PPL Assignment 2

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1. In order to access the memory address of a variable, val, prepend it with & sign. For example, &val returns the memory address of val. This memory address is assigned to a pointer and can be shared among functions. For example, int *p = &val assigns the memory address of val to pointer p. To access the content of the memory pointed to, prepend the variable name with a *. For example, *p will return the value stored in val and any modification to it will be performed on val. Create a program with function update having parameters as int *a & int *b Modify the values in memory so that a contains their sum and b contains their absolute difference.

Source Code:

```
#include<stdio.h>
#include <stdlib.h>
#include <iostream>
using namespace std;
void update(int *a, int *b){
    int temp= *a;
    *a = *a + *b;
    *b = abs(temp- *b);
}
int main(){
    int a,b;
    cout<<"Enter the values of a and b respectively: ";
    cin>>a>>b;
    int *p = &a;
    int *q= &b;
    update(p,q);
    cout<<"The summation is: "<<a<<"\nThe Absolute difference is: "<<b;
    return 0;
}
```

Output:

```
PROBLEMS  OUTPUT  DEBUG CONSOLE  TERMINAL

PS C:\Users\Himani\Desktop\PPL> cd "c:\Users\Himani\Desktop\PPL
Enter the values of a and b respectively: 2 9
The summation is: 11
The Absolute difference is: 7
PS C:\Users\Himani\Desktop\PPL>
```

2. Write a program with two classes Hotel Room and Hotel Apartment denoting respectively a standard hotel room and a hotel apartment. An instance of any of these classes has two parameters: bedrooms and bathrooms denoting respectively the number of bedrooms and the number of bathrooms in the room.

The prices of a standard hotel room and hotel apartment are given as:

- Hotel Room: 50 x bedrooms + 100 x bathrooms.
- Hotel Apartment: The price of a standard room with the same number bedrooms and bathrooms plus 100.

For example, if a standard room costs 200, then an apartment with the same number of bedrooms and bathrooms costs 300.

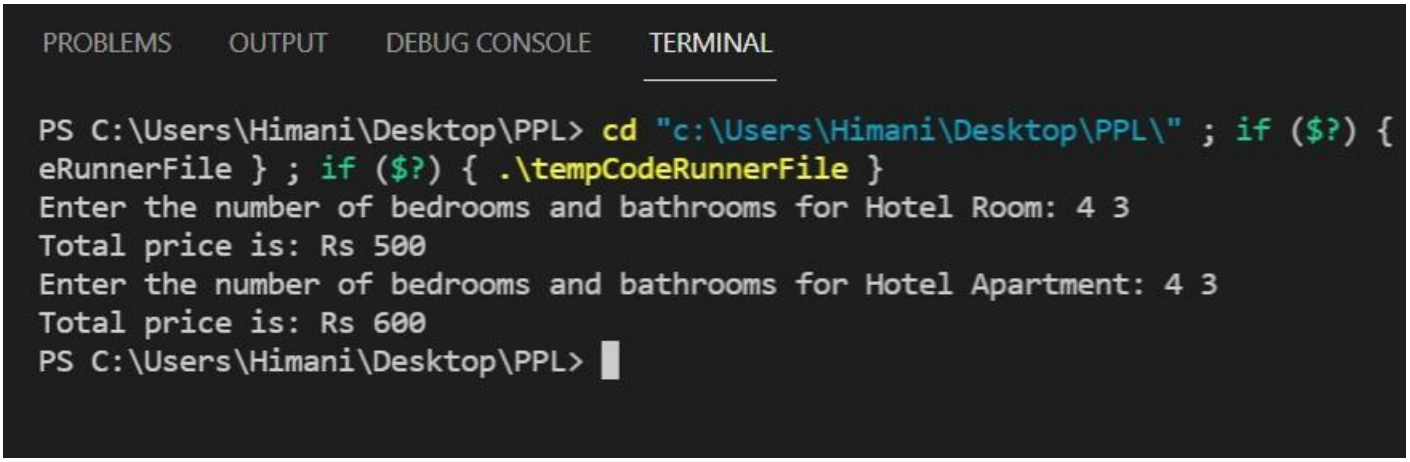
Write a program to return the correct profit. Make necessary assumptions wherever necessary.

