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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, AI=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”