

ORF 201
COMPUTER METHODS FOR PROBLEM SOLVING

Lecture 2
Arithmetic, Simple Loops



Hello World

The file `Hello.java`

Every file must have
one **public class**

```
public class Hello
```

```
{
```

```
    public static void main(String[] args)
```

```
    {
```

```
        System.out.println("Hello, World!");
```

```
    }
```

```
}
```

Point of entry
is **main()**

All code must
be in a **class**

To compile:

```
javac Hello.java
```

To run (execute):

```
java Hello
```

Output:

```
Hello, World!
```

Fahrenheit to Celsius

Anything between `/*` and `*/` is ignored by the compiler.

```
/* Program to print a Fahrenheit to Celsius
   conversion table for fahr = 0, 20, ..., 300 */
public class FahrCels
{
    public static void main(String [ ] args)
    {
        int fahr, celsius;

        fahr = 0;
        celsius = 5 * (fahr-32) / 9;
        System.out.println(fahr + "\t" + celsius);

        fahr = 20;
        celsius = 5 * (fahr-32) /9;
        System.out.println(fahr + "\t" + celsius);

        .
        .
        fahr = 300;
        celsius = 5 * (fahr-32) / 9;
        System.out.println(fahr + "\t" + celsius);

    }
}
```

`int` is the integer data type

`=` is the assignment operator.

Arithmetic operators:
`+`, `-`, `*`, `/`

`fahr` and `cels` are instances of `int`

Statements are executed in sequence. End with semicolon.

`"\t"` is the tab string

Fahrenheit to Celsius 2

```
/* Program to print a Fahrenheit to Celsius conversion
   table for fahr = 0, 20, ..., 300 */
```

```
public class FahrCels2
{
    public static void main(String [ ] args)
    {
        int fahr, celsius;
        int lower, upper, step;

        lower = 0;      /* lower limit of temp table */
        upper = 300;    /* upper limit */
        step = 20;      /* step size */

        fahr = lower;
        while (fahr <= upper) {
            celsius = 5 * (fahr-32) /9;
            System.out.print(fahr);
            System.out.print("\t");
            System.out.println(celsius);
            fahr = fahr + step;
        }
    }
}
```

Declare

Initialize

Compute

while (...) {...}
Logical operators:

<, >, <=, >=,
==, !=

print vs.
println

Run It

To compile:

```
javac FahrCels2.java
```

To run:

```
java FahrCels2
```

The output:

0	-17
20	-6
40	4
60	15
80	26
100	37
120	48
140	60
160	71
180	82
200	93
220	104
240	115
260	126
280	137
300	148

Fahrenheit to Celsius 3

```
/* Program to print a Fahrenheit to Celsius conversion table
   for fahr = 0, 20, ..., 300 (floating point version) */

import java.text.DecimalFormat;
public class FahrCels3
{
    public static void main(String [ ] args)
    {
        double fahr, celsius;
        int lower, upper, step;
        DecimalFormat floating = new DecimalFormat("##,##0.#");

        lower = 0;      /* lower limit of temp table */
        upper = 300;    /* upper limit */
        step = 20;      /* step size */

        fahr = lower;
        while (fahr <= upper) {
            celsius = (5.0/9.0) * (fahr-32);
            System.out.println(floating.format(fahr) +
                               "\t" + floating.format(celsius));
            fahr = fahr + step;
        }
    }
}
```

import DecimalFormat
gives us **DecimalFormat**
objects

double vs. float

5/9=0 whereas
5.0/9.0=0.555...

Floating.format(x)

The Output

0.0	-17.8
20.0	-6.7
40.0	4.4
60.0	15.6
80.0	26.9
100.0	37.8
120.0	48.9
140.0	60.0
160.0	71.1
180.0	82.2
200.0	93.3
220.0	104.4
240.0	115.6
260.0	126.7
280.0	137.8
300.0	148.9