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Virtual University	CS201-Introduction to Programming (Solved Subjective) LECTURE FROM (23 to 45)	
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cs201-Introduction to



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Question 1:-

Identify each of the following as system software and application software. (mark 5)
LINUX, DISK CLEANUP, WORD PROCESSOR, WINDOWS, STUDENT INFORMATION

Answer:-

System software: - Linux, Disk cleanup, windows.
Application software:- Word Processor, Student information

Question 2:-

Write a program which defines three variables of type double which store three different values including decimal points, using set precision manipulators to print all these values with different numbers of digits after the decimal number.(5)

Answer:-

```
#include
#include
int main ()
{
double x1 = 12345624.72345
double x2 = 987654.12345
double x3 = 1985.23456
cout << setprecision (3) << x1<< endl;
cout << setprecision (4) << x2 << endl;
cout << setprecision (5) << x3<< endl;
return 0;
}
```

Question 3:-

Define static variable also explain life time of static variable? (3)

Answer:

Static variable means maintaining the state of a variable. It exists and lives around even when we are outside the function. It is created and initialized only once during the lifetime of the program and therefore it will be destroyed or taken out of memory only once during the lifetime of the program.

Question 4:-

What do you know about run time error? (3)

Answer:

Run-Time Errors
rules
Example: Accessing a non-existent variable, property, method, object, etc (e.g. a method name is misspelled)
• Sources of these can be determined by a careful

• reading of the code, but unfortunately, not always

Question 5:

What is limitation of the friendship between classes? (3)

Answer:

Friendship relation between classes is a one way relation that is if one class declare friend another class then the another class is the friend of first class but not the first class if the friend of another class.

Question 6:

what is the source and destination of cin?(2)

Answer:

For *cin*, the source is normally keyboard and the destination can be an ordinary variable i.e. native-data type variable

Question 7:

Write the general syntax of allocation memory dynamically to an array using new operator? (2)

Answer:

Following is the syntax:

new data_type [number_of_locations];

Question 8:

What is diffrent between pointer and variable?

Answer:-

normal variable contains tha value of variable either int or float whereas pointer variable contains the address of another variable

Question 9:

What is difference between Unary and binary operators and how they can be overloaded?

Answer:-

Unary operator takes one argument.

a ++ is an example of unary operator

Binary take two operators

+,-,* are example of binary operators

Overloaded binary operator may return any type

Here is general syntax of overloading

Return-type operator symbol (parameters);

Operator is keyword

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Question 10:

How many types of templates?

Answer:-

There are two different types of templates in C++ language i.e.' function templates and class templates.

Question 11:

What will be the output of following function if we call this function by passing int 5? template T reciprocal(T x) {return (1/x); }

Answer:

The output will zero as 1/5 and its .05 but conversion to int make it zero
Above is prototype of template class so assume passing an int and returning an int

Question 12:

Identify the errors in the following member operator function and also correct them.

```
math * operator(math m);
math * operator (math m)
{
math temp;
temp.number= number * number;
return number;
```

Answer:-

The errors are in the arguments of the member operation function and also in the body of operator member function. Correct function should be

```
math *operator(math *m);
math *operator (math *m)
{
math temp;
temp = m;
temp.number= number * number;
return temp.number;
```

Question No.13:

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Define buffer? Explain its usage? 5 MARKS

Answer:

a program that writes the output data to the disc, it will be nice to collect the output data (numbers) and write it on the disc in one write operation instead of writing the numbers one by one. The area where we gather the numbers is known as buffer.

Question No.14:

Why binary search algorithm is efficient than linear search algorithm? 5 marks

Answer:

Binary search algorithm is more efficient than liner algorithm because the arrays are sorted in ascending or descending order and we use "divide and conquer" technique. In binary search each iteration reduces the search by the factor of two but in the linear we have the same number of searches as we have the number of elements. E.g. if we have array of 1000 elements the linear search will take 1000 iterations however binary search will take max 10.

Question No.15:

Operator function ka syntax (3 marks)

Question No.16:

Post increment and pre increment k syntax btana thay (2 marks)

Answer:

Classname operator ++(); ---- pre increment

Classname operator ++(int) -----post increment

Question No.17:

What is language translator?(2 marks)

Answer:

So we need a translator which translates the code of our program into machine language. There are two kinds of translators which are known as Interpreter and Compilers. These translators translate our program which is written in C-Language into Machine language

Question No.18:

Write something something about testing in designing program?
3 MARKS

Answer:-

Testing. The programmer should design a test plan and use it to test the program. It is a good idea, when possible, to have someone else test the program.

