Module 1 - Lecture 2

Variables and Data Types

Yesterday

- File systems
- What is a Shell?
- Git overview

Java Overview

- Java is a modern object-oriented programming language.
- It’s portable. Write once, run anywhere.
- First created at Sun Microsystems in 1995, now controlled by Oracle.

Java vs Related Languages

- C/C++
  - Similar syntax
  - Java eliminated undesirable features
- JavaScript
  - Originally developed by Netscape in 1995 as “LiveScript”
  - No technical relationship
- C#
  - Released by Microsoft with .NET platform in 2000
  - Similar features and syntax

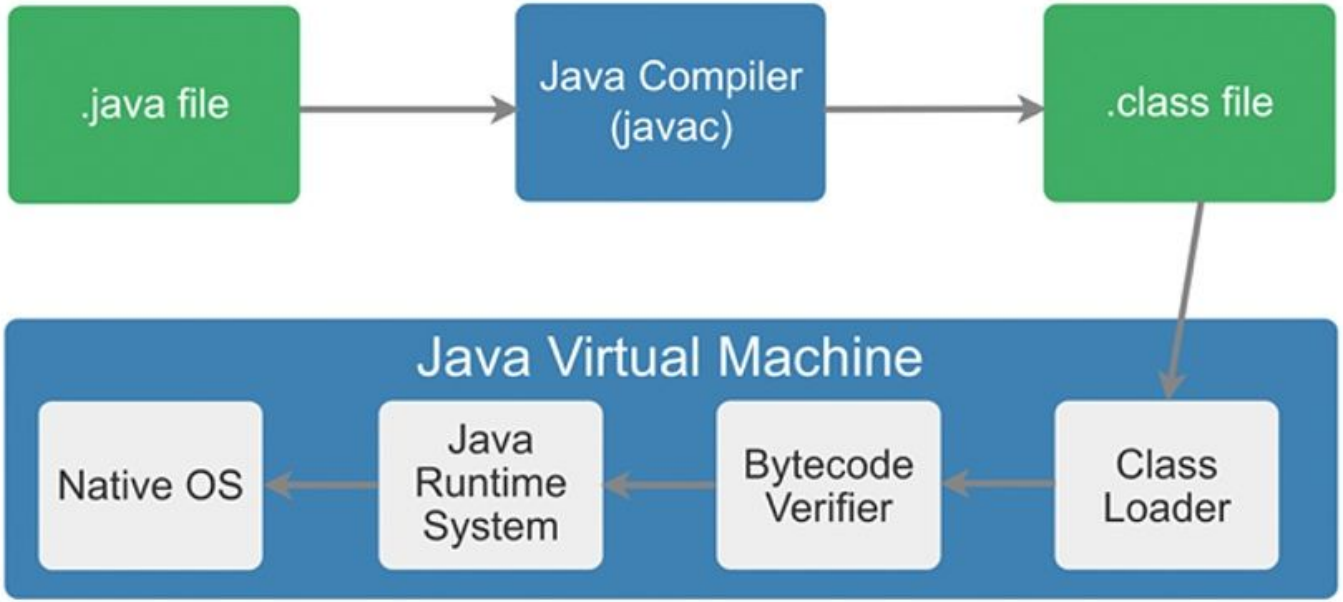
Parts of Java

- Java Virtual Machine (JVM)
  - The code runs on the JVM.
  - Platform **independent**.

- Java Runtime Environment (JRE)
  - Contains the tools required to **run** Java programs.
  - Contains the JVM along with Java's built-in libraries/packages
  - Platform **dependent**.

- Java Development Kit (JDK)
  - Contains the tools required to **write** Java programs.
  - Contains a JRE
  - Platform **dependent**.

What is Java bytecode?



Source: http://www.techlila.com/write-programs-linux/

Eclipse

- Eclipse is an Integrated Development Environment (IDE).
- It provides features to increase efficiency for software developers.
  - An easy to use user interface
  - Code organization
  - Immediate feedback when errors occur
  - Debugging
  - Syntax highlighting
  - Intellisense

Let's Code!

What is a Program?

A program is made up of two parts, **data** and **behavior**.

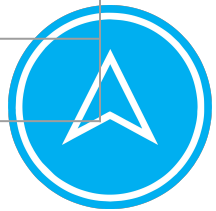
Today's focus: **data!**

Variables

- A variable is a storage container paired with a symbolic name or identifier.
- Variable names must be unique.
- Variables contain a **value** of a certain **type.**
- Variables come about through **declaration**, and **initialization/assignment**.

Java Primitive Data Types

Type	Contains
boolean	true or false
byte	-127 to 127
char	‘a’, ‘b’, ‘c’, or any Unicode character
int	-2^31 to 2^31 - 1
long	-2^63 to 2^63 - 1
float	-3.4 * 10^38 to 3.4 * 10^38 - 1
double	±5.0 × 10^−324 to ±1.7 × 10^308



String

A string represents a sequence of zero or more Unicode characters.

- **Declaring a String**
  With `"..."`
- **Escape Characters**
  Like `\n` and `\t`. Needed because you can't really type a tab or return in a string directly.

Variable Declaration in Java

<data_type> <variable_name>;

int myAge;
String myName;
bool isInstructor;

Each of the statements above **declare** a variable with a data type and a name.

Variable Initialization in Java

<data_type> <variable_name> = <value>;

int myAge = 50;
String myName = “Billie”;
bool isInstructor = **true**;

Each of the statements above **initialize** a variable with a data type, a name, and a value.

Variable Assignment in Java

<variable_name> = <value>;

myAge = 50;
myName = “Billie”;
isInstructor = **true**;

Each of the statements above **assign** a variable with a a name to a value.
An assignment statement is only valid if the variable has already been declared or initialized!

Variable Naming

- Follow camel-casing conventions: the first word is lowercase, and subsequent words have the first letter capitalized
- Use pronounceable names for variables
- Use names over single characters
- Avoid creating multiple variables that are variations of the same name, as this creates confusion
- Use names that describe WHAT the variable does, not HOW it does it
- With booleans, use names that start with is, has, was, and so on; avoid using a double negative

CANNOT

- Start with a number
- Use keywords

Let's Code!

Expressions

An **expression** is statement of code which can be evaluated to produce a result. We use the result to often assign the value to another variable or as the input to another expression.

Today we will focus on **arithmetic expressions**.

Category	Operators
multiplicative	`*` or `/` or `%`
additive	`+` or `-`
assignment	`=`

Let's Code!

Type Conversion

There are two types of casting that occur.

Widening / Implicit Casting occurs when we convert from one type with less size to a type with more size.

Narrowing occurs when we convert from a type with more size to a type with less size. **Truncation** occurs when you go from larger to smaller and have to lose some of the data in the process.

Let's Code!

Reading

- Module 1
  - Logical Branching

QUESTIONS?