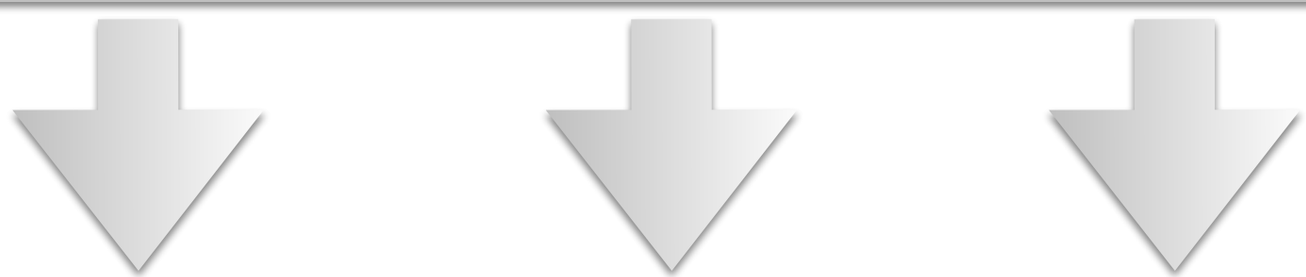
Another Example

```
int i = 100;
boolean isValid = true;

while ( isValid ) {
   System.out.println( i );
   i = i - 3;
   isValid = (i > 0);
}
```

Comparing Strings

Example

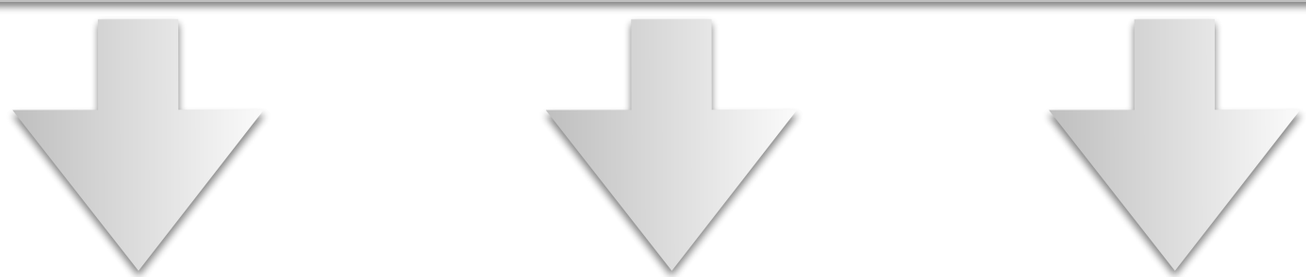
```
String s1 = “Alex”;
String s2 = “Alex”;

if ( s1 == s2 ) {
   System.out.println( “s1 equals to s2” );
}
else {
   System.out.println( “s1 not equal to s2” );
}
```



s1 equals to s2

Example

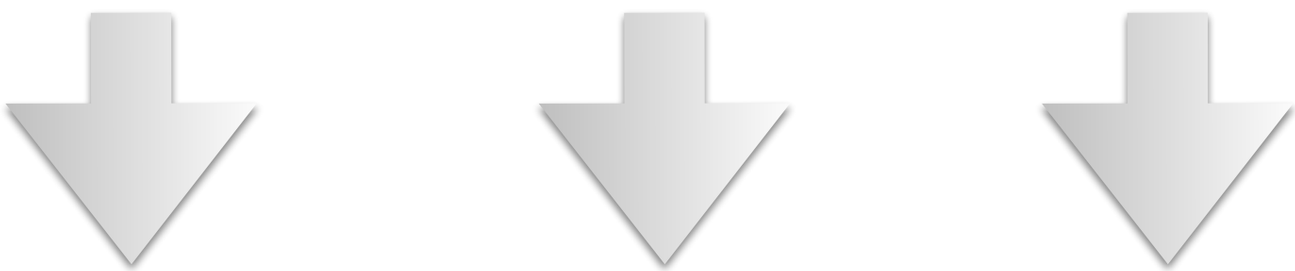
```
String s1 = “Ale”;
String s2 = “Alex”;
s1 = s1 + “x”;
if ( s1 == s2 ) {
   System.out.println( “s1 equals to s2” );
}
else {
   System.out.println( “s1 not equal to s2” );
}
```

