

## Ch4: Program Coding

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### Unit 1: Data Types in Java

L. Long Answer Questions:

*1) Define a variable.*

Ans- A variable is a quantity which varies during a program execution. A variable is the name of memory location where the information is stored. These are three types.

- ✓ local variable
- ✓ instance variable
- ✓ Class or static variable.

For example:

```
int a= 10;           // here a is the variable declared as int data type.
```

*2) What is meant by a constant? Explain with an example.*

Ans- Literals are used to express particular values within the source code of a program. These are also called constant.

```
Eg. a=6              //Here 6 in this piece of code is a literal constant.
```

*3) What are the rules to assign a variable in Java programming?*

Ans- Rules for Naming Variable are:

- ✓ All identifiers should begin with a letter (A to Z or a to z), currency character (\$) or an underscore (\_).
- ✓ After the first character, identifiers can have any combination of characters. A keyword cannot be used as an identifier.
- ✓ Most importantly, identifiers are case sensitive.

*4) Define the following*

- a) **Compiler**- A compiler is a system program, translates the instructions of a high-level language to a machine language. A program which is input to a compiler is called a source program.
- b) **Interpreter**- The software by which the conversion of high-level instructions is performed line-by-line to a machine level language is known as an Interpreter. If an error is found in any line, the execution is stopped till it is corrected.
- c) **Byte code**- Java language treats the compiler and the interpreter in different ways. Java compiler is a software that converts the source code into an intermediate binary form called the byte code. The byte code is a common binary form of the program that is irrespective of the machine on which it is to be executed.

5) *Distinguish between the following*

(a) Integer and Floating literal

<b>Integer literal</b>	<b>Floating literal</b>
These are sequence of digits (whole numbers). These are also called integer constants.	These are the numbers containing fractional part eg. 123.45. These are also called floating point constants.
They are of 3 types- decimal, octal and hexadecimal. Example- 123, 77, AFF etc.	They are of 2 types- float and double. Example- 0.0, 12.3659 etc.

(b) Character and String literal

<b>Character literal</b>	<b>String literal</b>
Character literals are expressed by a single character surrounded by single quotes.	A combination of characters is a string. Strings in Java are instances of the String.
Characters are stored as 16-bit UNICODE characters. Eg. char a= 'a';	String literals are enclosed in double quotes. Eg. String a= "Hello world";

(c) Source code and Object code

<b>Source code</b>	<b>Object code</b>
A program written in a high level language is known as source code.	A program written in a machine level language is known as object code.
Source code is easily understandable by the user to write and debug.	Object code is easily understandable by the computer to execute.

(d) Compiler and Interpreter

<b>Compiler</b>	<b>Interpreter</b>
It converts the entire source program into the object program at once.	It converts the source program into object program one line at a time.
It displays errors for the whole program together after compilation.	It displays the errors of one line at a time and after correction, the control goes to the next line.

6) *What is meant by primitive and non-primitive data type? Give an example of each.*

Ans- Primitive data type are built-in data type present in Java Language. For example: int, long, double, Boolean etc.

The non-primitive Java data types are created by the programmer during the coding process, they are known as the “reference variables” or “object variables” as they refer to a location where data is stored. For example: Class, Array, Interface etc.

7) *Who developed Java? What was it initially called?*

Ans- Java is an object-oriented programming language developed primarily by James Gosling and his colleagues at the Sun Micro Systems in USA.

The language was initially called Oak (named after the oak tree outside Gosling's office).

8) *Mention at least four features of Java.*

Ans- The basic features of Java are:

It can access data from a local system as well as from the Internet.

- ✓ Java programming is written within a class. The variables and functions are declared defined with the class.
- ✓ Java doesn't require any preprocessor (#) or inclusion of header files for creating a Java application program.
- ✓ Java is case sensitive. As a programming language, the upper case and lower case letters distinguished by the language.

9) *What is a package? Give an example.*

Ans- Java package is a collection of various classes. Each class contains different functions. A package can be included in a program by using the key word 'import'. The process of importing packages is as follows:

- (i) import java.io.\*;
- (ii) import java.util.\*;

10) *What is meant by implicit and explicit type conversion Explain with an example.*

Ans- Widening or Automatic or Implicit Type Conversion- Implicit type casting takes place when two data types are automatically converted, This happens when the two data types are compatible.

