Class : 11

Register Number | | | | | | | |

COMMON HALF YEARLY EXAMINATION - 2023 - 24

COMPUTER SCIENCE

Time Allowed : 3.00 Hours] [Max. Marks : 70

Instructions : (1) Check the question paper for fairness of printing. If there is any lack of fairness, inform the Hall Supervisor immediately.

(2) Use Blue or Black ink to write and underline and pencil to draw diagrams.

PART - I

Note : i) Answer All the questions. **15X1 = 15**

ii) Choose the most appropriate answer from the given four alternatives and write the the corresponding answer.

1. When a system restarts which type of booting is used.
   (a) Warm booting b) Cold booting c) Booting d) Real boot.
2. Which gate is called as the Logical Inventor.
   a) AND b) OR c) NOT d) XNOR
3. Which of the following is a CISC processor?
   (a) Intel P6 b) AMD K6 c) Pentium III d) Pentium IV
4. The File management system used in Linux is
   a) ext 2 b) NTFS c) FAT d) NFTS
5. Under which of the following OS, The option shift + Delete will permanently deletes a file or folder?
   a) Windows 7 b) Windows 8 c) Windows 10 d) All the above
6. If i = 5 before the assignment i : = i - 1 after the assignment the value of i is
   a) 5 b) 4 c) 3 d) 2
7. Which of the following properties is true after the assignment at line 3?
   1. - - i , j = 0
   2. i, j : = i + 1, j - 1
   3. - - ?
   a) i + j > 0 b) i + j < 0 c) i + j = 0 d) i = j
8. If j = 22 and p = 3 then the result of P = P * ++ j is ----------
   (a) 61 b) 69 c) 66 d) 63
9. Which of the following is not a datatype modifier?
   a) Signed b) int c) Long d) Short
10. How many times the following loop will execute ? for (int i = 0 ; i < 10 ; i ++)
    a) 0 b) 10 c) 9 d) 11
11. Which Function begins the program execution.
    a) isalpha ( ) b) isdigit ( ) c) main ( ) d) islower ( )
12. Structure definition is terminated by
    a) : b) } c) ; d) : :
13. Which of the following supports the transitive nature of data?
    a) Inheritance b) Encapsulation c) Polymorphism d) Abstraction
14. The member function defined within the class behave like ---------- function.
    a) inline b) Non - inline c) outline d) data
15. A Computer network security that monitors and controls incoming and outgoing traffic is
    a) Cookies b) Virus c) Firewall d) Worms

PART – II

II. Answer any six questions. Question No. 24 is compulsory. **6x2=12**

16. Data and Information - Differentiate.
17. Which source is used to Erase the content of a EPROM?
18. What are the security management features available in Operating System.
19. What is Abstraction?
20. What is a Reference Variable? What is its use?
21. What are Importance of void datatype?
22. Write down the Importance of Destructor.
23. What is Harvesting?
24. What is the Output of the following Program?

```
int year ;
cin >> year ;
if (year % 100 = = 0)
   if (year % 400 = = 0)
        Cout < < "Leap" ;
   else
        Cout < < "Not Leap year: ;
```

If the Input given is
(i) 2000
(ii) 2003
(iii) 2010 ?

PART – III

III. Answer any six questions. Question No. 33 is compulsory. **6 × 3 = 18**

25. Write the truth table of Fundamental Gates.
26. Write the two ways to create a New Folder.
27. List out the key features of Operating System.
28. What is the use of a Header File?
29. Write the Syntax and Purpose of Switch Statement.
30. Write a short note on Stremp ( ) Function.
31. What do you mean by Modularization and Software Reuse?
32. What do you mean by Overriding?
33. Write about Encryption and Decryption.

