END-EXAM

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Q-1) a) Fibonacci Series

b) Number Factorial

c) Simple Program for Multiple Inheritance

Ans-1

Ans- 1-a) :- The Fibonacci sequence, also known as Fibonacci numbers, is defined as the sequence of numbers in which each number in the sequence is equal to the sum of two numbers before it. The Fibonacci Sequence is given as:

Fibonacci Sequence = 0, 1, 1, 2, 3, 5, 8, 13, 21, ….

I created a program which first take input from user than calls a function fibo,Where,first I initialize the initial 2 numbers of series and nextTerm as 0, then I make a loop from i=1 to n. Here n is the number of terms so n time iterates, then inside the loop for i=1 prints 1st number i.e. t1. than for i=2 prints 2nd number i.e t2. than from i=3 onwards i give Next Term as sum of previous 2 terms and than t1 to t2 and t2 the nextTerm and prints nextTerm … this loops runs for n time .

CODE

VSS Codes > EndExamPrograms > 1-a.cpp > main()

```cpp
// Q-1 a) Fibonacci Series

#include<iostream>
using namespace std;

void fibo(int n)
{
    int t1=0,t2=1,nextTerm=0;
    cout << "Fibonacci Series: ";

    for (int i=1; i<=n; i++)
    {
        if(i==1) {
            cout<<t1<<" ";
            continue;
        }
        if(i==2) {
            cout<<t2<<" ";
            continue;
        }
        nextTerm = t1 + t2;
        t1 = t2;
        t2 = nextTerm;

        cout << nextTerm << " ";
    }
}

int main(){
    int n;
    cout<<"Enter number of Terms : ";
    cin>>n;
    fibo(n);
    return 0;
}
```

OUTPUT

```
PS D:\VSS Codes\EndExamPrograms> cd "d:\VSS Codes\EndExa
Enter number of Terms : 10
Fibonacci Series: 0 1 1 2 3 5 8 13 21 34
PS D:\VSS Codes\EndExamPrograms>
```

Ans- 1-b) :- factorial, in mathematics, the product of all positive integers less than or equal to a given positive integer and denoted by that integer and an exclamation point. Thus, factorial seven is written 7!, meaning 1×2×3×4×5×6×7. Factorial zero is defined as equal to 1.

I created a program which first takes input from the user then calls a function factorial, Where, i have added if and else , where if contains recursion where recursion means function calls itself for many times until n not becomes 1. In recursion her happens we return n*factorial(n-1) which call function for n-1 same happens until it not becomes 1.

CODE

VSS Codes > EndExamPrograms > 1-b.cpp > main()

```cpp
// Q-1 b) Number Factorial

#include<iostream>
using namespace std;

long long int factorial(int n)
{
    if(n > 1)
        return n * factorial(n - 1);
    else
        return 1;
}

int main(){
    int n;
    cout<<"Enter Number : ";
    cin>>n;
    cout<<"Factorial of "<<n<<" is "<<factorial(n)<<endl;
    return 0;
}
```

OUTPUT

```
PS D:\VSS Codes\EndExamPrograms> cd "d:
Enter Number : 6
Factorial of 6 is 720
PS D:\VSS Codes\EndExamPrograms>
```

Ans- 1-c) :- Multiple inheritance is a feature of some object-oriented computer programming languages in which an object or class can inherit features from more than one parent object or parent class. It is distinct from single inheritance, where an object or class may only inherit from one particular object or class.

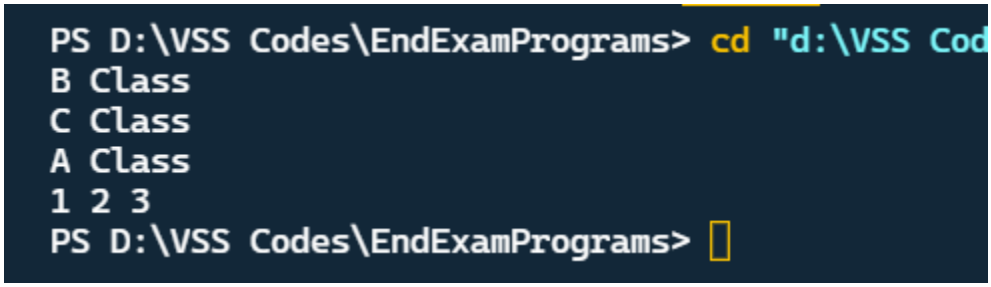
I created a program which have 3 classes where Class A have 2 parent classes B,C which can be accessed by class A as i have done in Program.

CODE

VSS Codes > EndExamPrograms > 1-c.cpp > main()

```cpp
// Q-1 c) Multiple Inheritence
#include<iostream>
using namespace std;

class B
{
private:

public:
    int a = 1;
    B(){
        cout<<"B Class"<<endl;
    }
};

class C
{
private:

public:
    int b = 2;
    C(){
        cout<<"C Class"<<endl;
    }
};

class A : public B,public C
{
private:
public:
    int c = 3;
    A(){
        cout<<"A Class"<<endl;
    }
};

int main(){
    A obj;
    cout<<obj.a<<" "<<obj.b<<" "<<obj.c<<endl;;
    return 0;
}
```

OUTPUT



Q-3) Hierarchical inheritance Example Program , Example for Function with argument and with return value.

Ans-3)

Ans-3-a) :- From the below program and output we can infer how hierarchical inheritance works in terms of C++.

