WiCS Workshop: Java 101

By Jacob Hobbs

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About me!

Jacob Hobbs

- Major: Computer Science (BA)
- Double Major: Women, Gender, and Sexuality Studies, conc: Sexuality Studies
- Minor in Mathematics
- Head TA for CS 2100 (DSA 1)
- CoStar Group SWE Intern (Summer ‘23, ‘24)
- Co-Director of WXTJ, our student radio!

Workshop Agenda / Goals

1. Who Uses Java?
2. Why Java?
3. What is Object Oriented Programming (OOP)?
4. Java Data Types & Some Data Structures
5. Example: Minecraft's Brigadier!

Who Uses Java? BIG players!

Though new companies are starting to use new, specialized programming languages, Java is still used across the field because of its simplicity, reliability, and security. Here are some examples:

Why Java?

Java is...

Portable

- Can be used for a variety of applications, and across almost any OS
- Same code can be used for multiple devices/operating systems

Safe

- Based on C syntax
- You can write all of your code on *one line!* No issues with spacing (looking at you, Python!)
- Addresses C “gotchas” like memory management. Java does this for you!

Object-Oriented

- *more on this...*

What is Object-Oriented Programming (OOP)?

Everything is an object! (object = thing with properties & functions)

Objects...

- Can be made up of other objects
- Can pass messages to each other objects
- Have a type (we call an object's type its *class*)

An object's type/class defines what questions you can ask that object

OOP Example: My Mini Coop!

What properties do Minis have?

What functions would a Mini be able to perform?

How would Minis interact with other Minis? With other objects?

What other objects compose a Mini?

OOP Example: My Mini Coop!

Aside: these lists are very similar to UML diagrams, which are very often used to describe things in CS

Properties
(info/data about the object)

- MPG: int
- milage: int
- maxSpeed: int
- paintColor: String
- tirePressure:double[]
- bodyLength: double

What else?

Methods
(things the object can do)

+ start()
+ changeGear(Gear g)
+ rollDownWindows()
+ brake()
+ getGasLevel(): double
+ getMediaVolume(): int

What else?

Java Data Types

“Primitive” Data Types

- Basic data type that stores a certain amount of information and type of information
- No extra functions
- Examples (size, usage):
  - boolean (1 bit, stores true/false)
  - byte (1 byte, whole nums)
  - short (2 bytes, whole nums)
  - char (2 bytes, stores single character)
  - int (4 bytes, whole nums)
  - long (8 bytes, whole nums)
  - float (4 bytes, nums w/ decimal)
  - double (8 bytes, nums w/ decimal)

“Reference” Types

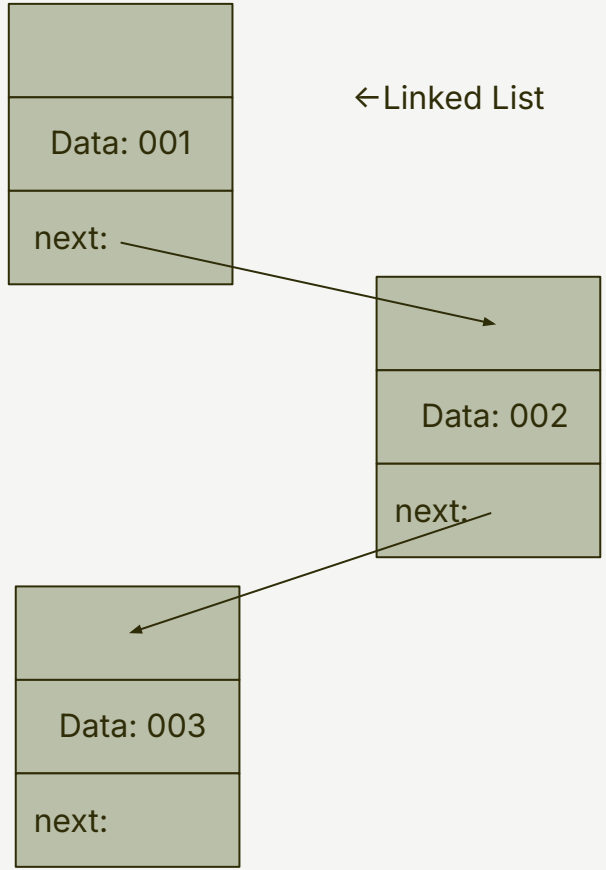
- Much more powerful
- You can define your own types or “classes” of data
- Can define specific functions that your custom type can do
- Examples:
  - My mini cooper!
  - Strings (text)
  - Any other more complex object

Data Structures

Data Structures are like combinations of various data types. Combining multiple custom classes allow for extremely useful applications (especially in the real world!)

Some examples are:

- Arrays
- ArrayLists/Vectors
- Linked LIsts
- Trees (Binary Search Tree, AVL Tree, etc)
- Hash Tables
- Priority Queues
- Heaps



Ex: Minecraft's Brigadier!

Click around Minecraft's site to see how they use Java!

tinyurl.com/WiCS-Java101

Type in the link above, go to "WiCS Java 101 Links, then click the Minecraft Code link.

← Click the link to their GitHub on this page!

Writing Your First Program!

Go to the shared drive and check out CS 2100's first lab!

tinyurl.com/WiCS-Java101

Go to the link above, and check out "DSA1-Lab-1.pdf" to find out how to download IntelliJ (a great Java IDE) and how to write your first program!