PART – IV

IV. Answer all the questions. **5 × 5 = 25**

34. (a) Discuss the various Generations of Computers. **(OR)**
    (b) (i) Add : $1101010_2 + 101101_2$ (ii) Subtract : $1101011_2 - 111010_2$
35. (a) Explain the Characteristics of a Microprocessor. **(OR)**
    (b) Explain the versions of Windows Operating System.
36. (a) What are Arithmetic Operators in C++? differentiate Unary and Binary Arithmetic Operators. Give example for each of them. **(OR)**
    (b) What is an entry Control Loop? Explain any one of the Entry controlled loop with suitable example.
37. (a) What are the advantages of OOPs? **(OR)**
    (b) What are the rules for Operator Overloading?
38. (a) Explain the different types of Inheritance. **(OR)**
    (b) What is the Output of the following?

```
#include < io stream >
Using namespace std ;
Class base
{
    Public :
    base ( )
    {
        Cout < < " /n constructor of base class.." ;
    }
  ~ base ( )
{
    Cout < < "/n Destructor of base
}                    class ..." ;
} ;
  Class derived : public base
{
   Public :
   derived ( )
{
   Cout < < " / n Constructor of derived.." ;
}
  ~     derived ( )
{
   Cout < < " / n Destructor of derived.." ;
}
} ;
   class derived 1 : public derived
    {
      public :
     derived 1 ( )
      {
        Cout < < "/n Constructor of derived 1..." ;
      }
      ~    derived 1 ( )
{
    Cout < < "/ n Destructor of derived 2.." ;
}
} ;
   int main ()
{
   derived 1 x ;
   return 0 ;
}
```

COMMON HALF YEARLY EXAMINATION – 2023 – 2024 (ANSWER KEY)

CLASS: XI **MARK: 70**

SUB: COMPUTER SCIENCE **TIME: 3 : 00 Hrs**

PART – I

I. CHOOSE THE CORRECT ANSWER: **15 X 1 = 15**

1. a) Warm booting
2. c) NOT
3. c) Pentium III
4. a) ext 2
5. a) Windows 7
6. b) 4
7. c) i + j = 0
8. b) 69
9. b) int
10. b) 10
11. c) main ( )
12. c) ;
13. a) Inheritance
14. a) inline
15. c) Firewall

PART – II

II. ANSWER ANY SIX QUESTIONS. QUESTION No. 24 IS COMPULSORY: **6 X 2 = 12**

16. Data and Information – Differentiate.

Ans:

DATA	INFORMATION
i. Data is raw (unprocessed) facts and figures.	i. Information is processed Data represented is useful and meaningful form.
ii. Data may not give meaningful message.	ii. Information conveys some meaning.

17. Which source is used to erase the content of a EPROM?

Ans: Ultraviolet rays is used to erase the contents of a EPROM (Erasable Programmable Read Only Memory). EPROM retains its contents until it is exposed to ultraviolet light. The ultraviolet light clears its contents, making it possible to reprogram the memory.

18. What are the security management features available in Operating System?

Ans: The Operating System provides three levels of securities to the user end. They are,

1) File access level
2) System level
3) Network level

19. What is Abstraction?

Ans: Abstraction is the process of ignoring or hiding irrelevant details and modeling a problem only by its essential features.

Example: A map is an abstraction of the things we find on the ground.

20. What is a Reference Variable? What is its use?

Ans: A reference provides an alias for a previously defined variable. Declaration of a reference consists of base type and an & (ampersand) symbol, reference variable name is assigned the value of a previously declared variable.

Syntax:

<type> <& reference_variable> = <original_variable>

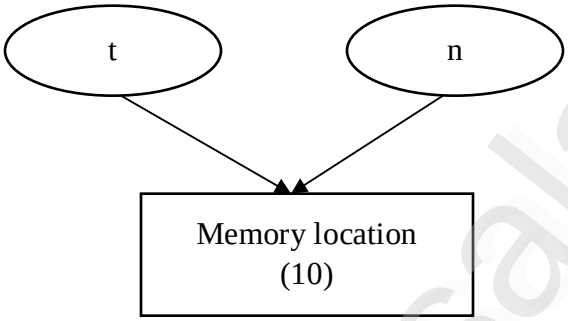
Example:

```
int n;
int &t = n;
n = 10;
cout<<"\n The value of n="<<n;
cout<<"\n The value of t="<<t;
```

Output:

The value of n= 10
The value of t= 10

In the above program variables n and t point to the same memory location and hence the output is 10 for both the variables.



21. What are Importance of void datatype?

Ans: void type has two important pupose:

i. To indicate the function does not return a value
ii. To declare a generic pointer

22. Write down the importance of Destructor.

Ans: Destructor is important because

- Destructor will free the resources that the object may have acquired during its lifetime.
- Destructor function removes the memory of an object which was allocated by the constructor at the time of creating a object. Thus free the unused memory.

23. What is Harvesting?

Ans: A person or program collects login and password information from a legitimate user to illegally gain access to others account(s).

