**JACKSON RUITIARI KABIRU**

**SCT221-0837/2022**

**CHRIS MACHARIA**

**SCT221-0778/2022**

**Java programming**

**Section 1:**

1. Explain the differences between primitive and reference data types.

Primitive Data Types:These are the basic data types that store simple values directly in the memory location. Examples include int, float, boolean, etc.

Size: They have a fixed size (e.g., int is 4 bytes, char is 2 bytes).

Usage: Typically used for simple values like numbers and characters.

Reference Data Types:These are objects or instances of classes. They store references (memory addresses) to the actual data, not the data itself. Examples include arrays, strings, and any object of a class.

Size: The size can vary depending on the class and its fields.

Usage: Used for more complex data structures and objects.

1. Define the scope of a variable (hint: local and global variable)

Local Variable: A variable declared inside a method or block and can only be accessed within that method or block.

Global (Instance/Static) Variable: Variables declared inside a class but outside of any method. They can be accessed by any method within the class. If it's static, it belongs to the class itself; if it's an instance variable, it belongs to the object instance.

1. Why is initialization of variables required.

Initialization gives variables a starting value. Uninitialized variables can lead to unpredictable behavior, as they may contain garbage values.

1. Differentiate between static, instance and local variables.

Static Variable: Shared across all instances of a class. It belongs to the class, not to any specific object.

Instance Variable: Belongs to an instance of a class. Each object has its own copy.

Local Variable: Declared inside methods or blocks. They are temporary and disappear once the block of code is finished.

1. Differentiate between widening and narrowing casting in java.

Widening : Converting a smaller data type to a larger data type (e.g., int to long). It's done automatically by the compiler.

Narrowing : Converting a larger data type to a smaller one (e.g., double to int). It must be done manually and can lead to data loss.

1. the following table shows data type, its size, default value and the range. Filling in the missing values.

|  |  |  |  |
| --- | --- | --- | --- |
| **TYPE** | **SIZE (IN BYTES)** | **DEFAULT** | **RANGE** |
| boolean | 1 bit | FALSE | true, false |
| Char | 2 | ‘\u0000’ | ‘\0000’ to ‘\ffff’ |
| Byte | 1 | 0 | -128 to 127 |
| Short | 2 | 0 | -215 to +215-1 |
| Int | 4 | 0 | -20000000 to 20000000 |
| Long | 8 | 0L | - 92233720368 to 92233720368 |
| Float | 4 | 00.0f | 1.45-45 to 3.40235E38 |
| Double | 8 | 0.0d | -1.8E+308 to +1.8E+308 |

1. Define class as used in OOP

A class is a blueprint or template from which objects are created. It contains fields (attributes) and methods (functions) that define the behavior of the objects.

1. Explain the importance of classes in Java programming.

Classes are the building blocks of OOP. They enable encapsulation, inheritance, and polymorphism, which are the pillars of OOP, allowing for reusable, modular, and maintainable code.