Chapter 1 - Variables and datatypes

Just like we have some rules that we follow to speak english (the grammar), we have some rules to follow while writing a Java program. The set of these rules is called syntax.
↳ Vocabulary & Grammar of Java.

Variables
A variable is a container that stores a value. This value can be changed during the execution of the program.
Example:

int number = 8 ; ← Value it stores!
Data type   variable name

Rules for declaring a variable name
We can choose a name while declaring a Java variable if the following rules are followed:

1. Must not begin with a digit → int 1arry; is invalid !
2. Name is case sensitive → harry and Harry are different !
3. Should not be a keyword (like void)
4. White space not allowed. → int Code with Harry; is invalid
5. Can contain alphabets, $ character, _ character and digits if the other conditions are met.

Data Types
Data types in Java fall under the following categories
1. Primitive Data Types (Intrinsic)
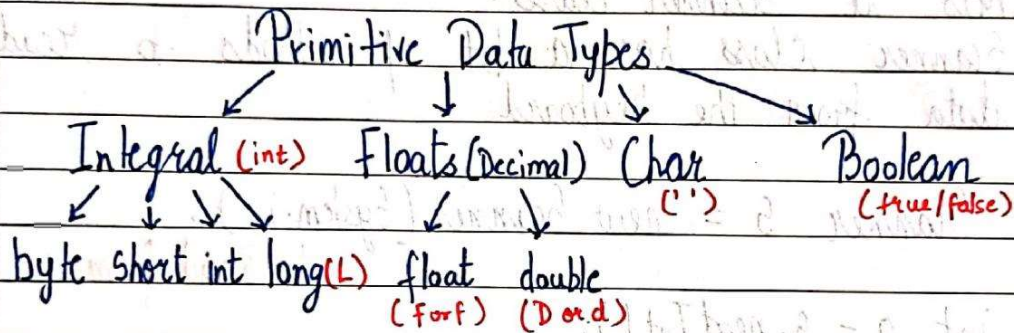2. Non-Primitive Data Types (Derived)

Primitive Data Types

Java is statically typed. → Variables must be declared before use!

There are 8 primitive data types supported by Java:

1, byte → • Value ranges from −128 to 127
- • Takes 1 byte
- • Default value is 0

2, Short → • Value ranges from $-(2^{16})/2$ to $(2)^{16}/2 - 1$
- • Takes 2 bytes
- • Default value is 0

3, int → • Value ranges from $-(2^{32})/2$ to $(2)^{32}/2 - 1$
- • Takes 4 bytes
- • Default value is 0

4, float → • Value ranges from (See Docs)
- • Takes 4 bytes
- • Default value is 0.0f

5, long → • Value ranges from $-(2^{64})/2$ to $(2^{64})/2 - 1$
- • Takes 8 bytes
- • Default value is 0

6, double → • Value ranges from (See docs)
- • Takes 8 bytes
- • Default value is 0.0d

7, char → • Value ranges from 0 to 65535 $(2^{16}-1)$
- • Takes 2 bytes → because it supports unicode
- • Default value is '\u0000'

8. boolean →   • Value can be true or false
               • Size depends on JVM
               • Default value is false

Quick Quiz : Write a Java program to add
              three numbers.

How to choose data types for our Variables

Primitive Data Types

Integral (int)   Floats (Decimal)   Char   Boolean
                                    ('')   (true/false)

byte short int long(L)   float   double
                         (f or F) (D or d)

In order to choose the data type we first need to
find the type of data we want to store. After that
we need to analyze the Min & Max value we might use

Literals
A constant value which can be assigned to the variable
is called as a literal

    101   → Integer literal
    10.1 f → Float   literal
    10.1   → double literal (default type for decimals)
    'A'   →   character literal
    true →   boolean literal
    "Harry" → String literal

Keywords
Words which are reserved and used by the Java Compiler. They cannot be used as an Identifier.

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Go to dbcs.oracle.com for a comprehensive list!

Reading data from the Keyboard
In order to read data from the keyboard, Java has a Scanner class.

Scanner class has a lot of methods to read the data from the keyboard

Scanner s = new Scanner (System.in);

↳ Read from the keyboard

int a = s.nextInt();

↳ Method to read from the keyboard (Integer in this case)

Exercise 1.1
Write a Program to calculate percentage of a given student in CBSE board exam. His marks from 5 subjects must be taken as input from the keyboard. (Marks are out of 100).