Source Code:

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

class HotelRoom
{
    public:
        HotelRoom(int bedrooms, int bathrooms) {
            bedrooms_ = bedrooms;
            bathrooms_ = bathrooms;
        }

        int get_price()
        {
            return 50*bedrooms_ + 100*bathrooms_;
        }
    private:
        int bedrooms_;
        int bathrooms_;
};

class HotelApartment : public HotelRoom
{
    public:
        HotelApartment(int bedrooms, int bathrooms)
        : HotelRoom(bedrooms, bathrooms) {}

        int get_price()
        {
            return HotelRoom::get_price() + 100;
        }
};
```

```
int main()
{
    int a,b;
    cout<<"Enter the number of bedrooms and bathrooms for Hotel Room: ";
    cin>>a>>b;
    HotelRoom hr(a,b);
    cout<<"Total price is: Rs "<<hr.get_price()<<endl;

    cout<<"Enter the number of bedrooms and bathrooms for Hotel Apartment: ";
    cin>>a>>b;
    HotelApartment ha(a,b);
    cout<<"Total price is: Rs "<<ha.get_price();
    return 0;
}
```

Output:



3. Write a class to represent a vector (a series of float values). Include member functions to perform the following tasks:

- To create the vector
- To modify the value of a given element.
- To multiply by a scalar value.
- To display the vector in the form (10, 20, 30,...)

Source Code:

```
#include<iostream>
#include<conio.h>
#include<stdio.h>
#include<string.h>
using namespace std;
//class Vector
class Vector
{
public:
int x,y,z;

//to set vector set_vector() function
    void set_vector()
    {
        cout<<"\nEnter the scaler values of vector quentity\nIn x direction :";
```

```
        cin>>x;
        cout<<"\nIn y direction :";
        cin>>y;
        cout<<"\nIn z direction :";
        cin>>z;
    }

//to modify scalar values of vector quantity
    void modify()
    {
        int i;
        display();
        cout<<"\nEnter the direction in which you want to modify vector\n1. x-dimension\n2. y-
dimension\n3. z-dimension\n";
        cin>>i;
        if(i==1)
        {
            cout<<"\nEnter new x :";
            cin>>x;
        }
        else if(i==2)
        {
            cout<<"\nEnter new y :";
            cin>>y;
        }
        else if(i==3)
        {
            cout<<"\nEnter new z :";
            cin>>z;
        }
        display();
    }

    //to multiply vector with scalar value
    void multiply()
    {
        int scalar;
        cout<<"\nEnter scalar quantity to multiply by :";
        cin>>scalar;
        x=x*scalar;
        y=y*scalar;
        z=z*scalar;
        display();
    }

    //to display vector
    void display()
    {
        cout<<"\nEntered vector is :"<<x<<"i + "<<y<<"j + "<<z<<"k";
    }
    };

    int main()
    {
        Vector vt;
```

```
        vt.set_vector();
        vt.modify();
        vt.multiply();
        getch();
    }
```

Output:

```
PS C:\Users\Himani\Desktop\PPL> cd "c:\Users\Himani\Desktop\PPL\" ; if ($?) { g++ 3.cpp -o 3 } ; if ($?) { .\3 }

Enter the scaler values of vector quentity
In x direction :2

In y direction :3
PS C:\Users\Himani\Desktop\PPL> cd "c:\Users\Himani\Desktop\PPL\" ; if ($?) { g++ tempCodeRunnerFile.cpp -o tempCod
eRunnerFile } ; if ($?) { .\tempCodeRunnerFile }

Enter the scaler values of vector quentity
In x direction :3

In y direction :4

In z direction :5

Entered vector is :3i + 4j + 5k
Enter the direction in which you want to modify vector
1. x-dimension
2. y-dimension
3. z-dimension
2

Enter new y :5

Entered vector is :3i + 5j + 5k
Enter scalar quantity to multiply by :6

Entered vector is :18i + 30j + 30k
PS C:\Users\Himani\Desktop\PPL>
```

4. A book shop maintains the inventory of books that are being sold at the shop. The list includes details such as author, title, price, publisher and stock position. Whenever a customer wants a book, the sales person inputs the title and author and the system searches the list and displays whether it is available or not. If it is not, an appropriate message is displayed. If it is, then the system displays the book details and requests for the number of copies required. If the requested copies book details and requests for the number of copies required. If the requested copies are available, the total cost of the requested copies is displayed; otherwise the message “Required copies not in stock” is displayed. Design a system using a class called books with suitable member functions and Constructors. Use new operators in constructors to allocate memory space required. Implement C++ program for the system.

Improve the system design to incorporate the following features:

- The price of the books should be updated as and when required. Use a member function to implement this.
- The stock value of each book should be automatically updated as soon as a transaction is completed.
- The number of successful and unsuccessful transactions should be recorded for the purpose of statistical analysis. Use static data members to keep count of transactions.

- Also demonstrate the use of pointers to access the members.

Source Code:

```
 #include<iostream>
#include<conio.h>
#include<stdio.h>
#include<string.h>
#include<iomanip>
using namespace std;

class book{
        static int successful,unsuccessful;
        char **author;
        char **title;
        float *price;
        char **publisher;
        int *stock_copy;
        int size;


        public:
            book(){
                size=5;
                author=new char*[10];
                title=new char*[10];
                publisher=new char*[10];

                for(int i=0;i<size;i++){
                    author[i]=new char[50];
                    title[i]=new char[50];
                    publisher[i]=new char[50];
                }

                stock_copy=new int[size];
                price=new float[size];