Class A is the single base or parent class that has its own properties as well as some common properties as the base class and methods as well. Therefore, the base class will surpass its properties to the child class. Class B is the subclass which in turn will inherit the properties from parent class A, class C will also work in a similar fashion. Derived classes B and C will have object creation which will inherit and hold the properties from the parent class which is class A objects of their respective classes will behave with the defined methods and variables. Output shows the Value of integer stored in various class called from different object of derived class.

CODE

VSS Codes > EndExamPrograms > 3-a.cpp > ...

```cpp
// Q-3 a) Hierarchical inheritance
#include<iostream>
using namespace std;

class A
{
private:

public:
    int a=1;
    A(){
        cout<<"A Class"<<endl;
    }
};

class B : public A
{
private:

public:
    int b=2;
    B(){
        cout<<"B Class"<<endl;
    }
};

class C : public A
{
private:
public:
    int c=3;
    C(){
        cout<<"C Class"<<endl;
    }
};

int main(){
    B obj1;
    C obj2;

    cout<<obj1.a<<" "<<obj1.b<<endl;
    cout<<obj2.a<<" "<<obj2.c<<endl;


    return 0;
}
```

OUTPUT

```
PS D:\VSS Codes> cd "d:\VSS Codes\End
A Class
B Class
A Class
C Class
1 2
1 3
PS D:\VSS Codes\EndExamPrograms>
```

Ans-3-b) :- Function with arguments and return type means a function which takes some value and also returns value like in int value or char etc..

Here i Created a Program Which have to variable a,b than we call sum function which take 2 argument a and b in it and returns the sum in integer form .

CODE

VSS Codes > EndExamPrograms > 3-b.cpp > main()

```cpp
// Q-3 b) Example for Function with argument and with return value.
#include<iostream>
using namespace std;

int sum(int a,int b)
{
    cout<<"This is Function with argument and return value "<<endl;
    return a+b;
}

int main(){
    int a=5,b=6;
    int c=sum(a,b);
    cout<<c<<endl;
    return 0;
}
```

OUTPUT

```
PS D:\VSS Codes> cd "d:\VSS Codes\EndExamPrograms\" ; i
This is Function with argument and return value
11
PS D:\VSS Codes\EndExamPrograms>
```

Q-4) Example for Function without Argument and return value , and calculate the sum of two numbers , check whether a number is even or odd.

Ans-4) Function without arguments and return type means a function which does not take any value and also does not return anything.

Sum can be calculated using a function that takes 2 arguments and returns their sum.and odd even by a%%2=0 than even else odd.

CODE

VSS Codes > EndExamPrograms > 4.cpp > main()

```cpp
// Q-4 Example for Function Argument and return Value , and Sum of 2 numbers and whether it is even or not
#include<iostream>
using namespace std;

void function(){
    cout<<"Function Without Argument and Return Type called "<<endl;
}

int sum(int a, int b){
    return a+b;
}

void iseven(int a){
    if(a%2==0){
        cout<<"Entered Number is EVEN"<<endl;
    }
    else{
        cout<<"Entered Number is ODD"<<endl;
    }
}

int main(){
    // 1st Part of Question
    function();

    // 2nd Part of Question
    int a,b;
    cout<<"Enter 2 number you want to sum : ";
    cin>>a>>b;
    int c = sum(a,b);
    cout<<"Sum of "<<a<<" and "<<b<<" is "<<c<<endl;

    // 3rd Part of Question
    int d;
    cout<<"Enter a Number You Want to Check if it is Even or Odd : ";
    cin>>d;
    iseven(d);

    return 0;
}
```

OUTPUT

```
PS D:\VSS Codes\EndExamPrograms> cd "d:\VSS Codes\EndExamPrograms\" ; if ($
Function Without Argument and Return Type called
Enter 2 number you want to sum : 10 50
Sum of 10 and 50 is 60
Enter a Number You Want to Check if it is Even or Odd : 5645
Entered Number is ODD
PS D:\VSS Codes\EndExamPrograms>
```

Q-5) Program to calculate the area of the square , calculate the average of five numbers.

Ans-5) For area of Square I asked the user to give the value of Side and then passed that side value in function sqarea which returns square of side or area of square. And for average taken 5 values from the user and passed them in function average and returned the average.

CODE

VSS Codes > EndExamPrograms > 5.cpp > main()

```cpp
// Q-5 Calculate Area of Square and Average of Given Five numbers

#include<iostream>
using namespace std;

int sqarea(int s){
    return s*s;
}

float average(int a,int b,int c,int d,int e)
{
    return (a+b+c+d+e)/5;
}

int main(){
    // 1st Part of Question
    int s;
    cout<<"Enter Side Length of Square : ";
    cin>>s;
    int a = sqarea(s);
    cout<<"Area of Square with Side "<<s<<" is "<<a<<endl;

    // 2nd Part of Question
    int l,m,n,o,p;
    cout<<"Enter 5 Numbers : ";
    cin>>l>>m>>n>>o>>p;
    cout<<"Average of Entered 5 Numbers is : "<<average(l,m,n,o,p)<<endl;

    return 0;
}
```

OUTPUT

```
PS D:\VSS Codes\EndExamPrograms> cd "d:\VSS Co
Enter Side Length of Square : 5
Area of Square with Side 5 is 25
Enter 5 Numbers : 5 10 15 20 25
Average of Entered 5 Numbers is : 15
PS D:\VSS Codes\EndExamPrograms>
```