



Special Assignment

CEM 251 OOP with C++

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1.

```
joy@joy-x510unr:~/git/CE-Minor/OOP_SEM4/Special_Assignment$ ./a.out
Enter 1 to create Current Account or 2 to create Savings Account:
2
Please enter your Name: Joy
Please enter your Account Number: 69420
Please enter your Bank Balance: 1200
Balance should be greater than minimum balance which is 1500
Please Re-enter your balance.
Please enter your Bank Balance: 2000
Enter 1 to withdraw money or 2 to deposit money:
1
Enter amount you want to withdraw from your account: 700
Cannot withdraw if account balance gets less than minimum balance.
Please enter other amount.
Enter amount you want to withdraw from your account: 200
Balance after withdrawal = 1800
-----
Savings Account Details:
Account Number: 69420
Account Name: Joy
Account Balance: 1800
-----
joy@joy-x510unr:~/git/CE-Minor/OOP_SEM4/Special_Assignment$
```

2.

```
2.cpp - CE_Minor (Workspace) - Visual Studio Code
PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL
joy@joy-x510unr:~/git/CE-Minor/OOP_SEM4/Special_Assignments$ ./a.out
UG students please enter your information:
Enter your name: Joy
Enter your Roll no.: 26
Enter your age: 20
Enter your Semester: 4
Enter your stipend: 0
Enter your fee: 234000
-----
UG STUDENT INFORMATION
Name: Joy
Age: 20
Roll No.: 26
Semester: 4
Stipend: 0
Fee: 234000
-----
UG students please enter your information:
Enter your name: Deep
Enter your Roll no.: 67
Enter your age: 18
Enter your Semester: 2
Enter your stipend: 1000
Enter your fee: 80000
-----
UG STUDENT INFORMATION
Name: Deep
Age: 18
Roll No.: 67
Semester: 2
Stipend: 1000
Fee: 80000
-----
UG students please enter your information:
Enter your name: Sharvil
Enter your Roll no.: 56
Enter your age: 20
Enter your Semester: 3
Enter your stipend: 0
Enter your fee: 234000
-----
```

2.cpp - CE_Minor (Workspace) - Visual Studio Code



PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL

Enter your age: 20

Enter your Semester: 3

Enter your stipend: 0

Enter your fee: 234000

UG STUDENT INFORMATION

Name: Sharvil

Age: 20

Roll No.: 56

Semester: 3

Stipend: 0

Fee: 234000

UG students please enter your information:

Enter your name: Parth

Enter your Roll no.: 66

Enter your age: 21

Enter your Semester: 5

Enter your stipend: 0

Enter your fee: 800000

UG STUDENT INFORMATION

Name: Parth

Age: 21

Roll No.: 66

Semester: 5

Stipend: 0

Fee: 800000

UG students please enter your information:

Enter your name: Dhawal

Enter your Roll no.: 55

Enter your age: 22

Enter your Semester: 6

Enter your stipend: 0

Enter your fee: 800000

UG STUDENT INFORMATION

Name: Dhawal

Age: 22

Roll No.: 55

Semester: 6

Stipend: 0

Fee: 800000



2.cpp - CE_Minor (Workspace) - Visual Studio Code



PROBLEMS

OUTPUT

DEBUG CONSOLE

TERMINAL



PG students please enter your information:

Enter your name: Deep

Enter your Roll no.: 143

Enter your age: 27

Enter your Semester: 3

Enter your stipend: 100000

Enter your fee: 50000

PG STUDENT INFORMATION

Name: Deep

Age: 27

Roll No.: 143

Semester: 3

Stipend: 100000

Fee: 50000

PG students please enter your information:

Enter your name: Paras

Enter your Roll no.: 134

Enter your age: 24

Enter your Semester: 2

Enter your stipend: 90000

Enter your fee: 80000

PG STUDENT INFORMATION

Name: Paras

Age: 24

Roll No.: 134

Semester: 2

Stipend: 90000

Fee: 80000

PG students please enter your information:

Enter your name: Akshay

Enter your Roll no.: 89

Enter your age: 23

Enter your Semester: 1

Enter your stipend: 150000

Enter your fee: 70000

PG STUDENT INFORMATION



2.cpp - CE_Minor (Workspace) - Visual Studio Code



PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL



Enter your stipend: 1500000

Enter your fee: 70000



PG STUDENT INFORMATION

Name: Akshay

Age: 23

Roll No.: 89

Semester: 1

Stipend: 1500000

Fee: 70000

PG students please enter your information:

Enter your name: Parth

Enter your Roll no.: 99

Enter your age: 23

Enter your Semester: 3

Enter your stipend: 5000

Enter your fee: 1000

PG STUDENT INFORMATION

Name: Parth

Age: 23

Roll No.: 99

Semester: 3

Stipend: 5000

Fee: 1000

PG students please enter your information:

Enter your name: Harsh

Enter your Roll no.: 21

Enter your age: 25

Enter your Semester: 3

Enter your stipend: 900000

Enter your fee: 1000000

PG STUDENT INFORMATION

Name: Harsh

Age: 25

Roll No.: 21

Semester: 3

Stipend: 900000

Fee: 1000000

Average age for students in UG = 20.2

Average age for students in PG = 24.4



joy@joy-x510unr:~/git/CE-Minor/OOP_SEM4/Special_Assignments\$

3. Justify the following statement with the help of a suitable example:

“In a class hierarchy of many levels if we want a function at any level to be called through a base class pointer then the function must be declared as virtual in the base class.”

- A C++ virtual function is a member function in the base class that you redefine in a derived class. It is declared using the virtual keyword. A 'virtual' is a keyword preceding the normal declaration of a function.
- It is used to tell the compiler to perform dynamic linkage or late binding on the function. There is a necessity to use the single pointer to refer to all the objects of the different classes.
- So, we create the pointer to the base class that refers to all the derived objects. But, when the base class pointer contains the address of the derived class object, it always executes the base class function. This issue can only be resolved by using the 'virtual' function.
- When the function is made virtual, C++ determines which function is to be invoked at the runtime based on the type of the object pointed by the base class pointer.

Example-

```
#include <iostream>
using namespace std;

class rectangle;

class figure
{
public:
    virtual void pf()
    {
        cout << "\nThis is the base class.\n";
    }
};

class rectangle: public figure
{
public:
    void pf()
    {
        cout << "\nThis is derived class\n";
    }
};

int main()
{
    figure* f;
    rectangle r;

    f=&r;
    f -> pf();

    return 0;
}
```

Here, the base class is figure and the rectangle is a derived class. When pf() function is defined as virtual function the base pointer executes base class function pf(). But when it is not declared as a virtual function then it executes the derived class function pf(). Thus virtual function is important. We can see the output in the below image.

```
joy@joy-x510unr:~/git/CE-Minor/OOP_SEM4/Special_Assignment$ g++ 3.cpp
joy@joy-x510unr:~/git/CE-Minor/OOP_SEM4/Special_Assignment$ ./a.out

This is derived class
joy@joy-x510unr:~/git/CE-Minor/OOP_SEM4/Special_Assignment$ g++ 3.cpp
joy@joy-x510unr:~/git/CE-Minor/OOP_SEM4/Special_Assignment$ ./a.out

This is the base class.
joy@joy-x510unr:~/git/CE-Minor/OOP_SEM4/Special_Assignment$ █
```

4.

```
2.cpp - CE_Minor (Workspace) - Visual Studio Code
PROBLEMS  OUTPUT  DEBUG CONSOLE  TERMINAL

joy@joy-x510unr:~/git/CE-Minor/OOP_SEM4/Special_Assignment$ ./a.out

Time initialised

T1 default constructor called:
0:0:0

T2 parameterized constructor called:
4:32:45

Time T1 set to 6:53:30
6:53:30
4:32:45

Adding both times:
10:25:15
joy@joy-x510unr:~/git/CE-Minor/OOP_SEM4/Special_Assignment$ █
```

5.

```
5.cpp - CE_Minor (Workspace) - Visual Studio Code
PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL

joy@joy-x510unr:~/git/CE-Minor/OOP_SEM4/Special_Assignment$ ./a.out

Enter information for 1st train:

Please enter Train number: 53462

Please enter capacity: 55

Please enter Journey date in dd/mm/yyyy format: 04/06/2020

Please enter Source: Ahmedabad

Please enter Destination: Bangalore

-----
Train Number: 53462
Capacity: 55
Journey date: 04/06/2020
From: Ahmedabad
To: Bangalore
-----

Enter information for 2nd train:

Please enter Train number: 5367

Please enter capacity: 60

Please enter Journey date in dd/mm/yyyy format: 09/09/2020

Please enter Source: Ahmedabad

Please enter Destination: Mumbai

-----
Train Number: 5367
Capacity: 60
Journey date: 09/09/2020
From: Ahmedabad
To: Mumbai
-----

Both the trains have same source but different destination
joy@joy-x510unr:~/git/CE-Minor/OOP_SEM4/Special_Assignment$
```