24. What is the Output of the following Program?

```
int year;
cin>>year;
if (year % 100 = = 0)
   if (year % 400 = = 0)
      cout<<"Leap";
   else
      cout<<" Not Leap year";
```

If the Input given is

i) 2000 ii) 2003 iii) 2010?

Ans: i) 2000 – Leap
ii) 2003 – No Output
iii) 2010 – No Output

PART – III

III. ANSWER ANY SIX QUESTIONS. QUESTION No. 33 IS COMPULSORY: 6 X 3 = 18

25. Write the truth table of Fundamental Gates.

Ans: AND, OR and NOT are the fundamental gates.

Truth Table: **AND gate**

Inputs		Output
A	**B**	**C = AB**
0	0	0
0	1	0
1	0	0
1	1	1

Truth Table: **OR gate**

Inputs		Output
A	**B**	**C = A + B**
0	0	0
0	1	1
1	0	1
1	1	1

Truth Table: **NOT gate**

Input	Output
A	**C = $\overline{A}$**
0	1
1	0

26. Write the two ways to create a New Folder.

Ans: The two methods to a create a New Folder, are

METHOD I:

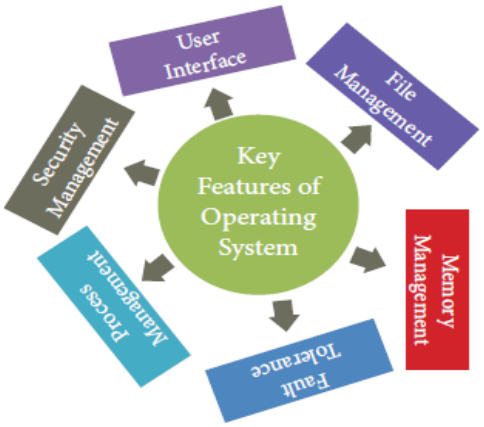
Step 1: Open **Computer Icon**
Step 2: Open any drive where you want to create a new folder. (For example select D:)
Step 3: Click on **File** ⟶ **New** ⟶ **Folder.**
Step 4: A new folder is created with the default name "New folder"
Step 5: Type in the f older name and press Enter key

METHOD II:

To create a folder in the desktop:
Step 1: In the Desktop, **Right click** ⟶ **New** ⟶ **Folder**
Step 2: A folder appears with the default name "New folder" and it will be highlighted
Step 3: Type the name you want and press Enter Key
Step 4: The name of the folder will change

27. List out the key features of Operating System.

Ans: Key Features of the Operating System



Key Features of the Operating System

- User Interface
- File Management
- Memory Management
- Fault Tolerance
- Process Management
- Security Management

28. What is the use of a header File?

Ans: To use the member objects of a header file, we have to include the header file in the program.

For Example: cin and cout are the member function of the header file <iostream.h>. so, to use cout and cin in a program, we must include the header file <iostream.h>.

The statement #include<iostream.h> will include the header file <iostream.h>.

Examples of header files: <iostream.h>, <conio.h>, <string.h> etc

29. Write the Syntax and purpose of Switch Statement.

Ans: The switch statement is a multi-way branch statement. It provides an easy way to dispatch execution to different parts of code based on the value of the expression. The switch statement replaces multiple if-else sequence.

Syntax:

```
switch (expression)
{
case constant 1:
      statement(s);
      break;
case constant 2:
      statement(s);
      break;
default:
      statement(s);
}
```

Workflow of switch:

Step 1: The expression is evaluated.

Step 2: Matches expression value against constant values specified in case statements.

Step 3: If a value matches, executes that respective set of statements. Otherwise, the statements undr the default option are executed.

30. Write a short note on strcmp( ) Function.

Ans: strcmp( )

Purpose: To compare two strings

General form: strcmp(string1, string2)

The strcmp( ) function takes two arguments: string1 and string2. It compares the contents of string1 and string2 lexicographally and returns

Positive value(1)	:	if the first differing character in string1 is greater than the corresponding character in string2. (ASCII values are compared)
Negative value(-1)	:	if the first differing character in string1 is less than the corresponding character in string2.
Zero (0)	:	If string1 and string2 are equal.

Examples:

char str1[ ] =”Hello”; char str2[ ] =”HELLO”; cout<<strcmp(str1,str2); **Output:** 1	char str1[ ] =”HELLO”; char str2[ ] =”Hello”; cout<<strcmp(str1,str2); **Output:** -1	char str1[ ] =”HELLO”; char str2[ ] =”HELLO”; cout<<strcmp(str1,str2); **Output:** 0

31. What do you mean by Modularization and Software Reuse?

Ans: Modularization: where the program can be decomposed into modules.

