Types and Variables

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Before We Begin

- Make sure you have Java and the Java JDK downloaded on your computer
  - can run **`java -version`** in terminal to check
- Make sure you have IntelliJ downloaded on your computer

Vocab Alert!

type: category or set of data values

- Affects the types of operations that can be performed on the data
- In Java always need to specify the type for data

primitive types: the 8 simple types for numbers, text etc.

Why do languages need types?

Computers see information as a long stream of 1s and 0s, types tell the computer how to view those ones or 1s.

Each type has distinct properties, value ranges, and number of 1s or 0s it takes up.

8 Primitive Types

byte: 8-bit signed whole number
- from -128 to 127

short: 16-bit signed whole number
- from -32,768 to 32,767

int: 32-bit signed whole number
- from -2^{31} to $2^{31}-1$

long: 64-bit signed whole number
- from -2^{63} to $2^{63}-1$

float: 32-bit non-whole (floating point) number
- used when wanting to save memory

double: 64-bit floating point number
- default choice for non whole numbers

boolean: truth value
- possible values are true and false

char: 16-bit unicode character, e.g. ‘A’
- can also set values by ASCII values

Example Assignments

```
byte b = 0;

short s = 0;

int i = 0;

long l = 0l;
```

```
float f = 0.0f;

double d = 0.0;

boolean truthy = true;

char c1 = 'A';

char c2 = 65;
```

A Note on Variable Names

- Different languages have different conventions for variables names
- For all languages variable names...
  - must start with a letter
  - can contain letters and numbers
  - cannot contain spaces
  - should be descriptive and easy to understand
- In Java…
  - regular variable names are “camel case”
    - ex: helloWorld
  - constants (discussed later) are all caps “snake case”
    - ex: HELLO_WORLD

The 4 Types You'll Use A Lot

int - whole numbers

double - non whole numbers

boolean - true or false

char - a single character

Some sample code :)

```
int heightInInches = 64;
System.out.println("I am " + heightInInches + " inches tall");

double heightInFeet = 5.33;
System.out.println("I am " + heightInFeet + " feet tall");

boolean overSixFeet = false;
System.out.println("Am I over 6 feet tall? " + overSixFeet);

char lastInitial = 'A';
System.out.println("My last name starts with: " + lastInitial);
```

Last Note on Types

When deciding which type to use for a variable try to pick the one that makes the most sense. Don’t use a double when you aren’t going to use the decimal part of it.

Examples:

- Number of days it rained last year → int
- Average of a group of numbers → double
- If the current month has a y in it → boolean
- Keep track of first letter in name → char

Practice Problem

Write a program with different types of variables in it. Your variables should have names that make sense and should kind of go together. Try to practice making variables of each type and then printing them out.

Example:

- Your age (int)
- The cost of your last meal (double)
- If you have an pets (boolean)
- Your favorite number less than ten (char)

The End