

# 5 – Data Types and Operators

1. Which is the keyword used for empty data type ? [ March 2020, Score 1 ]

**Ans.** void

2. Write the syntax to declare a variable in C++ with an example. [ March 2020, Score 2 ]

**Ans.** data\_type variable1 ;

3. Classify the following operators into unary and binary. [ March 2020, Score 2 ]

[ < , ! , = , ++ ]

**Ans.** Unary operators - ! and ++

Binary operators - < and ==

4. Compare relational operator and logical operator [ March 2020, Score 2 ]

**Ans.** Relational operators: Used for comparing numeric data. These are binary operators. The result of any relational operation will be either True or False.

Less than ( < ), Greater than ( > ), Less than equal to ( < = ), Greater than equal to ( > = ),

Equal to ( = = ), Not equal to ( ! = )

Logical Operators : Logical operators are used to combine two or more relational expressions. C++ provides three logical operators and they are:

Logical AND && - the result will be true if both the expressions are true; false otherwise.

Logical OR || - the result will be false if both the expressions are false; true otherwise.

Logical NOT ! - negates the logical value of an expression.

5. Find the value of z in the following expression, if x = 10 and y = 4. [ March 2020, Score 3 ]

i) z = x % y ;

ii) z = ( x < 20 ) && ( y < 5 )

iii) z = ( x > 20 ) ; ; ( y > 5 )

**Ans.** i) z = 2

ii) z = 1 or True

iii) Question has an error. So, you will get mark for any answer. ( if the question was

z = ( x > 20 ) || ( y > 5 ) , answer would be 0 Or False )

6. Rewrite the expression a = a + 10 using arithmetic assignment operator

[ July 2019, Score 1 ]

**Ans.** a += 10 ;

7. What are the different types of C++ statements? [ July 2019, Score 2 ]

**Ans.** Different types of C++ statements are:

Declaration statements, Assignment statements, Input statements and output statements.

8. Write short note on datatypes in C++.

[ July 2019, Score 3 ]

**Ans.** Data types: These are the means to identify the nature of the data and the set of operations that can be performed on the data. Based on nature, size and associated operations, data types are classified as: Fundamental data types, Derived data types and User defined data types.

1. Fundamental data types: These are the built-in data types of C++. Also known as basic data types or atomic data types. They are atomic in nature and cannot be further decomposed of. The five fundamental data types in C++ are char, int, float, double and void.

2. Derived data types: Derived data types are constructed from fundamental data types. Derived data types are: Array, pointers, functions etc.

3. User Defined data types: User defined data types are data types which are defined by the user himself. User can define the following data types: Structure, Union, enumeration, class etc.

9. What are statements? Explain any two types of statements in C++. [ March 2019, Score 3 ]

**Ans.** Statements are the smallest executable unit of a programming language.

1. Declaration statements: Any variable must be declared before it is used. When we declare a variable, we tell the compiler about the type of data that will be stored in it.

Variable declaration syntax:            data\_type <variable1>, <variable2>, <variable3>, . . . ;

2. Assignment statements: If in a statement, an assignment operator is used, it is called assignment statement.

10. Explain three different types of logical operators.

[ March 2019, Score 3 ]

**Ans.** C++ provides three logical operators and they are:

Logical AND &&    -    the result will be true if both the expressions are true; false otherwise.

Logical OR    ||    -    the result will be false if both the expressions are false; true otherwise.

Logical NOT    !    -    negates the logical value of an expression.

11. a) What is operator? Classify the operators based on number of operands.

[ March 2019, Score 2 ]

b) Find the output of the following operations if x = -11 and y =3

[ March 2019, Score 3 ]

i)  $-x + -y$

ii)  $x \% -y$

iii)  $x \% -11$

iv)  $(x > y) \& (x < y)$

v)  $!(x < y)$

vi)  $x * y$

**Ans.** a) Operators are the tokens or symbols that trigger computer to carry out operations. Based on number of operands, operators are classified as : unary, binary and ternary.

- b) i) - 8
- ii) - -2
- iii) - 0
- iv) - 0 or False
- v) - 0 or False
- vi) - -33

12. Briefly explain two any expressions in C++. [ July 2018, Score 2 ]

**Ans.** Expressions are composed of operators and operands. Classified into arithmetic expressions, relational expressions and logical expressions.

Arithmetic expression: An expression in which only arithmetic operators are used. Further classified into integer expressions and floating point (real) expressions.

Integer expression: An arithmetic expression that contains only integer operands and produces an integer result after performing all the operations given in the expression.

