1.4 Variables and Data Types

1.4.1 Variables:

Variables are the identifier of the memory location, which used to save data temporarily for later use in the program.

Syntax: type variable_name;

OR type variable_name, variable_name, variable_name;

❑ Rules of Declaring variables in Java

1) They must not begin with digit.

2) Variable names are case-sensitive. This means that the variable Abc is not same as abc or ABC.

3) White space is not allowed.

4) It should not be a keyword.

5) Variables name can be of any length.

6) Variable must be declared before it is used in the program, it must be declared to the compiler.

Declaration does following three things:

a) It tells variable name to the compiler.

b) It specifies the data type of the data hold by variable.

c) The place of declaration in the program decided the scope of the variable.

Example:

variable definition and initialization

```
int width, height=60;
char letter='C';
float marks, area;
double d;
```

```
actual initialization
width = 8;
marks = 98.67;
```

❑ Types of Variables in Java

➢ There are three types of variables in Java:

1. Local variables
2. Instance variables
3. Class/Static variables

1. Local variables

A variable that is declared within the method that is called local variables.

2. Instance variables

A non-static variable that is declared within the class but not in the method is called instance variable.

3. Class/Static variables

A variable that is declared with static keyword in a class but not in the method is called static or class variable.

Example:

```
class A
{
intmark = 87; //instance variable
 static introll_no= 13; //static variable
 public static void main(String[] args) {
int age = 19; //local variable
system.out.prinln(“Mark are:” +mark);
```

```
system.out.prinln("Roll No. is:" + roll_no);
system.out.prinln("Age is:" + age);
 }
}
```

1.4.2 Data Types:

- Every variable in Java has a data type which tells the compiler what type of variable it as and what type of data it is going to store.
- It specifies the size and type of values.
- Information is stored in a computer memory with different data types.
- Whenever a variable is declared it becomes necessary to define a data type that what will be the type of data that variable can hold.

❑ **Primary Data Type**

Java has 8 primitive data types are as follow:

1. **Numeric**
   (a) Integer – byte, short, int, long
   (b) Floating Point – float, double
2. **Non-Numeric**
   (a) Character– char
   (b) Boolean – Boolean

❑ **Non-Primitive Data Types**

1. Classes
2. Interface
3. Arrays

(a) Integer Types

It can hold whole numbers such as 196, -52, 4036 etc. Java supports four different types of integers These are:

Type	Contains	Default	Size	Range
byte	Signed integer	0	8 bit or1 byte	-27 to 27-1 or -128 to 127
short	Signed integer	0	16 bit or 2 bytes	-215 to 215-1 or -32,768 to 32767
int	Signed integer	0	32 bit or 4 bytes	-231 to 231-1 or -2147,483,648 to 2147,483,647
long	Signed integer	0	64 bit or 8 bytes	-263 to 263-1 or -9223,372,036,854,755,808 to 9223,372,036,854,755,807

(b) Rational Numbers

It is used to hold whole numbers containing fractional part such as 36.74, or -23.95 (which are known as **floating point** constants). There are two types of floating point storage in java. These are:

Type	Contains	Default	Size	Range
float	IEEE 754 floating point single-precision	0.0f	32 bit or 4 bytes	±1.4E-45 to ±3.40282347E+38F
double	IEEE 754 floating point double-	0.0	64 bit or 8 bytes	±439E-324 to ±1.797693134862315 7E+308

	precision			

(c) Characters

It is used to store character constants in memory. Java provides a character data type called char whose type consumes a size of two bytes but can hold only a single character.

Type	Contains	Default	Size	Range
char	Unicode character Unsigned	\u0000	16 bits or 2 bytes	0 to 216-1 or \u0000 to \uFFFF

(d) Conditional

Boolean type is used to test a particular condition during program execution. Boolean variables can take either true or false and is denoted by the keyword boolean and usually consumes one byte of storage.

Type	Contains	Default	Size	Range
boolean	true or false	false	1 bit	true or false