Software re-use: where a program can be composed from existing and new modules.

32. What do you mean by Overriding?

Ans: When a derived class member function has the same name as that of its base class member function, the derived class member function shadows/hides the base class’s inherited function. this situation is called function overriding and this can be resolved by giving the base class name followed by : : and the member function name.

Example:

```
class base
{
public:
    display();
};
class derived:public base
{
Public:
display();
};
```

In the above program the method display( ) is overridden in the derived class.

33. Write about Encryption and Decryption.

Ans: Encryption and Decryption are processes that ensure confidentially that only authorized persons can access the information. Encryption and Decryption are done by cryptography.

Encryption is the process of translating the plain text data (plaintext) into random and mangled data (called cipher-text).

Decryption is the reverse process of converting the cipher-text back to plaintext.

PART – IV

IV. ANSWER ALL THE QUESTIONS: **5 X 5 = 25**

34. (a) Discuss the various Generations of Computers.

Ans:

SN	Generation	Period	Main Component used	Merits/Demerits
1	First Generation	1940-1956	 Vacuum tubes	• Big in size • Consumed more power • Malfunction due to overheat • Machine Language was used
First Generation Computers - ENIAC , EDVAC , UNIVAC 1 ENIAC weighed about 27 tons, size 8 feet × 100 feet × 3 feet and consumed around 150 watts of power				
2	Second Generation	1956-1964	 Transistors	• Smaller compared to First Generation • Generated Less Heat • Consumed less power compared to first generation • Punched cards were used • First operating system was developed - Bat ch Processing and Multiprogramming Operating System • Machine language as well as Assembly language was used.
Second Generation Computers **IBM 1401, IBM 1620, UNIVAC 1108**				
3	Third Generation	1964 -1971	 Integrated Circuits (IC)	• Computers were smaller, faster and more reliable • Consumed less power • High Level Languages were used
Third Generation Computers **IBM 360 series, Honeywell 6000 series**				
4	Fourth Generation	1971-1980	 Microprocessor Very Large Scale Integrated Circuits (VLSI)	• Smaller and Faster • Microcomputer series such as IBM and APPLE were developed • Portable Computers were introduced.
5	Fifth Generation	1980 - till date	 Ultra Large Scale Integration (ULSI)	• Parallel Processing • Super conductors • Computers size was drastically reduced. • Can recognise Images and Graphics • Introduction of Artificial Intelligence and Expert Systems • Able to solve high complex problems including decision making and logical reasoning
6	Sixth Generation	In future		• Parallel and Distributed computing • Computers have become smarter, faster and smaller • Development of robotics • Natural Language Processing • Development of Voice Recognition Software

(OR)

(b) i) Add: $1101010_2 + 101101_2$ **ii) Subtract: $1101011_2 - 111010_2$**

Ans: i) Add:

```
  1101010 (+)
   101101
  --------
  10010111
```

$\therefore 1101010_2 + 101101_2 = 10010111_2$

ii) Subtract:

```
  1101011 (–)
   111010
  --------
  0110001
```

$\therefore 1101011_2 - 111011_2 = 0110001_2$

35. a) Explain the Characteristics of a Microprocessor.

Ans: Characteristics of Microprocessors

i) Clock speed ii) Instruction set iii) Word size

i) Clock speed: Every microprocessor has an internal clock that regulates the speed at which it executes instructions. The speed at which the microprocessor executes instructions is called the clock speed. Clock speed is measured in KHz (Kilo Hertz), Mhz (Mega Hertz) or in GHz (Giga Hertz).

Example: Clock speed of Intel 4004 microprocessor = 740 KHz.

ii) Instruction set: A command which is given to a computer to perform an operation on data is called an instruction. Basic set of machine level instructions that a microprocessor is designed to execute is called as an instruction set. This instruction set carries out the following types of operations:

- Data transfer
- Arithmetic operations
- Logical operations
- Control flow
- Input / output

iii) Word size: The number of bits that can be processed by a processor in a single instruction is called its words size. Word size determines the amount of RAM that can be accessed by a microprocessor.

Eg: Word size of Intel 4004 = 4 bits
Word size of Intel 8085 = 8 bits
Word size of Intel 8086 = 16 bits

[OR]

b) Explain the versions of Windows Operating System.

