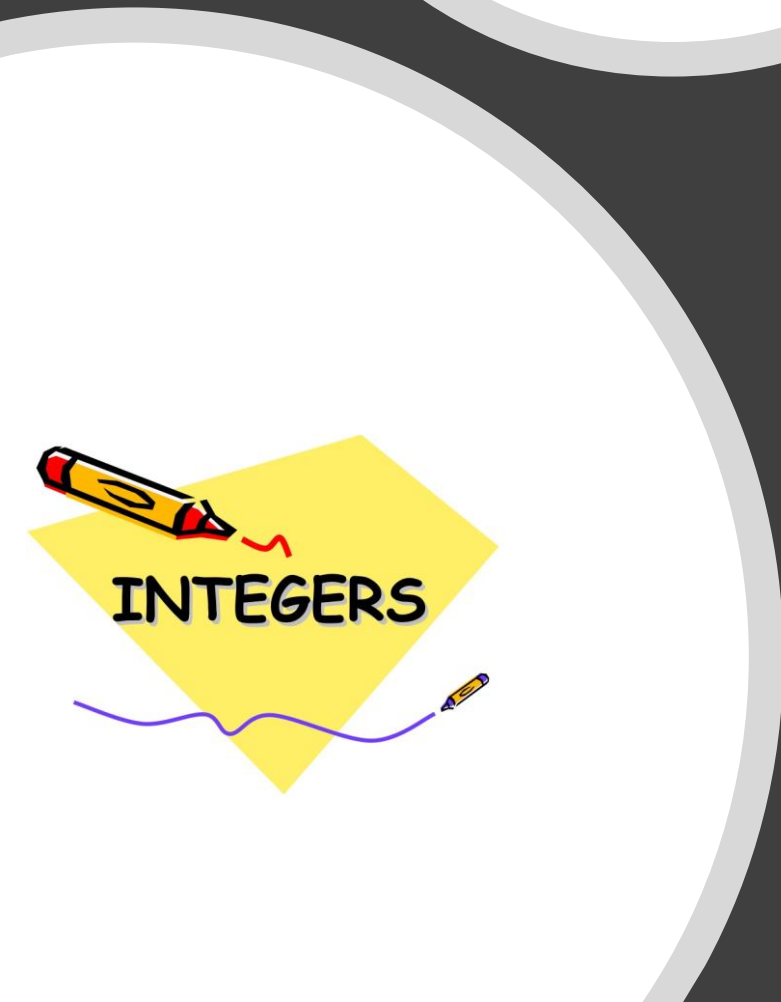


1.8



# Java Data & Data types

# Java Data & Data types



# What is data?

- Data is a collection of facts, such as numbers, words, measurements, or observations that carry information.
- In programming, data is measured, collected and reported.
- When programming in object oriented languages like Java, we must specify the data type of our variables, methods, etc...

# Primitive vs Objects

- In order to begin learning about the different data types, we must start learning the hierarchy of data in the Java programming language
- Java Data is divided by Primitives and Objects
- Primitive data types are forms of data that only specify the size and type of the variable values
- Objects (also called reference types) are forms of data that contain additional values and usually reference one or more data types.

# What are the primitive data types?

- byte = numbers from -128 to 127
- Short = numbers from -32,768 to 32,767
- Int = numbers from -2,147,483,648 to 2,147,483,647
- Float = stores fractional numbers up to 7 decimal places
- Double = stores fractional numbers up to 15 decimal places
- Boolean = store true or false
- Char = store single characters or ASCII values

# What are the Objects?

- Safe to say that it be impossible to mention all the objects in the Java Library
- Also it is difficult to say all of them as we can create or own objects
- Objects contain methods usually unique to its type that help us process the data inside of it.
- The most common objects in the Java Library are:
  - Numbers = A reference to all numbers
  - Strings = a collection of chars
  - Arrays = a immutable collection of other data
  - ArrayList = a mutable collection of data

# How do we declare variables with a data type?

- The common syntax for declaring variables in Java is
  - `datatype variable_name = data;`
  - OR
  - `datatype variable_name;`
- Example:
  - A Primitive:     `int num1 = 10;`
  - A Object:         `String str1 = "Hello World";`

# What can we do with data?

- We can perform operations on variables that coincide with they're types
- Examples:
  - We can add numbers
  - We can join strings
  - We can store collections of data
  - We can check for equality

# Operators

- Operators are used to perform operations on variables and values

Operation Types	Operators	Examples
Arithmetic Operations	+, -, *, /, %, ++, --	A+B, A-B
Relational Operations	==, !=, >, <, >=, <=	A==B, A!=B
Logical Operations	&&,   , !	(A==B) && (A<B)
Assignment Operations	=, +=, -=, *=, /=, %=	B=10, A+=20
Ternary Operations	(condition)? value if true : Value if false	X=(A<B)? 10:20
Bitwise Operations	&,  , ~, ^	A&B, A   B

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# Lets try some operations

- `int num1 = 10;`
- `int num2 = 7;`
- `System.out.println(num1 + num2);`
- Prints out 17
- `System.out.println(num1 == num2);`
- Prints out False
- `System.out.println(num1 * num2);`
- Print out 70

# Try some operations yourself

- Make a variable that calculates the area of a triangle
- Make a variable that calculates the percent out a fraction
  - Example:
    - $90/100 = 100\%$
    - $33/55 = 66\%$
    - $4/5 = 80\%$
- Combine two Strings
  - Example
    - "Hello" and " World" = "Hello World"