Week 1
Great Software Begins Here

Java Simple Hello World Program

Java's main function

- `public` – Java's main function requires a public **access modified**.
- `static` – Java's main method is static, which means no instances need to be created beforehand to invoke it.
- `void` – Some programming languages return a zero or 1 to indicate the main method has run successfully to complete. Java's main function is void, which means it does not return any value when it completes.
- `main` – When the JVM starts a standalone application, the main method is the function that gets invoked.
- `String[ ]` – An array of configuration parameters to be used by the application can be passed into the main function as arguments.
- `args` – The configuration parameters passed into the main function in Java are typically named args.

Packages

A **package** is simply a container that groups related types (Java classes, interfaces, enumerations, and annotations)

Map, Queue, Set, ArrayList, etc. belong to the java.util.* class.

packages help you to reserve the class namespace and create a maintainable code

Two types:

- Built-in Package
- User defined packages

Packages

How to define a Java package?

To define a package in Java, you use the **keyword** `package`

Java uses **file system directories** to store packages

The package name must be unique (like a domain name), but in reverse order. For example: edu.sjsu.cs

Use keyword `import`, to import packages in java

```
import package.name.ClassName; // To import a certain class only

import package.name.*
```

Access Modifiers

Access modifiers are used to set the accessibility (visibility) of classes, interfaces, variables, methods, constructors, data members, and the setter methods.

Modifier	Description
Default (package private)	declarations are visible only within the package
Private	declarations are visible within the class only
Protected	declarations are visible within the package or all subclasses
Public	declarations are visible everywhere

Attributes/Properties/Object Data Types

- class attributes are variables within a class

```
public class Rectangle {
        int x = 5;
        int y = 3;
}
```

- Accessing attributes:

You can access attributes by creating an object of the class, and by using the dot syntax (.)

Methods

- methods are declared within a class

- Static vs. Non-Static
  static method can be accessed without creating an object of the class, unlike public, which can only be accessed by objects

- Access Methods With an Object
  by using the dot syntax (.)

Java OOP

OOP stands for **Object-Oriented Programming**.

Procedural programming is about writing procedures or methods that perform operations on the data, while object-oriented programming is about creating objects that contain both data and methods.

Object-oriented programming has several advantages over procedural programming:

- OOP is **faster** and **easier** to execute
- OOP provides a **clear structure** for the programs
- OOP helps to keep the Java code DRY "**Don't Repeat Yourself**", and makes the code easier to maintain, modify and debug
- OOP makes it possible to create **full reusable applications** with less code and shorter development time