Ans:

Versions	Logo	Year	Specific features
Windows 1.x		1985	• Introduction of GUI in 16 - bit. processor • Mouse was introduced as an input device.
Windows 2.x		1987	• Supports to minimize or maximize windows. • Control panel feature was introduced with various system settings and customising options.
Windows 3.x		1992	• Introduced the concept of multitasking. • Supported 256 colours which brought a more modern, colourful look to the interface.
Windows 95		1995	• Introduced Start button, the taskbar, Windows Explorer and Start menu. • Introduced 32 - bit processor and focused more on multitasking.
Windows 98		1998	• Integration of the Web browser (Internet Explorer) with the Operating System. • DOS gaming began to disappear as Windows based games improved. • Plug and play feature was introduced.
Windows NT			• Designed to act as servers in network.
Windows Me		2000	• It introduced automated system diagnostics and recovery tools.
Windows 2000		2000	• Served as an Operating System for business desktop and laptop systems. • Four versions of Windows 2000 were released: Professional (for business desktop and laptop systems), Server (both a Web server and an office server), Advanced Server (for line-of-business applications) and Data Centre Server (for high-traffic computer networks).
Windows XP		2001	• Introduced 64-bit Processor. • Improved Windows appearance with themes and offered a stable version.
Windows Vista		2006	• Updated the look and feel of Windows.
Windows 7		2009	• Booting time was improved, introduced new user interfaces like Aero Peek, pinning programs to taskbar, handwriting recognition etc. and Internet Explorer 8.
Windows 8		2012	• Windows 8 is faster than previous versions of Windows. • Start button was removed. • Windows 8 takes better advantage of multi-core processing, solid state drives (SSD), touch screens and other alternate input methods. • Served as common platform for mobile and computer.
Windows 10		2015	• Start Button was added again. • Multiple desktop. • Central Notification Center for App notification and quick actions. • Cortana voice activated personal assistant.

36. a) What are Arithmetic Operators in C++? Differentiate Unary and Binary Arithmetic Operators.

Ans:

Arithmetic Operators: Arithmetic operators perform simple arithmetic operations like addition, subtraction, multiplication, division etc.,

Operator	Operation	Example
+	Addition	10 + 5 = 15
-	Subtraction	10 – 5 = 5
*	Multiplication	10 * 5 = 50
/	Division	10 / 5 = 2 (Quotient of the division)
%	Modulus (To find the remind-er of a division)	10 % 3 = 1(Remainder of the division)

- The above mentioned arithmetic operators are binary operators which requires minimum of two operands.

Increment and Decrement Operators

++ (Plus, Plus) Increment operator

-- (Minus, Minus) Decrement operator

An increment or decrement operator acts upon a single operand and returns a new value. Thus, these operators are unary operators. The increment operator adds 1 to its operand and the decrement operator subtracts 1 from its operand. For example,

- **x++ or ++ x** is the same as **x = x+1;**
  It adds 1 to the present value of x
- **x -- or -- x** is the same as to **x = x–1**;
  It subtracts 1 from the present value of x

The ++ or -- operators can be placed either as prefix (before) or as postfix (after) to a variable. With the prefix version, C++ performs the increment / decrement before using the operand.

Unary Operators	Binary Operators
(i) The operators which act upon a single operand are called unary operators.	(i) The operators which require two operands for their action are called binary operators.
(ii) They are pre-increment and post increment (+ +).	(ii) They are mathematical operators and relational operators.

Example (Assume n=2; what will be value of a)	
Prefix	Postfix
a=++n;	a=n++;
Value of a = 3	Value of a = 2
a=--n;	a=n--;
Value of a=1	Value of a=2

Example
10 + 5 = 15
10 – 5 = 5
10 * 5 = 50
10 / 5 = 2 (Quotient of the division)
10 % 3 = 1(Remainder of the division)

Example
a > b
a < b
a >= b
a <= b
a == b
a != b

[OR]

b) What is an Entry Control Loop? Explain any one of the Entry controlled loop with suitable example.

Ans: In an entry control loop, the test – expression is evaluated before the entering into a loop.