                //initialising some values
                title[0]=(char*)"object oriented programming with c++";
                title[1]=(char*)"programming in ANCI";
                title[2]=(char*)"electronic circuit theory";
                title[3]=(char*)"computer algorithm";
                title[4]=(char*)"complete solution of balagurusamy(c++)";

                author[0]=(char*)"balagurusamy";
                author[1]=(char*)"balagurusamy";
                author[2]=(char*)"boyelstade";
                author[3]=(char*)"shahani";
                author[4]=(char*)"abdus sattar";

                publisher[0]=(char*)"ABC";
                publisher[1]=(char*)"DEF";
                publisher[2]=(char*)"GHI";
                publisher[3]=(char*)"JKL";
                publisher[4]=(char*)"MNO";
```

```
            stock_copy[0]=200;
            stock_copy[1]=150;
            stock_copy[2]=50;
            stock_copy[3]=80;
            stock_copy[4]=300;

            price[0]=120.5;
            price[1]=115.75;
            price[2]=140;
            price[3]=180.5;
            price[4]=120;
        }

        //show all books
        void showdetail(){
            cout<<setw(22)<<"Title"<<setw(30)<<" Stock Copy "<<setw(20)
            <<" Price per book "<<endl;
            for(int i=0;i<size;i++)
            {
                cout<<setw(35)<<title[i]<<setw(10)<<stock_copy[i]
                <<setw(18)<<price[i]<<endl;
            }
        }

        //search
        int search(){
            char name[80],t[80];
            cout<<"Enter author name in small letter: ";
            getchar();
            gets(name);
            cout<<"Title of book in small letter: ";
            gets(t);

            int count=-1;
            int a,b;
            for(int i=0;i<size;i++){
                a=strcmp(name,author[i]);
                b=strcmp(t,title[i]);
                if(a==0 && b==0)
                    count=i;
            }
            return count;
        }

        //buy the book
        void buy(int i){
            if(i<0){
            cout<<" This book is not available \n";
            unsuccessful++;
            }else{
                cout<<" How many copies of this book is required : ? "; int copy;
cin>>copy;
                if(copy<=stock_copy[i]){
                    stock_copy[i]=stock_copy[i]-copy;
                    float total_price;
```

```
                        total_price=price[i]*copy;
                        cout<<"Total price = "<<total_price<<" TK\n";
                        successful++;
                    }else{
                        cout<<" Sorry your required copies is not available \n";
                        unsuccessful++;
                    }
                }
            }


            //edit price
            void edit_price()
            {
                cout<<"EDIT PRICE\n";
                int i;
                i=search();
                cout<<"Enter new price : "; float p; cin>>p;
                price[i]=p;
            }

            //transactions
            void showtransaction(){
            cout<<setw(22)<<"Successful Transaction"<<setw(34)
            <<"Unsuccessful Transaction "<<endl<<setw(10)
            <<successful<<setw(32)<<unsuccessful<<endl;
            }
};

int book::successful=0;
int book::unsuccessful=0;

int main(){
    book b1;
    int result;

    result=b1.search();
    b1.buy(result);
    cout<<"\n-------------------------------------"<<endl;

    b1.showdetail();
    cout<<"\n-------------------------------------"<<endl;

    b1.showtransaction();
    cout<<"\n-------------------------------------"<<endl;

    b1.edit_price();
    cout<<"DETAILS AFTER EDITTING THE PRICE OF THE BOOK"<<endl<<endl;
    b1.showdetail();
    return 0;
}
```

Output:

```
PROBLEMS    OUTPUT    DEBUG CONSOLE    TERMINAL

PS C:\Users\Himani\Desktop\PPL> cd "c:\Users\Himani\Desktop\PPL\" ; if ($?) { g++ 4
Enter author name in small letter:
shahani
Title of book in small letter: computer algorithm
 How many copies of this book is required : ? 2
Total price = 361 TK

-----------------------------------
                Title                   Stock Copy      Price per book
object oriented programming with c++       200             120.5
               programming in ANCI        150             115.75
          electronic circuit theory        50               140
                 computer algorithm        78              180.5
complete solution of balagurusamy(c++)       300               120

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Successful Transaction          Unsuccessful Transaction
         1                               0

-----------------------------------
EDIT PRICE
Enter author name in small letter: shahani
Title of book in small letter: computer algorithm
Enter new price : 20
DETAILS AFTER EDITTING THE PRICE OF THE BOOK

                Title                   Stock Copy      Price per book
object oriented programming with c++       200             120.5
               programming in ANCI        150             115.75
          electronic circuit theory        50               140
                 computer algorithm        78                20
complete solution of balagurusamy(c++)       300               120
PS C:\Users\Himani\Desktop\PPL>
```