Name - Akriti Choudhary
Roll number - 2005776
Class - B14
Subject - OOP Lab Exam
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Question 1)Write a program in C++ that creates a class parcel containing private member variable weight (of the parcel), protected variable shipping_cost, write a parameterized constructor that initializes these variables. Write a member function with name Cal_shipping () to calculate the shipping cost according to formula Rs. 10/Kg. Create a class called Box, which is publicly inheriting Parcel class. It should have private member variable no_of_boxes which will be initialized using a constructor based on the weight data member of parcel class(if weight exceeds 30 kg then no.of boxes requires 2 and if exceeds 50 kg no.of boxes required 5, otherwise 1 box required). Override class Cal_shipping () function defined in the class Parcel and add Rs. 30 to the shipping_cost variable if the volume of the box exceeds 3 units. Display all the information with the final shipping cost.

Solution:

```cpp
// Akriti Choudhary
// 2005776

#include <iostream>

using namespace std;

class parcel_776
{
    int weight_776;

protected:
    float shipping_cost_776;

public:
    parcel_776()
    {
        weight_776 = 0;
    }

    parcel_776(int we_776)
    {
        weight_776 = we_776;
    }

    void calshipping_776()
    {
        shipping_cost_776 = 10 * weight_776;
    }
```

```cpp
};
class box_776 : public parcel_776
{
    int no_of_boxes_776;

public:
    box_776(int we_776) : parcel_776(we_776)
    {
        if ((we_776 > 30) && (we_776 < 50))
        {
            no_of_boxes_776 = 2;
        }
        else if (we_776 >= 50)
        {
            no_of_boxes_776 = 5;
        }
        else
        {
            no_of_boxes_776 = 1;
        }
    }
    void calshipping_776()
    {
        parcel_776::calshipping_776();
        if (no_of_boxes_776 > 3)
        {
            shipping_cost_776 += 30;
        }
    }
    void display()
    {
        cout << "number of boxes : " << no_of_boxes_776 << endl;
        cout << "Shipping cost : " << shipping_cost_776 << endl;
    }
};
int main()
{
    int we_776;
    cout << "enter the weight : ";
    cin >> we_776;

    box_776 Akriti(we_776);

    Akriti.calshipping_776();
    Akriti.display();

    return 0;
}
```

```
PS C:\Users\KIIT\OneDrive\Desktop\test> g++ parcel.cpp -oparcel
PS C:\Users\KIIT\OneDrive\Desktop\test> ./parcel
enter the weight : 69
number of boxes : 5
Shipping cost : 720
PS C:\Users\KIIT\OneDrive\Desktop\test>
```

SET A

Question 2)Write a program in C++ that creates a class vect, which contains a pointer to an integer (int *ptr) and an integer (size).The integer pointer (ptr) will point to a dynamic array of integers and size represents the total capacity of that dynamic array. The class vect should behave as an array with practically unlimited entries.

a) Write a default constructor that will initialize integer pointer (ptr) to NULL and integer variable (size) to zero.

b) Write a parameterized constructor that will initialize integer variable (size) to a value passed as parameter. Initialize the integer pointer (ptr) to a dynamic array of size that equals to the parameter that is passed to constructor.

Solution:

```
//Akriti Choudhary(2005776)

#include <iostream>
using namespace std;

class vect_776
{
private:
    int size_776;
    int *ptr_776;

public:
    vect_776()
    {
        cout << "Default Constructor is called\n";
        size_776 = 0;
        ptr_776 = NULL;
    }
    vect_776(int s_776)
    {
        cout << "Parameterized Constructor is called\n";
        size_776 = s_776;
        ptr_776 = new int(size_776);
    }
    void input()
    {
        cout << "Enter the elements of the array : \n";
```

```cpp
        for (int i = 0; i < size_776; ++i)
        {
            cout << "Enter the " << i + 1 << " element of the array : ";
            cin >> ptr_776[i];
        }
    }
    void display()
    {
        for (int i = 0; i < size_776; ++i)
        {
            cout << ptr_776[i] << "\t";
        }
        cout << "\n";
    }
    ~vect_776()
    {
        cout << "Destructor is called\n";
        free(ptr_776);
    }
};
int main()
{
    int s_776;

    cout << "Enter the size of the dynamic array : ";
    cin >> s_776;

    vect_776 Akriti(s_776);
    Akriti.input();
    Akriti.display();

    return 0;
}
```

```
PS C:\Users\KIIT\OneDrive\Desktop\test> g++ vect.cpp -ovect
PS C:\Users\KIIT\OneDrive\Desktop\test> ./vect
Enter the size of the dynamic array : 5
Parameterized Constructor is called
Enter the elements of the array :
Enter the 1 element of the array : 7
Enter the 2 element of the array : 9
Enter the 3 element of the array : 8
Enter the 4 element of the array : 5
Enter the 5 element of the array : 45
7       9       8       5       45
Destructor is called
PS C:\Users\KIIT\OneDrive\Desktop\test>
```

Question 3)Write a program to declare three classes a1, a2, a3. The classes have private data member variable of string type. Assign the first name and surname of a student to member variable of class a1 and a2 respectively. Perform concatenation of two strings using overloading of + operator and store it to data member variable of class a3. Print the full name to the output screen using member function.

Solution:

```cpp
//Akriti Choudhary(2005776)
#include <iostream>

using namespace std;

class a1_776
{
private:
    string first_name_776;

public:
    a1_776()
    {
        first_name_776 = " ";
    }
    a1_776(string s_776)
    {
        first_name_776 = s_776;
    }
    string get_first_name()
    {
        return first_name_776;
    }

};

class a2_776 : public a1_776
{
private:
    string last_name_776;

public:
    a2_776()
    {
        last_name_776 = " ";
    }
    a2_776(string l)
    {
```

```cpp
        last_name_776 = l;
    }
    void set_last_name(string l)
    {
        last_name_776 = l;
    }
    string get_last_name()
    {
        return last_name_776;
    }
    friend string operator+(a2_776 &ob2);
};

class a3_776 : public a2_776
{
private:
    string name_776;
    string l_776;
    a2_776 ob2;

public:
    a3_776()
    {
        cout << "Enter last name : ";
        cin >> l_776;
        ob2.set_last_name(l_776);
        name_776 = +ob2;
    }
    void display()
    {
        cout << name_776 << "\n";
    }
};

string operator+(a2_776 &ob2)
{
    string s_776;
    cout << "Enter first name : ";
    cin >> s_776;

    a1_776 ob1(s_776);

    string n_776;
    n_776 = ob1.get_first_name() + " " + ob2.last_name_776;
    return n_776;
}

int main()
{
    a1_776 obj1_776;
```

```cpp
    a2_776 obj2_776;

    a3_776 ob3_776;
    ob3_776.display();

    return 0;
}
```

```
PS C:\Users\KIIT\OneDrive\Desktop\test> g++ overload.cpp -ooverload
PS C:\Users\KIIT\OneDrive\Desktop\test> ./overload
Enter last name : Choudhary
Enter first name : Akriti
Akriti Choudhary
PS C:\Users\KIIT\OneDrive\Desktop\test>
```