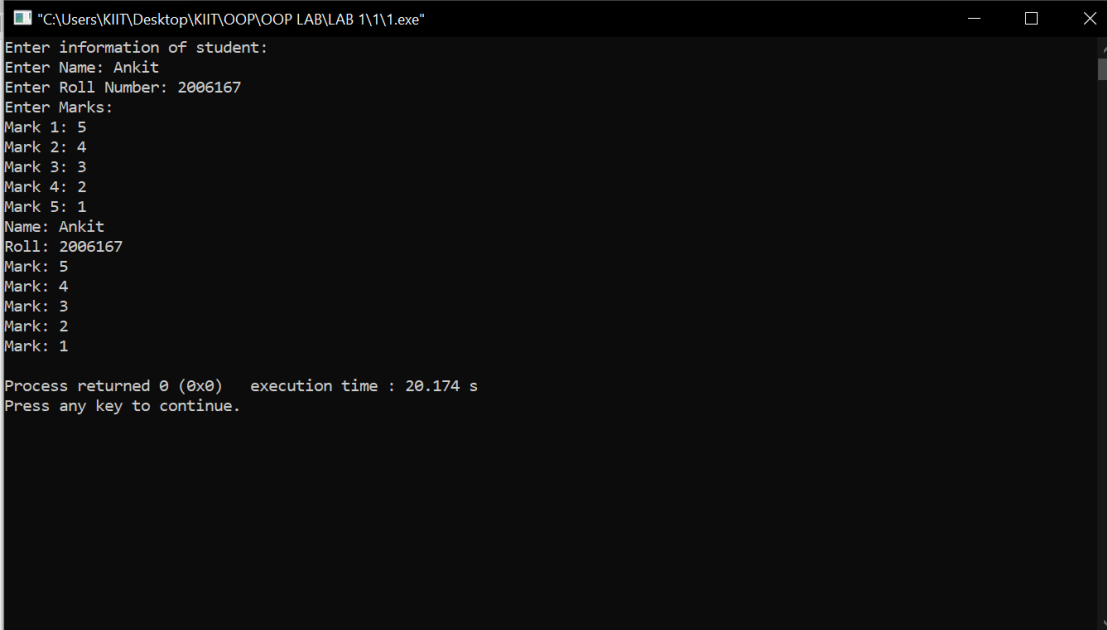


## Lab 1. Topic: Structures

- 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
```



The screenshot shows a Windows command prompt window titled "C:\Users\KIIT\Desktop\KIIT\OOP\OOP LAB\LAB 1\1\1.exe". The program prompts the user to enter student information. The user enters "Ankit" for the name, "2006167" for the roll number, and marks for five subjects: 5, 4, 3, 2, and 1. The program then displays the entered information. At the bottom, it shows "Process returned 0 (0x0) execution time : 20.174 s" and "Press any key to continue."

```
"C:\Users\KIIT\Desktop\KIIT\OOP\OOP LAB\LAB 1\1\1.exe"
Enter information of student:
Enter Name: Ankit
Enter Roll Number: 2006167
Enter Marks:
Mark 1: 5
Mark 2: 4
Mark 3: 3
Mark 4: 2
Mark 5: 1
Name: Ankit
Roll: 2006167
Mark: 5
Mark: 4
Mark: 3
Mark: 2
Mark: 1
Process returned 0 (0x0) execution time : 20.174 s
Press any key to continue.
```

- ii. WAP to input name, roll number and marks in 5 subjects for n number of students. Write functions to:-
- Find total marks and percentage of all n students.
  - Display details of a student with a given roll number.
  - Display the details for all the students having percentage in a given range.
  - Sort the array in ascending order of marks.

```

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      int total_167;
10     int percentage_167;
11 };
12
13 void calc(struct student s[], int n);
14 void find_stud(struct student s[], int n, int roll_no);
15 void find_range(struct student s[], int n, int lower, int upper);
16 void marks_sort(struct student s[], int n);
17
18 int main() {
19     int n_167;
20     cout<<"Enter Number of Students: ";
21     cin>>n_167;
22     struct student s[n_167];
23     cout<<"Enter information of student: \n";
24     for(int i=0; i<n_167; i++){
25         cin.ignore();
26         cout<<"Enter Name: ";
27         gets(s[i].name_167);
28         cout<<"Enter Roll Number: ";
29         cin>>s[i].roll_167;
30         cout<<"Enter Marks: \n";
31         for(int j=0; j<5; j++){
32             cout<<"Mark "<<j+1<<" : ";
33             cin>>s[i].marks_167[j];
34         }
35     }
36     marks_sort(s, n_167); //sorts marks of all students
37     calc(s, n_167);
38     int roll_no_167;
39     cout<<"Enter Roll No. of Student to Search: ";
40     cin>>roll_no_167;
41     cout<<endl;
42     find_stud(s, n_167, roll_no_167);
43     cout<<"Enter Lower and Upper Range of Percentage: ";
44     int lower_167, upper_167;
45     cin>>lower_167>>upper_167;
46     find_range(s, n_167, lower_167, upper_167);
47
48     return 0;
49 }
50
51 void calc(struct student s[], int n){
52     for(int i=0; i<n; i++){
53         int sum=0;
54         for(int j=0; j<5; j++){
55             sum+=s[i].marks_167[j];
56         }
57         s[i].total_167=sum;
58         s[i].percentage_167=(sum/5);
59     }
60 }
61
62 void find_stud(struct student s[], int n, int roll_no){
63     for(int i=0; i<n; i++){
64         if(s[i].roll_167==roll_no){
65             cout<<"Name: "<<s[i].name_167<<endl;
66             cout<<"Roll: "<<s[i].roll_167<<endl;
67             for(int j=0; j<5; j++){
68                 cout<<"Mark: "<<s[i].marks_167[j]<<endl;
69             }
70             cout<<"Percentage: "<<s[i].percentage_167<<endl;
71         }
72     }
73 }
74
75 void find_range(struct student s[], int n, int lower, int upper){
76     cout<<"Details of student in the range ("<<lower<<","<<upper<<") :\n";
77     for(int i=0; i<n; i++){
78         if(s[i].percentage_167>=lower && s[i].percentage_167<=upper){
79             cout<<"Name: "<<s[i].name_167<<endl;
80             cout<<"Roll: "<<s[i].roll_167<<endl;
81             for(int j=0; j<5; j++){
82                 cout<<"Mark: "<<s[i].marks_167[j]<<endl;
83             }
84             cout<<"Percentage: "<<s[i].percentage_167<<endl;

```

