What is java?

* OOP lang
* Compiled ( program called javac this is the compiler)
* Virtual machine ( this means if we can run the VM on a computer, we can run java code no matter that computers hardware or OS) WORA (Write Once Run Anywhere)
* That virtual machine is called the JVM
* Staticly Strongly typed
* Not a functional language

Why Java?

* WORA
* Number 1 server side language
* Has soooo many jobs

JVM JRE JDK

* JVM - virtual machine it can take java bytecode and execute on a machine
* JRE - java runtime environment - it has a jvm, it also has other code like java.lang and necessary config for the jvm to run on a machine
* JDK - java development kit - it has a jre for running java, it also has tools for writing new java code like javac the compiler

Asides

* Java 1.8 is the standard
* Java is pass by value

Java to study

* Variable types
  + What are they
    - Int, byte, char, short, long, double, float, bool ( primitives)
    - String, Array, Objects - reference types
  + What are their sizes
    - Byte - 1byte (8 bits 10010011)
    - Char - 2bytes
    - Short - 2bytes
    - Int - 4byte - the standard integer variable (assume all literal numbers are ints)
    - Long - 8 bytes (you will probably not have to use)
    - Float - 4 bytes
    - Double - 8 bytes - the standard for decimal values ( assume all decimals are doubles)
    - Bool - don’t worry about it
  + How do they relate to each other
    - Byte short char int long are all integer data types
      * This means no decimals they only hold whole numbers
      * Most can be positive or negative
    - Float Longs are our decimal types, they follow the IEEE floating point standard
  + What kinds of values can they hold
    - Byte char short int long get whole numbers no decimals
      * Int 2,147,483,647
    - Float and double get deciamls values - float has fewer than int and double has fewer than a long
    - Bool - true or false
  + Modifiers
    - Final - is the same effect as const. The variable cannot be reassigned
* Methods
  + What is a method
    - Its just like a function in js
    - Belongs to an object or a class
    - Has params and a return value
  + What are the pieces of a method signature
    - 4 pieces
    - 1 access modifer (public private protected)
    - 2 static or not (the word static makes the method belong to the class instead of belonging to an instance of the class ie an object
    - 3 return type (any primitive or object)
    - 4 ( with params) you put the type then a name
    - 5 throws for what exceptions it can throw
  + What is method overloading
    - Is two method with the same name on the same object but with a different signature
    - Public void doSomething() public void doSomething(int i) // we have to change params to do overloading
  + What is void
    - Void just means it returns no value
* Objects
  + How to make an object
    - Write the object name write var name = new call constructor
    - String s = new String(“s”)
  + What is a class
    - Class is a blueprint and an object is built from that blueprint
    - Class are where we wwrite all of our code
    - All classes can become objects
    - Chose one class the run the program - a method called main
    - We make classes for data in hiearchy
    - Constructor (have name of the class)
      * Always call super or this as the first line of the constructor
      * Use these to make new instances of objects
    - Superclass object at top
    - There needs to be at least one class per file and it needs the same name as the file
  + What does the static keyword do
    - Makes a variable or method belong to the class and not an instance of the class
  + How to relate objects to each other
    - There is a hierarchy it has the super class Object at the top
    - We are all of the types of our parents and ourself
  + Method overriding
    - When I write a method with the exact same signature as a method from one of my parents.
    - Then I get to use my implementation instead of theirs
  + What are some methods every object has
    - equals, hashcode, toString
* Flow control
  + Expressions
    - How to compare to variable s
      * == ( there is no ===) != ! > <
    - How to compare objects?
      * Do == will compare the references to the objects
        + This means it will only be true if they are literally the same object
        + A a = new A()
        + A a2 = a
        + a2 == a
      * To compare values we have to override the equals method and write a method that compares our objects
    - Truthy falsey?
      * DOES NOT EXISTS IN JAVA
      * You can’t just put a variable into a java
        + if(user) // this wont work
      * Everything in a java expression must eval to either True or False
  + If
  + Else
  + Switch
  + For
  + While
  + Do while
  + Enhanced for
  + Ternary
* Arrays
  + Size
    - Arrays in java have a fixed size chosen on creation
    - This size will never change
  + Types
    - Like in TS, we choose one type for the array
      * Int[]
      * Object[]
      * User []
  + Access
    - arrayName[0]
    - Array.length this is a property that has the length of the array
    - So the last index of the array is array.length - 1
  + Methods
    - Only has the methods from the Object class
    - Arrays.sort
    - Arrays.indexOf
    - Their is a class called Arrays that has many static method for manipulating Arrays
  + How are they compared js arrays
    - not dynamic in size
    - Restricted in types
    - Faster in memory
* Strings
  + String data type
    - String, Object
    - Use “” to make
  + What is the String pool
    - Java devs discovered, people make the same string literals over and over
    - Lets put all strings into a special place on the heap and then if you try to make a string in that string pool, you just get a reference to the one that was already made
    - This way we can save a lot of memory from making string objects
    - One of the quirks of the string pool is that all strings must be immutable
    - STRING POOL IS NOT PERFECT
    - We can make strings not in the pool
  + What is the intern method
    - The intern method returns a reference to a string in the string pool
    - We call it on any string and that string will then be interned in the pool if it wasn’t already there.
  + How to Compare strings
    - If every single string in our program was in the string pool, we could use == for our comparisons
    - Because that is not the case, we should use .equals for comparing strings
    - s.equals(“hello”)