# Primitive Types

## Why Java

* Java is popular <https://www.tiobe.com/tiobe-index/>.
* Java is friendly to new learners.
* Java is “compiled once and run anywhere”
* Java is cross platforms.

## Java and JDKs

* Oracle JDK vs OpenJDK
* Install OpenJDK
* Verify installation by “java –version” and “javac –version”

## HelloWorld

* Plain text editor
* Compile and run
* Explanation of each line in “HelloWorld.java”

## Data and Data Types

* Where to save data? memory address is hard to remember so using a meaningful name instead.
* What to save? How to interpret bits in a fixed memory block? Data type.
* The most basic data type is integer
* Arithmetic operators +,-,\*,/, %
* Self increment/decrement ++,--
* Compound assignment +=,-=,…
* Big endian vs Little endian (advanced)

## Double

* Introduction to FPU
* Casting between int and double
* How to round a double value to the nearest integer? (int)(x+0.5) (int)(x-0.5)

## String literal

# Using Objects

Primitive types are ready for use in Java, while other data types need to be customized/defined by programmers. Some types are so common so they are already defined and included in Java Standard Library such as String.

## Objects

* Class and object
* Class is another name for “data type”
* Instance is another name of object
* Where are objects stored? Heap and Stack (Advanced)
* null

## Methods

* + Method prototype/signature
  + Parameters
  + Return
  + Arguments vs parameters
  + Overloaded methods: same name but different signatures (name mangling)

## String

* Syntax sugar for creating String objects with literals
* String objects are immutable
* Concatenation with +, +=
* Escape sequences \
* Java APIs document online
* Packages are containers of multiple classes, java.lang is the package containing String.
* String methods: length(), substring(), indexOf(), equals(), compareTo()
* Character encoding (Advanced)

## Integer and Double class

* Integer
  + Integer(int)
  + Integer.MIN\_VALUE
  + Integer.MAX\_VALUE
  + int intValue()
* Double
  + Double(double)
  + double doubleValue()
* Boxing and Unboxing

## Math

Just the same as String, Integer, Double, Math is also a class in java.lang package.

* Math class contains only static methods.
* Common methods: abs(), pow(), sqrt(), random() [0,1)
* Generate random number in range 10 to 100?

# Boolean Expressions and if Statements

## Relational operators

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

## If statements

* One way selection, if(){}
* Two-way selection if(){} else{}
* Multiple-way selection if(){} else if{} else if{} … else{}

## Logical operators

* !, &&, ||
* Short-circuited evaluation

## Comparing objects

* Obj1 == obj2 VS. obj1.equals(object2)
* String == string (immuatable so…)

# Iteration

## While loop

## For loop

## String iteration

# Writing Classes