

## Day 2

# Variables and Data Tyes

### Variables

- A variable is a container that holds data values.
- Variables are used to store and represent data in a program.

#### **Examples:**

int x = 100;

int age = 30;

float price = 150.50f;

double cost = 150.50;

String name = "John";

char grade = 'A';

### Data Types

Data types define the type and size of data that can be stored in a variable.

#### **1) Primitive Data Types**

Primitive data types are the most basic data types in Java. They are predefined by the language and named by a reserved keyword.

- byte
- short
- int
- long
- float
- double
- char
- boolean

#### **2) Non-Primitive (Reference) Data Types**

Non-primitive data types are created by the programmer and are not defined by Java (except for String).

- **String**
- **ArrayList**

- **HashMap**
- **HashSet**
- **Object**

### **Size and Description of Primitive Data Types**

<b>Data Type</b>	<b>Size</b>	<b>Description</b>
byte	1 byte	Stores whole numbers from -128 to 127.
short	2 bytes	Stores whole numbers from -32,768 to 32,767.
int	4 bytes	Stores whole numbers from -2,147,483,648 to 2,147,483,647.
long	8 bytes	Stores whole numbers from -9,223,372,036,854,775,808 to 9,223,372,036,854,775,807.
float	4 bytes	Stores fractional numbers, sufficient for storing 7 decimal digits.
double	8 bytes	Stores fractional numbers, sufficient for storing 15 decimal digits.
boolean	1 bit	Stores true or false values.
char	2 bytes	Stores a single character/letter enclosed in single quotes (e.g., 'A').

### **Examples of Valid and Invalid Declarations**

- **char ch = 'ABC';** // Invalid: char can only store a single character.
- **String ch = 'ABC';** // Invalid: String should use double quotes.
- **String ch = 'A';** // Invalid: String should use double quotes.
- **String ch = "A";** // Valid
- **boolean b = true;** // Valid
- **boolean b = "true";** // Invalid: boolean should not use quotes.
- **String s = true;** // Invalid: String cannot store a boolean value.
- **String s = "true";** // Valid

## Java Variables and Data Types Quiz

### Question 1:

Which of the following is a correct way to declare a variable in Java? a) int 1stNumber = 10;  
b) float number1 = 5.0f;  
c) char letter = "A";  
d) double value = '5.0';

**Answer:**

b) float number1 = 5.0f;

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### Question 2:

What is the size of an int in Java?

- a) 4 bits
- b) 8 bits
- c) 16 bits
- d) 32 bits

**Answer:**

d) 32 bits

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### Question 3:

Which data type would you use to store a single character?

- a) String
- b) char
- c) boolean
- d) int

**Answer:**

b) char

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### Question 4:

What is the default value of a boolean variable in Java?

- a) true
- b) false
- c) 0
- d) 1

**Answer:**

b) false

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### Question 5:

What is the result of the following code snippet?

```
int a = 10;  
int b = 20;  
int result = a + b;  
System.out.println(result);
```

- a) 1020
- b) 30
- c) 20
- d) 10

**Answer:**

- b) 30
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**Question 6:**

Which of the following is a valid float variable declaration?

- a) float num = 3.14;
- b) float num = 3.14d;
- c) float num = 3.14f;
- d) float num = 3.14F;

**Answer:**

- c) float num = 3.14f;
  - d) float num = 3.14F;
- 

**Question 7:**

What will be the output of the following code?

```
int x = 5;  
int y = 2;  
double result = x / y;  
System.out.println(result);
```

- a) 2.5
- b) 2
- c) 2.0
- d) 0

**Answer:**

- c) 2.0
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**Question 8:**

Which keyword is used to declare a constant in Java?

- a) final
- b) static
- c) const
- d) fixed

**Answer:**

- a) final
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**Question 9:**

Which of the following is a correct way to declare a string in Java?

- a) String name = 'John';
- b) char name = "John";
- c) String name = "John";
- d) char name = 'J';

**Answer:**

- c) String name = "John";