Question No.19:

Read the given below code and explain what task is being performed by this function.

5 MARKS

```
Matrix :: Matrix ( int row , int col )
{
numRows = row ;
numCols = col ;
elements = new ( double * ) [ numRows ] ;
for ( int i = 0 ; i < numRows ; i ++ )
{
elements [ i ] = new double [ numCols ] ;
for ( int j = 0 ; j < numCols ; j ++ )
elements [ i ] [ j ] = 0.0 ;
}
}
```

Hint : This function belong to a matrix class, having
Number of Rows = numRows
Number of Columns = numCols

Which one (copy constructor or assignment operator) will be called in each of the following code segment?

1)Matrix m1 (m2);

2)Matrix
m1, m2;
m1 = m2;

3)Matrix m1 = m2;

Answer:-

In this code the matrix function is defined, it get the number of rows from the user and create the row of
matrix and then get the columns from the user and create the columns. The New is showing for creating more array space for the data which user enters. The elements [i][j] will print the data in matrix

Question No: 20 (Marks: 2)

How many arguments a Unary Operator take? Can we make a binary operator as unary operator?

Answer:-

Unary operator takes only one arguments like i++ or i-- (Post increment or post decrement operators for integers) or ++i,--i (Pre increment or pre decrement operators for integers) ,we can not make Unary operator as binary or binary as

Unary operator.

Question No: 21 (Marks: 2)

Which arithmetic operators cannot have a floating point operand?

Answer:-

Modulus operator

This operator can only be used with integer operands ONLY

Question No: 22 (Marks: 2)

What are manipulators? Give one example.

Answer:-

The manipulators are like something that can be inserted into stream, effecting a change in the behavior. For example, if we have a floating point number, say pi (л), and have written it as *float pi = 3.1415926* ; Now there is need of printing the value of pi up to two decimal places i.e. 3.14 . This is a formatting functionality. For this, we have a *manipulator* that tells about width and number of decimal points of a number being printed.

OR

Answer: Manipulators are operators used in C++ for formatting output. The data is manipulated by the programmer's choice of displayed.

Endl manipulator: This manipulator has the same functionality as the „\n newline character.

Question No: 23 (Marks: 2)

Write down piece of code that will declare a matrix of 3x3. And initialize all its locations with 0;

Answer:-

```
int matrix [3] [3] ;

matrix [0] [0] = 0;
matrix [0] [1] = 0;
matrix [0] [2] = 0;
matrix [1] [0] = 0;
matrix [1] [2] = 0;
matrix [1] [2] = 0;
matrix [2] [0] = 0;
matrix [2] [1] = 0;
```

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matrix [2] [2] = 0;

Another answer:-

we can also do it as given below

int matrix [3][3] = { 0 }; //all elements 0

Question No: 24 (Marks: 3)

Which one (copy constructor or assignment operator) will be called in each of the following code segment?

1) Matrix m1 (m2);
2) Matrix
   m1, m2;
   m1 =
   m2;
3) Matrix m1 = m2;

Answer:-

1) Matrix m1 (m2); copy constructor
2) Matrix m1, m2;
   m1 = m2; assignment operator
3) Matrix m1 = m2; assignment operator

Question No: 25 (Marks: 3)

What will be the output of following function if we call this function by passing int 5?

```
template <class T>
T reciprocal(T x)
{
return (1/x);
}
```

Answer:-

0

The output will zero as 1/5 and its .05 but conversion to int make it zero

Above is prototype of template class so assume passing an int and returning an int

Question No: 26 (Marks: 3)0

Identify the errors in the following member operator function and also correct them. math * operator(math m);

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```
math * operator (math m)
{
    math temp;
    temp.number= number * number;
    return number;

}
```

Answer:

The errors are in the arguments of the member operation function and also in the body of operator member function.

Correct function should be

```
math *operator(math *m);

math *operator (math *m)
{
    math temp;
    temp = m;
    temp.number= number * number;
    return temp.number;

}
```

Question No: 27 (Marks: 5)

Write a program which defines three variables of type double which store three different values including decimal points, using setprecision manipulators to print all these values with different number of digits after the decimal number.

Answer:-

```
#include <iostream>
#include <iomanip>

int main ()
{
 double x1 = 12345624.72345
  double x2 = 987654.12345
  double x3 = 1985.23456
  cout << setprecision (3) <<
                        x1<< endl;
   cout << setprecision (4) <<
                        x2 << endl;
    cout << setprecision (5) <<
```

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```
                x3<< endl;

 return 0;
}
```

Question No: 28 (Marks: 5)

What are the advantages and disadvantages of using templates?