13. Consider  $x = 5$  and  $y = 2$  and write the output of the following expressions.

- a)  $x == y \ \&\& \ y > x$       b)  $x >= 2 \ || \ y == 2$       c)  $(x * x) - y$       [ July 2018, Score 3 ]

**Ans.** a) 0 or False      b) 1 or True      c) 23

14. Explain any three types of statements in C++. [ July 2018, Score 3 ]

**Ans.** 1. Declaration statements: Any variable must be declared before it is used. When we declare a variable, we tell the compiler about the type of data that will be stored in it.

Variable declaration syntax: `data_type <variable1>, <variable2>, <variable3>, ... ;`

2. Assignment statements: If in a statement, an assignment operator is used, it is called assignment statement.

3. Input statements: Input statement is a means that allows the user to store data in the memory during the execution of the program. The get from or extraction operator ( `>>` ) specifies the input operation. Eg: `cin>>num;`

15. Write the output of the following C++ expressions. [ March 2018, Score 2 ]

Let  $a = 7$ ,  $b = 2$

- a)  $a + b * 3 / ++b ;$
- b)  $a <= 7 \ \&\& \ b > 1 ;$

**Ans.** a) 9  
b) 1 Or True

16. Data types are necessary to declare variables in C++. [ March 2018 ]

- a) What is a data type? [ Score 1 ]
- b) Write the classification of fundamental data types in C++. [ Score 2 ]

**Ans.** a) Data types: These are the means to identify the nature of the data and the set of operations that can be performed on the data.

b) Fundamental data types: These are the built-in data types of C++. They are atomic in nature and cannot be further decomposed of. The five fundamental data types in C++ are char, int, float, double and void.

17. Write a short note on arithmetic and logical operators in C++. [ March 2018, Score 3 ]

**Ans.** Arithmetic operators are used to perform basic arithmetic operations such as :

Addition ( + ), Subtraction ( - ), Multiplication ( \* ), Division ( / ), Modulus ( % )

Modulus operator (%) is also called as mod operator. It gives the remainder value during arithmetic division.

C++ provides three logical operators and they are:

Logical AND && - the result will be true if both the expressions are true; false otherwise.

Logical OR || - the result will be false if both the expressions are false; true otherwise.

Logical NOT ! - negates the logical value of an expression.

18. Explain the operations involved in the following C++ expressions and write the output.

a)  $5 / 2 + 3$

[ July 2017, Score 2 ]

b)  $( 10 \% 3 ) / 2.0$

OR

Write sample statements in C++ for the cascading of input and output operators.

**Ans.** a) Division and addition. Output is 5.

b) Modulus and division. Output is 0.5

OR

If we want to input 3 values to different variables a,b and c, we can write it as `cin>>a>>b>>c ;`

Similarly, to display the contents of 3 different variables, we can write as `cout<<a<<b<<c ;`

19. Find the best match from columns B and C for each item in column A. [ July 2017, Score 3 ]

A		B		C	
a)	"g"	i)	Assignment operator	1	Modifier
b)	==	ii)	int	2	Same as 9
c)	short	iii)	Relational operator	3	constant
		iv)	String	4	Two operands are needed

**Ans.** a) – iv) – 3 ( "g" – String – constant )

b) – i) – 4 ( == - Assignment operator – Two operands are needed )

c) – ii) – 1 ( short – int – Modifier )

20. List the three numeric data types in C++ with an example for each. [ July 2017, Score 3 ]

**Ans.** The three numeric data types are:

- i) int: integers are whole numbers without fractional parts. Eg: 8, -26
- ii) float: Float numbers are numbers with fractional parts. Eg: 45.8, 0.632, -45.32
- iii) double: double datatypes represent float values with higher precision and size. Eg: same as that of float.

21. Let x and y are two variables of int data type, then correct the following input statement.

cin<<x>>y ;

[ March 2017, Score 1 ]

Ans. cin>>x>>y ;

22. Predict the output of the following operations

[ March 2017, Score 2 ]

x = -5 and y = 3 initially

- a) -x
- b) x / y
- c) x % y
- d) -x + -y

Ans. a) 5      b) -1      c) -2      d) 2

23. Consider the following statement.

[ March 2017, Score 2 ]

int Length ;

Then what is the difference between ( a ) and ( b ) ?

- a) Length = 50
- b) Length == 50

Ans. Length = 50 means: Assign value 50 to the variable Length.

Length == 50 means: Compare whether the value within the variable Length is 50 or not.

24. A part of bio data of a student is given. Identify the data types which we can use to store and process these data.

[ March 2017, Score 3 ]

Roll\_Number : 34  
 Age : 17  
 Sex : M  
 Mob\_Number : 8181818181  
 Height\_In\_Cm : 152.8  
 Pincode : 690601

Ans. Roll\_Number : int      Age: int      Sex: char  
 Mob\_Number: long int      Height\_In\_Cm: Float      Pincode: long int

25. Given that x = 5 and y = 5. What will be the value of the expression x > y || y > x ?

[ July 2016, Score 1 ]

Ans. 0 or False

26. What is the difference between x = 5 and x == 5 in C ++ ?

[ July 2016, Score 2 ]

OR

Write value returned by following C++ expressions.