```

85         }
86     }
87 }
88
89 void marks_sort(struct student s[], int n){
90
91     for(int p=0;p<n;p++){
92         int counter=0;
93         while(counter<4){
94             for(int i=0;i<4;i++){
95                 if(s[p].marks_167[i]>s[p].marks_167[i+1]){
96                     int temp=s[p].marks_167[i];
97                     s[p].marks_167[i]=s[p].marks_167[i+1];
98                     s[p].marks_167[i+1]=temp;
99                 }
100             }
101             counter++;
102         }
103     }
104 }
105

```

"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.

```

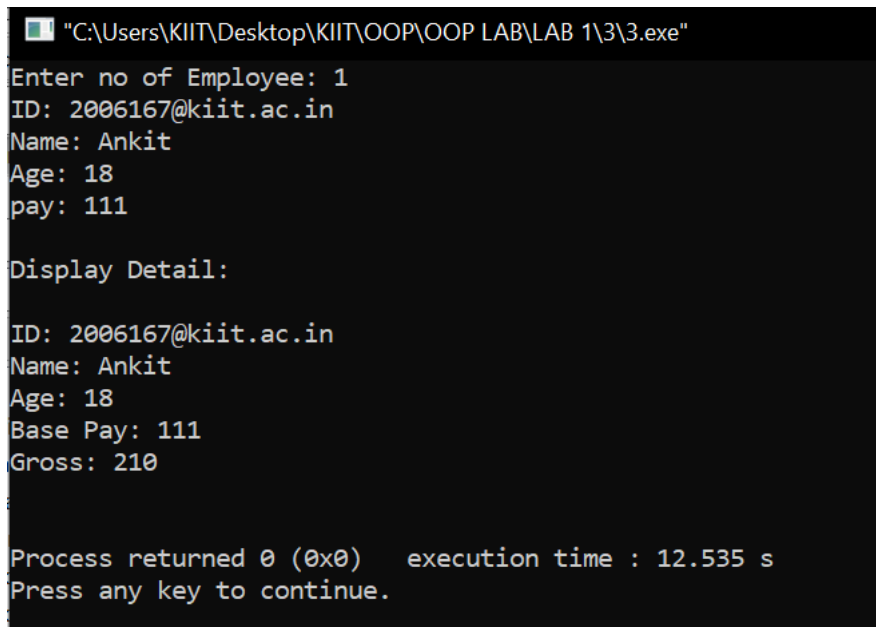
- iii. WAP to enter id, name, age and basic salary of n number of employees. Calculate the gross salary of all the employees and display it along with all other details .

[ Gross salary= Basic salary + DA + HRA,

DA = 80% of Basic salary

HRA=10% of Basic salary ]

```
1  #include <iostream>
2  using namespace std;
3
4  struct emp{
5      char id_167[50];
6      char name_167[50];
7      int age_167;
8      long int pay_167;
9      long int gross_167;
10 };
11
12 int main() {
13     int n_167;
14     cout<<"Enter no of Employee: ";
15     cin>>n_167;
16     struct emp s[n_167];
17     for(int i=0;i<n_167;i++){
18         cin.ignore();
19         cout<<"ID: ";
20         gets(s[i].id_167);
21         cout<<"Name: ";
22         gets(s[i].name_167);
23         cout<<"Age: ";
24         cin>>s[i].age_167;
25         cout<<"pay: ";
26         cin>>s[i].pay_167;
27     }
28     for(int i=0;i<n_167;i++){
29         int hr = (s[i].pay_167)*0.8;
30         int dr = (s[i].pay_167)*0.1;
31         s[i].gross_167 = s[i].pay_167+hr+dr;
32     }
33     cout<<endl<<"Display Detail: "<<endl<<endl;
34     for(int i=0;i<n_167;i++){
35         cout<<"ID: "<<s[i].id_167<<endl<<"Name: "<<s[i].name_167<<endl;
36         cout<<"Age: "<<s[i].age_167<<endl<<"Base Pay: "<<s[i].pay_167<<endl;
37         cout<<"Gross: "<<s[i].gross_167<<endl<<endl;
38     }
39     return 0;
40 }
41
```



```
"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.
```