Answer:-

Many thing can be possible without using templates but it do offer several clear advantages not offered by any other techniques:

Advanatages:

• Templates are easier to write than writing several versions of your similar code for different types.

•

•

Youcreate only one generic version of your class or function instead of manually creatingspecializations. Templates are type-safe. This is because the types that templates act upon are known at compile time, so the compiler can perform type checking before errors occur.

• Templates can be easier to understand, since they can provide a straightforward way of abstracting type information.

• It help in utilizing compiler optimizations to the extreme. Then of course there is room for misuse of the templates. On one hand they provide an excellent mechanism to create specific type-safe classes from a generic definition with little overhead.

Disadvantages:

On the other hand, if misused

• Templates can make code difficult to read and follow depending upon coding style.

• They can present seriously confusing syntactical problems esp. when the code is large and spread over several header and source files.

• Then, there are times, when templates can "excellently" produce nearly meaningless compiler errors thus requiring extra care to enforce syntactical and other design

• constraints. A common mistake is the angle bracket problem.

Question No: 29 (Marks: 5)

Suppose a program has a math class having only one data member number.
Write the declaration and definition of operator function to overload + operator for the statements of main function.

```
    math obj1, obj2;
    obj2= 10 + obj1 ;
```

Answer:-

```
#include <iostream.h>
```

```
math
{
mth operator + (obj1,obj2)
mth operator + (obj1,obj2)
{
 mth operator + (obj1,obj2)
mth operator + (obj1,obj2)
}
}
```

Question No: 30 (Marks: 3)

Is it possible to define two functions as given below? Justify your answer.

```
func(int x, int y)
func(int &x, int &y)
```

Answer:-

No, we cannot define two functions as func(intx, inty) func(int &x, int&y) because it's give an error
function not initializing.

Question No: 31 (Marks: 3)

What happens when we use new and delete operator?

Answer:

When we use *NEW* operator to create objects the memory space is allocated for the object and then its constructor is called. Similarly, when we use *DELETE* operator with our objects, the destructor is called for the object before deallocating the storage to the object.

Question No: 32 (Marks: 5)

What is the difference between function overloading and operator overloading?

Answer:-

Difference b/w function overloading and operator overloading is:
In function overloading, the functions have the same name but differ either by the number of arguments or the type of the arguments.
Operator overloading is to allow the same operator to be bound to more than one implementation, depending on the types of the operands.

Question No: 33 (Marks: 5)

Why the first parameter of operator function for << operator must be passed by reference?

Answer:-

Operator<<'s first parameter must be an ostream passed by reference. Its second parameter, the IntList that is printed, does not have to be passed as a const-reference

parameter; however it is more efficient to pass it by reference than by value (since that avoids a call to the copy constructor), and it should not be modified by operator<<, so it should be a const reference parameter

Question No: 34 (Marks: 5)

Read the given below code and explain what task is being performed by this function

```
Matrix :: Matrix ( int row , int col )
{
   numRows = row ;
   numCols = col ;
   elements = new ( double * ) [ numRows ] ;
   for ( int i = 0 ; i < numRows ; i ++ )
         {
      elements [ i ] = new double [ numCols ] ;
      for ( int j = 0 ; j < numCols ; j ++ )
           elements [ i ] [ j ] = 0.0 ;
    }
}
```

Hint : This function belong to a matrix class, having
Number of Rows = numRows
Number of Columns = numCols

Answer:

In this code the matrix function is defined, it get the number of rows from the user and create the row of matrix and then get the columns from the user and create the columns. The New is showing for creating more array space for the data which user enters. The elements [i][j] will print the data in matrix form.
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Question No: 35 (Marks: 2)

What is the difference between switch statement and if statement.

Answer:

1. if statement is used when we have to check two conditions while switch is a multi conditional control statement
2. SWITCH statement can be executed with all cases if the “break” statement is not used whereas IF statement has to be true to be executed further.