Examples: 1. while loop 2. for loop

while loop:

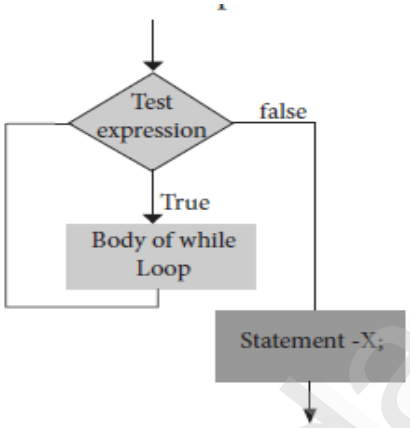
Purpose: A while loop is a control flow statement that allows the loop statements to be executed as long as the condition is true.

Type: Entry control loop

Syntax:

```
while (Test expression)
{
 Body of the loop;
}
Statement-x;
```

Flowchart representation:



Workflow:

Step 1: Test-expression is evaluated to either True or False.

Step 2: If test-expression is True

a) The body of the loop is executed
b) Control is transferred to step1.

Step 3: if test-expression is False, the control exits the while loop

Example:

```
int a=2;
while (a<=10)
 {
  cout<<a<<'\t';
  a+=2;
 }
```

OUTPUT:

2 4 6 8 10

37. a) What are the advantages of OOPs?

Ans: Re-usability: "Write once and use it multiple times" you can achieve this by using class.

Redundancy: Inheritance is the good feature for data redundancy. If we need a same functionality in multiple class we can write a common class for the same functionality and inherit that class to sub class.

Easy maintenance: It is easy to maintain and modify existing code as new object can be created with small differences to existing ones.

Security: Using data hiding and abstraction only necessary data will be provided thus maintains the security of data.

[OR]

b) What are the rules for Operator Overloading?

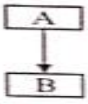
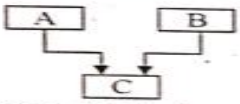
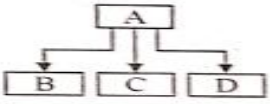
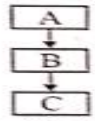
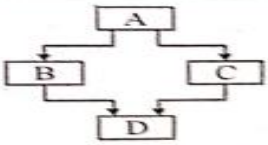
Ans:

- Precedence and Associatively of an operator cannot be changed.
- No new operators can be created, only existing operators can be overloaded.
- Cannot redefine the meaning of an operator's procedure. Only additional functions can be given to an operator.
- Overloaded operators cannot have default arguments.
- When binary operators are overloaded, the left hand object must be an object of the relevant class.

38. a) Explain the different types of Inheritance.

Ans: Inheritance is a process of creating new classes called derived classes, from the existing or base classes.There are different types of inheritance,

i. Single Inheritance
ii. Multiple Inheritance
iii. Multilevel Inheritance
iv. Hybrid Inheritance
v. Hierarchical Inheritance

i. **Single Inheritance** When a derived class inherits only from one base class, it is known as single inheritance	 Single Inheritance
ii. **Multiple Inheritance** When a derived class inherits from multiple base classes it is known as multiple inheritance Multiple Inheritance.	 Multiple Inheritance
iii. **Hierarchical inheritance** When more than one derived classes are created from a single base class , it is known as Hierarchical inheritance.	 Hierarchical Inheritance
iv. **Multilevel Inheritance** The transitive nature of inheritance is itself reflected by this form of inheritance. When a class is derived from a class which is a derived class - then it is referred to as multilevel inheritance.	 Multilevel Inheritance
v. **Hybrid inheritance** When there is a combination of more than one type of inheritance, it is known as hybrid inheritance. Hence, it may be a combination of Multilevel and Multiple inheritance or Hierarchical and Multilevel inheritance or Hierarchical, Multilevel and Multiple inheritance.	 Hybrid inheritance

[OR]

b) What is the output of the following?

```
#include<iostream>
using namespace std;
class base
{
public:
base()
{ cout<<"\nConstructor of base class..."; }
~base()
{ cout<<"\nDestructor of base class.... "; }
};
class derived:public base
{
public :
derived()
{ cout << "\nConstructor of derived ..."; }
~derived()
{ cout << "\nDestructor of derived ..."; }};
class derived1 :public derived
{
public :
derived1()
{ cout << "\nConstructor of derived1 ...";}
~derived1()
{ cout << "\nDestructor of derived1 ...";}
};
int main()
{
derived1 x;
return 0;
}
```

Ans:

```
Output:
Constructor of base class...
Constructor of derived ...
Constructor of derived1 ...
Destructor of derived1 ...
Destructor of derived ...
Destructor of base class....
```

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