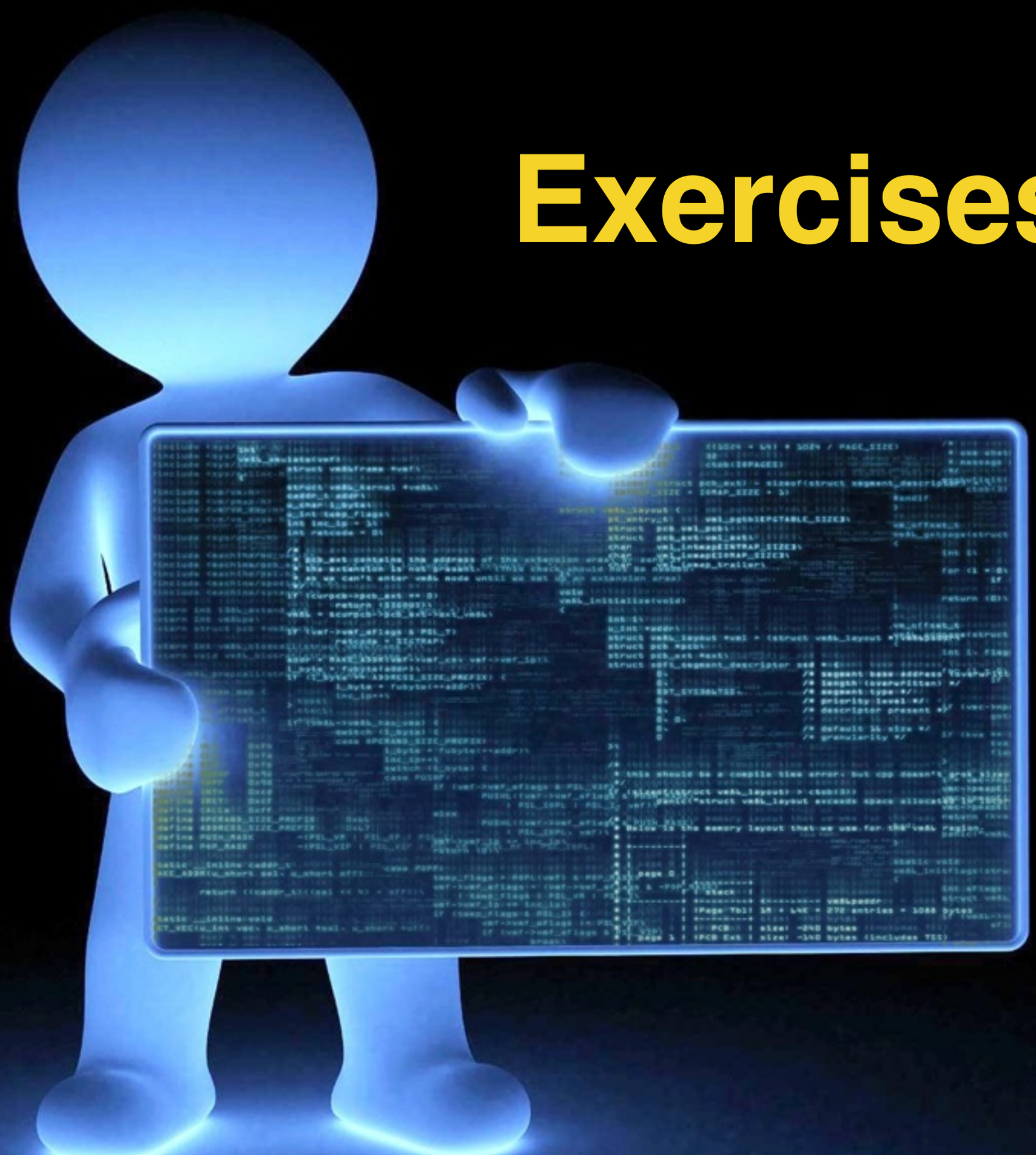


s1 not equal to s2

Solution, when Comparing Strings…

```
String s1 = “Ale”;
String s2 = “Alex”;
s1 = s1 + “x”;  // now s1 contains “Alex”
if ( s1.equals( s2 ) ) {
   System.out.println( “s1 equals to s2” );
}
else {
   System.out.println( “s1 not equal to s2” );
}
```



s1 equals to s2

Exercises