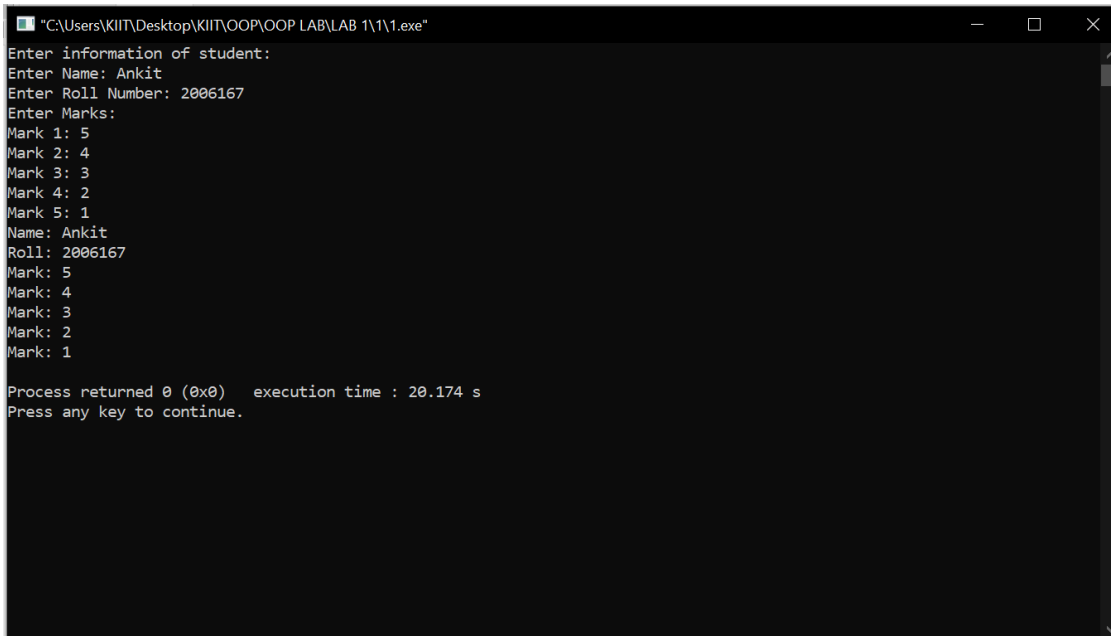
Lab 1. Topic: Structures

i. WAP to input name, roll number and marks in 5 subjects for a student, and display it.

```
1   #include <iostream>
2
3   using namespace std;
4
5   struct student{
6       char name_167[50];
7       int roll_167;
8       float marks_167[5];
9   };
10
11  int main() {
12      struct student s;
13      cout<<"Enter information of student: \n";
14      cout<<"Enter Name: ";
15      gets(s.name_167);
16      cout<<"Enter Roll Number: ";
17      cin>>s.roll_167;
18      cout<<"Enter Marks: \n";
19      for(int i=0; i<5; i++){
20          cout<<"Mark "<<i+1<<": ";
21          cin>>s.marks_167[i];
22      }
23      //display
24      cout<<"Name: "<<s.name_167<<endl;
25      cout<<"Roll: "<<s.roll_167<<endl;
26      for(int i=0; i<5; i++){
27          cout<<"Mark: "<<s.marks_167[i]<<endl;
28      }
29      return 0;
30  }
31
```



ii. WAP to input name, roll number and marks in 5 subjects for n number of students. Write functions to:-

