

02-0: Java Programs

- Java programs are a collection of classes
 - Each class is a *Template*, not an *Object*
 - Can't use a class until we create an instance (call "new")
- One exception: Static Methods
- In this course, we will only use one static method: main method

02-1: Java Programs

- Simplest Java Program:
 - Hello World 3 ways

02-2: Classes

- Classes contain data and methods (like functions in python)
- Methods can access data members (called instance variables) of a class
- Special method, called "Constructor", which is called when an object of the class is created using new.

02-3: Classes

- Second Example: Employee

02-4: Implementation I: Locals

- Variables declared inside functions are called local variables
- Stored on the *Call Stack*
- Created when function is called
- Disappear when function ends

02-5: Implementation I: locals

- When a method is called:
 - Allocate space on the call stack to store method parameters & variables local to the method
 - Activation record for the method
 - Copy values into the space allocated for the parameters
 - Execute the body of the method
 - Pop activation record off the stack

02-6: Implementation I: locals

- Example: MethodTest
 - Code
 - Memory contents (on whiteboard)

02-7: **Pass-By-Value**

- Methods in Java are “Pass-By-Value”
- Value is copied into the parameter
- Changes to the parameter don’t change the value passed in
- Example: MethodTest2

02-8: **Objects**

- Stack is not the only place where data is stored
- Objects (specifically, instance variables) are stored on the Heap
 - Different section of memory than the stack
 - Memory is *allocated* (or set aside) on the heap through a call to **new**

02-9: **Objects**

- HeapData, HeapDriver1

02-10: **Objects**

- Every object in your program is a pointer to memory on the heap
- When we pass an object as a parameter, copy the pointer
- Changes to the *pointer itself* are not reflected back to the calling method
- Changes made to *what the pointer points to* are reflected back to the calling method

02-11: **Objects**

- HeapData, HeapDriver2, MethodTest3