C++ lab Programs

1. Write a C++ Program to display Names, Roll No., and grades of 3 students who have appeared in the examination. Declare the class of name, Roll No. and grade. Create an array of class objects. Read and display the contents of the array.

Program:

```
#include <iostream>
using namespace std;
class Student_Info{
   int roll_number, grade;
   char student_name[50];
   public:
      void read_data(int count){
         cout<<" Enter student "<<count+1<<" information ";
         cout<<"Name of the Student: ";
         cin>>student_name;
         cout<<"Roll Number: ";
         cin>>roll_number;
         cout<<"Grade";
         cin>>grade;
      }
      void display_data(int count){
         cout<<" Student "<<count+1;
         cout<<"\nName of the Student: "<<student_name;
         cout<<"\nRoll Number: "<<roll_number;
```

```
        cout<<"\nGrade Secured: "<<grade;
    }
};
int main(){
   Student_Info stud[3];
   int i;
   for(i=0; i<3; i++)
      stud[i].read_data(i);
   for(i=0; i< i++)
      stud[i].display_data(i);
   return 0;
}
```

Output:

```
Enter students 3 information
Name of the student: Sushma
Roll Number: 20wh1a1207
Grade: 10
Name of the student: Apoorvasree
Roll Number: 20wh1a1321
Grade: 8
Name of the student: Ambica
Roll Number: 20wh1a1332
Grade: 9.
```

2. Given that an EMPLOYEE class contains following members: data members: Employee number, Employee name, Basic, DA, IT, Net Salary and print data members.

Program:

```
#include <iostream>

using namespace std;

class employee

{

        int   emp_number;

        char  emp_name[20];

        float emp_basic;

        float emp_da;

        float emp_it;

        float emp_net_sal;

        public:

                void get_emp_details();

                float find_net_salary(float basic, float da, float it);

                void show_emp_details();

};

void employee :: get_emp_details() {

        cout<<"\nEnter employee number: ";

        cin>>emp_number;

        cout<<"\nEnter employee name: ";

        cin>>emp_name;

        cout<<"\nEnter employee basic: ";
```

```
        cin>>emp_basic;
        cout<<"\nEnter employee DA: ";
        cin>>emp_da;
        cout<<"\nEnter employee IT: ";
        cin>>emp_it;
}
float employee :: find_net_salary(float basic, float da, float it) {
   return (basic+da)-it;
}
void employee :: show_emp_details() {
        cout<<"\n Details of  Employee ";
        cout<<"\nEmployee Name     :  "<<emp_name;
        cout<<"\nEmployee number    :  "<<emp_number;
        cout<<"\nBasic salary      :  "<<emp_basic;
        cout<<"\nEmployee DA       :  "<<emp_da;
        cout<<"\nIncome Tax        :  "<<emp_it;
        cout<<"\nNet Salary        :  "<<find_net_salary(emp_basic, emp_da, emp_it);
}
int main() {
   employee emp;
   emp.get_emp_details();
   emp.show_emp_details();
   return 0;
}
```

Output:

Enter employee number: 1231

Enter employee name: Avanisree

Enter employee basic: 10000

Enter employee DA: 500

Enter employee IT: 200

Details of employee

Employee Name: Sushma

Employee Number: 1207

Basic Salary: 10000

Employee DA: 500

Income Tax: 200

Net Salary: 10300

3. Write a C++ program to read the data of N employee and compute Net salary of each employee (DA=52% of Basic and Income Tax (IT) =30% of the gross salary).

Program:

```
#include<iostream.h>
#include<conio.h>
class Employee
{
  char emp_name[30];
  int emp_number;
  float basic, da, it, gross_salary, net_salary;
```

```
  public:
  void read_emp_details(int count){
        cout<<"\nEnter Employee "<<count<<" Details ";
        cout<<"\nEmployee Number: ";
        cin>>emp_number;
        cout<<"Employee Name: ";
        cin>>emp_name;
        cout<<"Basic Salary: ";
        cin>>basic;
  }
  float find_net_salary(){
    da = basic * 0.52;
    gross_salary = basic + da;
    it = gross_salary * 0.30;
    net_salary = (basic + da) - it;
    return net_salary;
  }
  void display_emp_details(int count){
    cout<<"\n\Employee "<<count<<" Details";
    cout<<"\nEmployee Number     : "<<emp_number;
    cout<<"\nEmployee Name       : "<<emp_name;
    cout<<"\nNet Salary: "<<net_salary;
  }
};
int main(){
```

```
  Employee emp[100];
  int number_of_emp, count;
  clrscr();
  cout<<"\nPlease enter the number of Employees: ";
  cin>>number_of_emp;
  for(count=0; count< number_of_emp; count++){
    emp[count].read_emp_details(count+1);
  }
  for(count=0; count < number_of_emp; count++){
    emp[count].find_net_salary();
  }
  for(count=0; count < number_of_emp; count++){
    emp[count].display_emp_details(count+1);
  }
  return 0;
}
```