a. Find total marks and percentage of all n students.
b. Display details of a student with a given roll number.
c. Display the details for all the students having percentage in a given range.
d. Sort the array in ascending order of marks.

```cpp
#include <iostream>

using namespace std;

struct student{
    char name_167[50];
    int roll_167;
    float marks_167[5];
    int total_167;
    int percentage_167;
};

void calc(struct student s[], int n);
void find_stud(struct student s[], int n, int roll_no);
void find_range(struct student s[], int n, int lower, int upper);
void marks_sort(struct student s[], int n);

int main() {
    int n_167;
    cout<<"Enter Number of Students: ";
    cin>>n_167;
    struct student s[n_167];
    cout<<"Enter information of student: \n";
    for(int i=0;i<n_167;i++){
        cin.ignore();
        cout<<"Enter Name: ";
        gets(s[i].name_167);
        cout<<"Enter Roll Number: ";
        cin>>s[i].roll_167;
        cout<<"Enter Marks: \n";
        for(int j=0; j<5; j++){
            cout<<"Mark "<<j+1<<": ";
            cin>>s[i].marks_167[j];
        }
    }
    marks_sort(s,n_167);    //sorts marks or all students
    calc(s,n_167);
    int roll_no_167;
    cout<<"Enter Roll No. of Student to Search: ";
    cin>>roll_no_167;
    cout<<endl;
    find_stud(s,n_167,roll_no_167);
    cout<<"Enter Lower and Upper Range of Percentage: ";
    int lower_167, upper_167;
    cin>>lower_167>>upper_167;
    find_range(s,n_167,lower_167,upper_167);

    return 0;
}

void calc(struct student s[], int n){
    for(int i=0;i<n;i++){
        int sum=0;
        for(int j=0;j<5;j++){
            sum+=s[i].marks_167[j];
        }
        s[i].total_167=sum;
        s[i].percentage_167=(sum/5);
    }
}

void find_stud(struct student s[], int n, int roll_no){
    for(int i=0;i<n;i++){
        if(s[i].roll_167==roll_no){
            cout<<"Name: "<<s[i].name_167<<endl;
            cout<<"Roll: "<<s[i].roll_167<<endl;
            for(int j=0; j<5; j++){
                cout<<"Mark: "<<s[i].marks_167[j]<<endl;
            }
            cout<<"Percentage: "<<s[i].percentage_167<<endl;
        }
    }
}

void find_range(struct student s[], int n, int lower, int upper){
    cout<<"Details of student in the range ("<<lower<<","<<upper<<") :\n";
    for(int i=0;i<n;i++){
        if(s[i].percentage_167>=lower && s[i].percentage_167<=upper){
            cout<<"Name: "<<s[i].name_167<<endl;
            cout<<"Roll: "<<s[i].roll_167<<endl;
            for(int j=0; j<5; j++){
                cout<<"Mark: "<<s[i].marks_167[j]<<endl;
            }
            cout<<"Percentage: "<<s[i].percentage_167<<endl;
```

```
            }
        }
    }

    void marks_sort(struct student s[], int n){

        for(int p=0;p<n;p++){
            int counter=0;
            while(counter<4){
            for(int i=0;i<4;i++){
                if(s[p].marks_167[i]>s[p].marks_167[i+1]){
                    int temp=s[p].marks_167[i];
                    s[p].marks_167[i]=s[p].marks_167[i+1];
                    s[p].marks_167[i+1]=temp;
                }
            }
            counter++;
            }
        }
    }
```

```
"C:\Users\KIIT\Desktop\KIIT\OOP\OOP LAB\LAB 1\2\2.exe"
Enter Number of Students: 2
Enter information of student:
Enter Name: Ankit
Enter Roll Number: 2006167
Enter Marks:
Mark 1: 5
Mark 2: 3
Mark 3: 4
Mark 4: 2
Mark 5: 1
Enter Name: Arun
Enter Roll Number: 27112002
Enter Marks:
Mark 1: 9
Mark 2: 7
Mark 3: 2
Mark 4: 6
Mark 5: 1
Enter Roll No. of Student to Search: 2006167

Name: Ankit
Roll: 2006167
Mark: 1
Mark: 2
Mark: 3
Mark: 4
Mark: 5
Percentage: 3
Enter Lower and Upper Range of Percentage: 1 35
Details of student in the range (1,35) :
Name: Ankit
Roll: 2006167
Mark: 1
Mark: 2
Mark: 3
Mark: 4
Mark: 5
Percentage: 3
Name: Arun
Roll: 27112002
Mark: 1
Mark: 2
Mark: 6
Mark: 7
Mark: 9
Percentage: 5

Process returned 0 (0x0)   execution time : 130.798 s
Press any key to continue.
```

iii. WAP to enter id, name, age and basic salary of n number of employees. Calculate the gross salary of all the employees and display it along with all other details .

[Gross salary= Basic salary + DA + HRA,
DA = 80% of Basic salary
HRA=10% of Basic salary]

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

struct emp{
    char id_167[50];
    char name_167[50];
    int age_167;
    long int pay_167;
    long int gross_167;
};

int main() {
    int n_167;
    cout<<"Enter no of Employee: ";
    cin>>n_167;
    struct emp s[n_167];
    for(int i=0;i<n_167;i++){
        cin.ignore();
        cout<<"ID: ";
        gets(s[i].id_167);
        cout<<"Name: ";
        gets(s[i].name_167);
        cout<<"Age: ";
        cin>>s[i].age_167;
        cout<<"pay: ";
        cin>>s[i].pay_167;
    }
    for(int i=0;i<n_167;i++){
        int hr = (s[i].pay_167)*0.8;
        int dr = (s[i].pay_167)*0.1;
        s[i].gross_167 = s[i].pay_167+hr+dr;
    }
    cout<<endl<<"Display Detail: "<<endl<<endl;
    for(int i=0;i<n_167;i++){
        cout<<"ID: "<<s[i].id_167<<endl<<"Name: "<<s[i].name_167<<endl;
        cout<<"Age: "<<s[i].age_167<<endl<<"Base Pay: "<<s[i].pay_167<<endl;
        cout<<"Gross: "<<s[i].gross_167<<endl<<endl;
    }
    return 0;
}

```

```
"C:\Users\KIIT\Desktop\KIIT\OOP\OOP LAB\LAB 1\3\3.exe"
Enter no of Employee: 1
ID: 2006167@kiit.ac.in
Name: Ankit
Age: 18
pay: 111

Display Detail:

ID: 2006167@kiit.ac.in
Name: Ankit
Age: 18
Base Pay: 111
Gross: 210


Process returned 0 (0x0)   execution time : 12.535 s
Press any key to continue.
```