Question No: 36 (Marks: 2)

How can we initialize data members of contained object at construction time?

Answer:

Initializer list is used to initialize the contained objects at the construction time.

Question No: 37 (Marks: 2)

How the data members of a class are initialized with meaningful values?

Answer:

The C++ compiler generates a default constructor for a class if the programmer does not provide it. But the default constructor does not perform any data members initialization. Therefore, it is good practice that whenever you write a class, use a constructor function to initialize the data members to some meaningful values.

Question No: 38 (Marks: 2)

Can we overload *NEW* and *DELETE* operators?

Answer: Page 412

Yes, it is possible to overload *new* and *delete* operators to customize memory management. These operators can be overloaded in global (non-member) scope and in class scope as member operators.

Question No: 39 (Marks: 3)

What will be the output of following functions if we call these functions three times?

1)

```
void func1(){
int x = 0;
x++;
cout << x << endl;
}
```

Answer:

1
1
1

2)

```
void func2(){
static int x = 0 ;
x++;
```

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```
cout << x << endl ;
}
```

Answer:

1
2
3

Question No: 40 (Marks: 3)

What is the keyword ‘this’ and what are the uses of ‘this’ pointer?

Answer:

'this' is use to refer the current class member without using the name of the class.We cannot use it as a variable name. ‘this’ pointer is present in the function, referring to the calling object. this pointer points to the current object.

Question No: 41 (Marks: 3)

Suppose an object of class A is declared as data member of class B.

(i) The constructor of which class will be called first?

Answer: A

(ii) The destructor of which class will be called first?

Answer: B

Question No: 42 (Marks: 5)

Write the general syntax of a class that has one function as a friend of a class along with definition of friend function.

Answer:

```
class frinedclass{
public:
friend int compute(exforsys e1)
};
Int compute(exforsys e1)
{
//Friend Function Definition which has access to private data
return int(e1.a+e2.b)-5;
}
```

Question No:43 (Marks: 5)

The following code segment has errors. Locate as many as you can and explain briefly.

```
class Circle // no need to enter colon here ,
so I removed it {
```

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```
private : //colon missing
double centerX;
double centerY;
double radius;
public: //colon missing
void setCenter(double, double);
void setRadius(int);
};//semi colon missing
```

Question No: 44 (Marks: 5)

Write a program which defines five variables which store the salaries of five employees, using setw and
setfill manipulators to display all these salaries in a column.
Note: Display all data with in a particular width and the empty space should be filled with character x
Output should be displayed as given below:

```
xxxxxx1000
xxxxxx1500
xxxxx20000
xxxxx30000
xxxxx60000
```

Answer:

```
#include <iostream.h>
#include  <iomanip.h>
main(){
int sal1 =1000;
int sal2 =1500;

int sal3 =20000;
int sal4 =30000;
int sal5 =60000;
cout << setfill ('x') << setw (10);
cout<< sal1<<endl;
cout << setfill ('x') << setw (10);
cout<< sal2<<endl;
cout << setfill ('x') << setw (10);
cout<< sal3<<endl;
cout << setfill ('x') << setw (10);
cout<< sal4<<endl;
cout << setfill ('x') << setw (10);
cout<< sal5<<endl;
```

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```
int i=0;
cin>>i; // to stop the screen to show the output
}
```

Question No: 45 (Marks: 1)

What is the use of reference data type?

Answer:-

A reference data type is a variable that can contain an address. The reference data types in Java are arrays, classes and interfaces. You'll hear often say that Java does not have pointers. Yet, you could consider a reference data type to be a pointer

Question No: 46 (Marks: 1)

What are the main types of operators in terms of number of arguments they take?

Answer:-

The difference is in the number of arguments used by the function. In the case of binary operator overloading, when the function is a member function then the number of arguments used by the operatormember function is one (see below example). When the function defined for the binary operator overloading is a friend function, then it uses two arguments

Question No: 47 (Marks: 2)

What is the this pointer? Give an example of its use

Answer:-

This pointer is use to points to the current object in programming.

In a C++ program, if you create object A of class X, you can then obtain the address of A by using the "this" pointer. The address is available as a local variable in the non-static member functions of X, and its type is const X*. The "this" pointer works because C++ creates instances of its data members, and it keeps one copy of each member function.

Question No: 48 (Marks: 10)

Write a C++ program that contains a class ‘myClass’ having two data members of type int. The class must have

- A default constructor which must initialize all the data members to their meaningful values.
- A destructor with no implementation.
- Setter member functions to set all data members of class
- Getter member functions to get all data members of class

In main function of the program

5. Prompt the user to enter the number of objects to be created.
6. Dynamically allocate memory to objects according to the size entered by user.
7. De-allocate memory that was allocated to objects

Answer:

```
#include <stdio.h>
#include <iostream>
#include <cstring>
using namespace std;

class myclass
{

public:
int a;
int b;
int *iptr, *sptr;

construct{int,int.int}

        void seta(int);
        void setb(int);
        void setc(int);

        int geta();
        int getb();
        int getc();

};
void Person: :seta(int aa)
{


        a=aa;
}

void Person: :setb (int bb)
{

        b=bb;
}
        void Person: :setc (int cc)
```

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```
{
        c=cc;
}

main()

{

int num;

cout<<"Enter the number of objects to be created";

cin>>num;

for (int i =1;i==num;i++)
{
Person i_

}
}
```

Question No: 49 (Marks: 3)

What will be the output of following functions if we call these functions three times?

1)

```
void func1(){
int x = 0;
x++;
cout << x << endl;
}
```

Output will be:

1
1
1

2)

```
void func2(){
static int x = 0 ;
x++;
cout << x << endl ;
}
```

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Output will be:
1
2
3

Question No: 50 (Marks: 3)
If the requested memory is not available in the system then what does calloc/malloc and new operator return?
Answer:-

malloc returns a void pointer to the allocated space or NULL if there is insufficient memory available. To return a pointer to a type other than void, use a type cast on the return value. The storage space pointed to by the return value is guaranteed to be suitably aligned for storage of any type of object. If size is 0, malloc allocates a zero-length item in the heap and returns a valid pointer to that item.
By default, malloc does not call the new handler routine on failure to allocate memory. You can override this default behavior so that, when malloc fails to allocate memory, malloc calls the new handler routine in the same way that the new operator does when it fails for the same reason.

Question No: 52 (Marks: 10)
Write a program which consists of two classes, Date and Person.
Date class should contain three data members day, month, year and setter and getter function for these data members. Date class should also contain showdate() member function to display date.

Person class should contain three data members Name, Address, and Bday, where Name and Address are char pointer while Bday(Date of birth) is of type Date, Person class should further contain two member functions Display() and setdate().

In main program Create an object of Class person and call the member functions with it.

Answer:
```
#include <stdio.h>
#include <iostream>
#include <cstring>
```

```
using namespace std;
class Date
{
public:
        int day;
        int month;
        int year;

public:
        Date()
                {
                        day=0;
                        month=0;
                        year=0;

                }

        void setDay(int);
        void setMonth (int);
        void setYear(int);

        int getDay();
        int getMonth();
        int getYear();

        void showDate();
};
```

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```
void Date: :setDay(int d)
{
        if{d<1 | | d>31)
        cout<<"Invalid month Renter it";
        cin>>d;
}
        day=d;
}

void Date: :setMonth (int m)
{
        if(m<1 | | m>12)
{
        cout<<"Invalid month Renter it";
        cin>>m;
}
        month=m;
}
        void Date: :setYear (int y)
{
        year=y;

        int Date: :getDay()
{
return day;
}
        int Date: :getMonth()
{
        return month:
}
        int Date: :getYear()
{
        return year;
}
        void Date: :showDate()
{
                cout<<day<<"-"<<month<<"-
                        "<<year<<end1;
}
Class Person
{
```

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```
public:

        char *Name;
  char *Address
        Date Bday;

public:
        Student()
        {
        Name=new char[20];
        Address=new char[10];
        cin.getline(Name,20);
        cout<<"Enter Address:";
        cin.getline(Address,10);
        }

void setDate()
{
        cout<<"Enter Day:";
        cin>>Ad_date.day;
        cout<<"Enter month:";
        cin>>Ad_date.month;
        cout<<"Enter Year:";
        cin>>Ad_date.year;
        }
void Display()
        {
        cout<<"Name: "<<end1;
        cout<<"Address: "<<Address<<end1;
        cout<<"Date of Birth: ";
        Ad-date.showDate();
        }
};
void main(){
        Person object;
        object.setDate();

        object.Display();

        system("pause");
}
```

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