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# CSYE 6200

## Concepts of Object Oriented Design

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# Java Program

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- Lecture
    - 1. Constants
    - 2. Variables: NOT INITIALIZED BY DEFAULT
      - 1. Char
      - 2. integer
      - 3. float
    - 3. Scope
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- Java is all about Classes
    - A Class is used to instantiate (i.e., create) one or more Objects

Java program is made up of various classes

- User created classes
- Libraries: Pre-existing classes

- Java Class Libraries
    - Classes organized in packages
  - We ALWAYS create OUR classes in packages
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- Java Program
    - Create Java source (.java) file
      - editor or Integrated Design Environment (IDE)
      - javac Hello.java
    - Compile source file
      - Compiler (javac) creates .class file
    - Load classes (.class) into memory
      - Class loader loads class files from disk

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- Java Program
    - Verify
      - Byte code verifier: checks byte codes in each class for security
    - JVM
      - Just-in-time (JIT) compiler translates bytecodes into machine specific language for execution

NOTE: Java Program execution begins in the main method

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- Java Types
    - Primitive Types
      - boolean, char, short, int, float, long, double.
      - Stack memory allocation
    - Non-Primitive (Reference) Types
      - Used to reference and hold Objects, e.g. String
      - Heap memory allocation
  - Java is
    - a **STRONGLY TYPED LANGUAGE**
    - a **STATICALLY TYPED LANGUAGE**
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- Java is a **STRONGLY TYPED LANGUAGE**
    - All variables are required to have types
  - Java is a **STATICALLY TYPED LANGUAGE**
    - Once assigned a type variables retain that type assignment for duration of program execution
      - EXCEPTION: type casting
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- Classes are Reference types
    - Class variable holds reference (i.e. pointer) to actual object allocation on heap
  - Class methods (like functions)
    - Each supplied argument must have a type
    - The return value must have types
    - Methods which do not return a value use void

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- 8 Primitive Types
    - boolean: ONLY true or false
    - byte: 8-bits
    - char: 16-bits
    - short: 16-bits
    - int: 32-bits
    - float: 32-bits
    - long: 64-bits
    - double: 64-bits
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- Online Information
    - Java 8
      - <http://docs.oracle.com/javase/8/docs/api/index.html>
    - Java 7
      - <http://docs.oracle.com/javase/7/docs/api/index.html>
    - Java 16
      - <https://docs.oracle.com/en/java/javase/16/docs/api/index.html>
    - Java 20
      - <https://docs.oracle.com/en/java/javase/20/docs/api/index.html>
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