- a) 60 % 25
- b) 22 / 7

**Ans.** x = 5 means: Assign value 5 to the variable x.

x == 5 means: Compare whether the value within the variable x is 5 or not.

**OR**

a) 10

b) 3

**27.** Explain logical operators in C++ ?

**[ July 2016, Score 3 ]**

**Ans.** Logical Operators : Logical operators are used to combine two or more relational expressions. C++ provides three logical operators and they are:

logical AND && - the result will be true if both the expressions are true; false otherwise.

Logical OR || - the result will be false if both the expressions are false; true otherwise.

Logical NOT ! - negates the logical value of an expression.

**28.** Memory requirement of void data type in C++ is ..... byte(s). **[ March 2016, Score 1 ]**

**Ans.** 0 ( Zero )

**29.** Explain the different types of logical operators in C++.

**[ March 2016, Score3 ]**

**Ans.** Logical Operators : Logical operators are used to combine two or more relational expressions. C++ provides three logical operators and they are:

logical AND && - the result will be true if both the expressions are true; false otherwise.

Logical OR || - the result will be false if both the expressions are false; true otherwise.

Logical NOT ! - negates the logical value of an expression.

**30.** Distinguish between float and double data type in C++.

**[ March 2016, Score 2 ]**

**OR**

What is a variable? Differentiate between memory address and content of the variable.

**Ans.** float: float numbers are numbers with fractional parts. Float needs 4 bytes of memory.

double: double datatypes represent float values with higher precision and size. Its size is 8 bytes.

**OR**

Variable is the name given to memory location, by which data in these location is referenced. The value stored in the location is called content of the variable. It is otherwise called as R-value. The location number at which the variable is stored is called its address. Address is also called as L-value.

31. If a = 5, b = 7 and c = 3, predict the output of the following expressions. [ July 2015, Score 2 ]

- a) a < b
- b) b % a
- c) ( a > c ) && ( a < b )
- d) a / c

Ans. a) 1 Or True  
b) 2  
c) 1 Or True  
d) 1

32.a) What do you mean by a data type? Compare the fundamental data types char and int available in C++. [ July 2015, Score 3 ]

b) Write the declaration in C++ for a variable that can be used to store height of a student. Justify, why you have selected this data type in the declaration. [ July 2015, Score 1 ]

**Ans.** a) Data types: These are the means to identify the nature of the data and the set of operations that can be performed on the data. Based on nature, size and associated operations, data types are classified as: Fundamental data types, Derived data types and User defined data types.

int data type: Integers are whole numbers without a fractional part. They can be positive, negative or zero. C++ allows 4 bytes of memory for integers.

char data type: Characters are the symbols covered by the character set of C++. The characters are internally treated as integers. Only 1 byte of memory is required for char data type.

b) float height ; Here, the variable is declared in float type so that the height with fractional values can be stored in it.

33. The memory size of float data type in C++ is ..... bytes. [ July 2015, Score 1 ]

- a) 2
- b) 4
- c) 8
- d) 10

Ans. 4

34. Identify the name of the following operators in C++ &&, ||, ! [ March 2015, Score 1 ]

**Ans.** && - Logical AND  
|| - Logical OR  
! - Logical NOT

35. What is the difference between “ = ” and “==” operators? [ March 2015, Score 2 ]

OR

What is the output of the following C++ statements ?

x = -7, y = 3

a) Add -x with -y

b) x modulus y

**Ans.** = is an assignment operator which assigns a value on the right side to the left.

== is a relational operator which compares whether the two values or expressions are equal or not.

**OR**

a)  $-7 + 3 = 4$

b) -1

**36.** In the following program, some lines are missing. Fill the missing lines and complete it.

```
#include<iostream>
```

**[ March 2015, Score 3 ]**

```
.....  
{  
int num1,num2,sum ;  
cout<<"Enter two numbers:" ;  
.....  
.....  
cout<<"Sum of numbers are"<<sum ;  
}
```

**Ans.**

```
#include<iostream>  
using namespace std;  
int main( )  
{  
int num1,num2,sum;  
cout<<num1<<num2,  
sum=num1+num2;  
cout<<<<"Sum of numbers are"<<sum ;  
}
```

**37.** What are data types? Explain the fundamental data types in C ++. **[ March 2015, Score 3 ]**

**Ans.** Data types: These are the means to identify the nature of the data and the set of operations that can be performed on the data.

Fundamental data types: These are the built-in data types of C++. They are atomic in nature and cannot be further decomposed of. The five fundamental data types in C++ are char, int, float, double and void.

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