Output:

```
Please enter the number of Employees:  3
Enter Employee 1 Details
Employee Number: 1207
Employee Name: Sushma
Basic Salary: 16000
Enter Employee 2 Details
Employee Number: 1232
Employee Name: Deekshitha
```

Basic Salary: 12000

Enter Employee 1 Details

Employee Number: 1233

Employee Name: Apoorva

Basic Salary: 15000

Employee 1 Details

Employee Number: 1207

Employee Name: Sushma

Net Salary: 17024

Employee 2 Details

Employee Number: 1232

Employee Name: Deekshitha

Net Salary: 12768

Employee 3 Details

Employee Number: 1233

Employee Name: Apoorva

Net Salary: 15960

4.Write a C++ program to declare Struct. Initialize and display contents of member Variables.

Program:

```
#include <iostream>
using namespace std;
struct college_info{
   char college_name[15];
```

```
    char college_code[10];
    char dept[50];
    int intake;
};
int main() {
    struct college_info college;

    cout<<"Enter the College Information \n";
    cout<<"Name of the college: ";
    cin>>college.college_name;
    cout<<"College Code: ";
    cin>>college.college_code;
    cout<<"Department: ";
    cin>>college.dept;
    cout<<"Department In-take: ";
    cin>>college.intake;
    cout<<"\nCollege Information";
    cout<<"Name of the college : "<<college.college_name;
    cout<<"\nCollege University Code: "<<college.college_code;
    cout<<"\nName of the Department: "<<college.dept;
    cout<<"\nThe department of "<<college.dept<<" has in-take : "<<college.intake;
    return 0;
}
```

Output:

Enter the College Information

Name of the College: BVRIT HYDERABAD College of Engineering for Women

College Code: 4R

Department: Informational Technology

Department in-take: 240

Name of the college: BVRIT HYDERABAD College of Engineering for Women

College University code: 4RIT

Name of the Department: IT

The department of IT has in-take: 240

5. Write a C++ program to declare a class. Declare pointer to class. Initialize and display the contents of the class member.

Program:

```
#include<iostream>
using namespace std;
class Rectangle{
    public:
        int length, breadth;
    void read(){
        cout<<"Length = ";
        cin>> length;
        cout<<"\n Breadth: "
        cin>> breadth;

    }
    void display(){
```

```
            int area = 2*length*breadth;
            cout<<"Area: "<<area;
        }
};
int main (){
        Reactangle rect, *ptr;
        ptr = & rect;
        ptr -> read();
        ptr -> display();
        return 0;
}
```

Output:

Length = 3

Breadth = 2

Area = 6

6. Write a C++ program to use scope resolution operator. Display the various values of the same variables declared at different scope levels.

Program:

```
#include <iostream>
using namespace std;
int my_variable = 10;  // Global variable my_variable
int main(){
        int my_variable = 100; // Local variable my_variable
        cout << "Value of global my_variable is " << ::my_variable << endl;
        cout << "Value of local my_variable is " << my_variable << endl;
        return 0;
}
```

Output:

```
Value of global my_variable is 10
Value of local my_variable is 100
```

7. Write a C++ program using this pointer.

Program:

```
#include <iostream>

using namespace std;
class Employee {
    public:
        int id;
        string name;
        float salary;
        Employee(int id, string name, float salary){
            this->id = id;
            this->name = name;
            this->salary = salary;
        }
        void display(){
        cout<<id<<"  "<<name<<"  "<<salary<<endl;
        }
    };
    int main(void) {
        Employee e1 =Employee(101, "Avani", 890000);
        Employee e2=Employee(102, "Sree", 59000);
        e1.display();
        e2.display();
        return 0;
  }
```

Output:

101 Sushma 890000
102, Sree, 59000

8. Write a C++ program on Friend Class &Friend Function

Program:

```
#include <iostream>
using namespace std;
class Box{
  private:
     int length;
  public:
      Box (): length (0) {}
  friend int Len (Box); //friend function
};
int Len (Box b)
{
   b. length +=10;
   return b. length;
}
int main ()
{
  Box b;
  cout <<" Length of box:" <<Len (b)<<endl;
  return 0;
}
```

Output:
Length of box: 10

9. Program to demonstrate Constructors & Destructors

Program:

```
#include<iostream>
using namespace std;
class test {
        public:
                int y, z;
        test(){
                y = 7;
                z = 13;
        }
        ~test(){ }
};
int main(){
        test a;
        cout <<"The sum is: "<< a.y + a.z;
        return 0;
}
```

Output:
The sum is 20

10. Write a C++ program to allocate memory using new operator

Program:

```
#include <iostream>
using namespace std;
int main() {
        int *ptr;
        ptr = new int;  // Dynamic memory allocation
        cout<< "Number of bytes allocated to ptr is " << sizeof(ptr) << endl;
        *ptr = 100;
        cout << "Value at ptr is " << *ptr << endl;
        return 0;
}
```

Output:

Number of bytes allocated to ptr is 4
Value at ptr is 100