When we assign value of a smaller data type to a bigger data type:

```
int i=100;  
double j = i;           //implicit type casting
```

Narrowing or Explicit Type Conversion- If we want to assign a value of large data type to a smaller data type we perform explicit type casting or narrowing. This is useful for incompatible data type where automatic conversion can't be done.

Here, target-type specifies the desired type to convert the specified value to.

```
double i = 100.0;  
int j = (int) i;    //explicit type casting
```

**11) Java program uses a compiler as well as an interpreter. Explain.**

Ans- Java language treats the compiler and the interpreter in different ways. Java compiler is a software that converts the source code into an intermediate binary form called the byte code. The byte code is a common binary form of the program that is irrespective of the machine on which it is to be executed. Now, the Java interpreter accepts the byte code and converts it into the machine code and makes it suitable for the specific platform.

**12) Java is case sensitive. Explain.**

Ans- Java is case sensitive. As a programming language, the upper case and lower case letters distinguished by the language.

## Unit 2: Operators and Expression

I. Answer the following questions:

1) What is an operator? Name the different types of operators.

Ans- An operator is a symbol or letter which causes the compiler to take an action and yield a value. An operator acts on different data items/entities called Operands. For example,

```
c = a + b;    // Here in this statement, = and + are the operators and a, b, c  
are the operands.
```

2) Explain the following:

a) **Arithmetical operator-** Arithmetic operators are used for various mathematical calculations. The result of an arithmetic expression is a numerical value. An arithmetic expression may be a variable or a constant or a combination of both.

b) **Relational operator-** Relational operators are used to determine the relationship between different operands. These are used in the work of comparison also. The two mathematical expressions can be compared by a relational operator. For example,

```
a < b    // Here in this expression, it returns 0 if the condition is  
false or returns 1 if the condition is true.
```

c) **Logical operator-** Logical operators combine the results of two or more than two expressions. The mode of connecting relationship in these expressions

refers as logic and the resulting expressions are called logical expressions. For example,

(a>b) && (a>c) //Here && is the logical operator that joins the two expressions in one.

**d) Arithmetic expression-** This expression is formed by connecting integer constants using arithmetic operators. It is also called Arithmetic expression.

For example:

int a,b,c;  
c=a+b;

**e) Unary operator-** The operator unary needs only one operand. It may be + or -. For example,

-a, +b uses unary operator (negative or positive).

**f) Binary operator-** The binary arithmetic operators acts upon two operands. The following arithmetic operators require two operands. For example,

a+b uses binary operator.

g) State the difference between = and ==

<b>= Operator</b>	<b>== Operator</b>
The symbol = is called assignment operator.	The symbol == is called relational operator.
It is used to assign a value to a variable.	It is used to compare two values.

h) Differentiate between the following:

a) **Arithmetical and Logical operator**

<b>Arithmetical operator</b>	<b>Logical operator</b>
Arithmetic operators are used for various mathematical calculations.	Logical operators combine the results of two or more than two expressions.
The result of an arithmetic expression is a numerical value.	The mode of connecting relationship in these expressions refers as logic and the resulting expressions are called logical expressions.

**b) Logical AND (&&) and Logical OR (||)**

<b>Logical AND (&amp;&amp;)</b>	<b>Logical OR (  )</b>
The logical AND operator (&&) connects two expressions to make them as a single expression.	The logical OR operator (  ) connects two expressions to make them as a single expression.
If both the original expressions are true, the resulting expression results a value 1 (true) otherwise false. For example, (10>5) && (10>8)	If both the original expressions are false, the resulting expression results a value 0 (false) otherwise true. For example, (10<5) && (10<8)

**a) Prefix and Postfix**

<b>Prefix</b>	<b>Postfix</b>
Prefix means before its operand that is first change the value and then uses it.	Postfix- Postfix means after its operand that is first uses it and then change the value.
int x = 10; int c= ++ x; Here value of x will be increased first then it will be assigned to c. So, the value of c will be 11.	int x = 10; int c= x++ ; Here value of x will be assigned to c first then it will be increased. So, the value of c will be 10.