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Section: CSE-13

Subject: OOP Lab

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Question: Write a program to input name, roll number and marks in 5 subjects for a student, and display it.

```
C structName.c X
lab-kiit > lab-1-oop > C structName.c > main()
1 //WAP to input name, roll number and marks in 5 subjects for a student, and display it.
2 #include <stdio.h>
3 struct student //structure definition
4 {
5     char name[50];
6     int roll;
7     float marks[5];
8 } s;
9
10 int main()
11 {
12     printf("Enter information:\n");
13     printf("Enter name: ");
14     fgets(s.name, sizeof(s.name), stdin);
15
16     printf("Enter roll number: ");
17     scanf("%d", &s.roll);
18     for(int i=1; i<=5; i++)
19     {
20         printf("Enter marks in subject %d: ", i);
21         scanf("%f", &s.marks[i]);
22     }
23
24     printf("Displaying Information:\n");
25     printf("Name: ");
26     printf("%s", s.name);
27     printf("Roll number: %d\n", s.roll);
28     for(int i=1; i<=5; i++)
29     {
30         printf("Marks in subject %d: %f\n", i, s.marks[i]);
31     }
32     return 0;
33 }
34
```

Output:

```
PS C:\learning-languages\cpp-programming> cd "c:\learning-languages\cpp-programming\lab-kiit\lab-1-oop\" ; if ($?) { gcc structName.c -o structName } ; if ($?) {
.\structName }
Enter information:
Enter name: Prajukta Dey
Enter roll number: 21052263
Enter marks in subject 1: 98
Enter marks in subject 2: 96
Enter marks in subject 3: 95
Enter marks in subject 4: 90
Enter marks in subject 5: 91
Displaying Information:
Name: Prajukta Dey
Roll number: 21052263
Marks in subject 1: 98.000000
Marks in subject 2: 96.000000
Marks in subject 3: 95.000000
Marks in subject 4: 90.000000
Marks in subject 5: 91.000000
PS C:\learning-languages\cpp-programming\lab-kiit\lab-1-oop>
```

Question 2: Write a program 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.

```
C structFunc.c X
lab-kiit > lab-1-oop > C structFunc.c > main()
1  /*MAP to input name, roll number and marks in 5 subjects for n number of students.
2  Write functions to:-
3  a. Find total marks and percentage of all n students.
4  b. Display details of a student with a given roll number.
5  c. Display the details for all the students having percentage in a given range.
6  d. Sort the array in ascending order of marks.*/
7
8  #include<stdio.h>
9  #include<conio.h>
10
11  struct Student
12  {
13      char name[30];
14      int rollNumber;
15      int marks[5];
16      int totalMarks;
17      float percentage;
18  };
19
20
21
22  //a. Find total marks and percentage of all n students.
23  void findTotalMarksPercentageStudents(struct Student students[],int numberStudents)
24  {
25      int i,m;
26      for(i=0;i<numberStudents;i++){
27          students[i].totalMarks=0;
28          students[i].percentage=0.0;
29          for(m=0;m<5;m++){
30              students[i].totalMarks+=students[i].marks[m];
31              students[i].percentage+=students[i].marks[m]*0.2;
32          }
33      }
34  }
35
36  //b. Display details of a student with a given roll number.
37  void displayDetailsStudent(struct Student students[],int numberStudents,int rollNumber){
38      int i,m;
39      for(i=0;i<numberStudents;i++){
40          if(rollNumber==students[i].rollNumber){
41              printf("The student's name: %s\n",students[i].name);
42              printf("The student's roll number: %d\n",students[i].rollNumber);
43              printf("The student's marks\n");
44              for(m=0;m<5;m++){
45                  printf("%d ",students[i].marks[m]);
46              }
47              printf("\nThe student's total marks: %d\n",students[i].totalMarks);
48              printf("The student's percentage: %.2f\n",students[i].percentage);
49              printf("\n");
50              break;
51          }
52      }
53  }
54
55  //c. Display the details for all the students having percentage in a given range.
56  void displayDetailsStudentsPercentageRange(struct Student students[],int numberStudents,float percentage1,float percentage2 ){
57      int i,m;
58      for(i=0;i<numberStudents;i++){
59          if(students[i].percentage>percentage1 && students[i].percentage<=percentage2){
60              printf("The student's name: %s\n",students[i].name);
61              printf("The student's roll number: %d\n",students[i].rollNumber);
62              printf("The student's marks\n");
63              for(m=0;m<5;m++){
64                  printf("%d ",students[i].marks[m]);
65              }
66              printf("\nThe student's total marks: %d\n",students[i].totalMarks);
67              printf("The student's percentage: %.2f\n",students[i].percentage);
68              printf("\n");
69          }
70      }
```

```

71 //d. Sort the array in ascending order of marks.
72 void sortArrayInAscendingOrderMark(struct Student students[],int numberStudents){
73     int i,j,m;
74     for (i = 0; i < numberStudents - 1; i++){
75         for (j = 0; j < numberStudents - i - 1; j++){
76             if (students[j].totalMarks > students[j + 1].totalMarks)
77             {
78                 // swap temp and elements[i]
79                 struct Student temp = students[j];
80                 students[j] = students[j + 1];
81                 students[j + 1] = temp;
82             }
83         }
84     }
85
86     for(i=0;i<numberStudents;i++){
87         printf("The student's name: %s\n",students[i].name);
88         printf("The student's roll number: %d\n",students[i].rollNumber);
89         printf("The student's marks\n");
90         for(m=0;m<5;m++){
91             printf("%d ",students[i].marks[m]);
92         }
93         printf("\nThe student's total marks: %d\n",students[i].totalMarks);
94         printf("The student's percentage: %.2f\n",students[i].percentage);
95         printf("\n");
96     }
97
98     findTotalMarksPercentageStudents(students,numberStudents);
99     printf("Enter the student's roll number to search: ");
100    scanf("%d",&rollNumber);
101    displayDetailsStudent(students,numberStudents,rollNumber);
102
103    printf("Enter the upper bound percentage: ");
104    scanf("%f",&percentage1);
105    printf("Enter the lower bound percentage: ");
106    scanf("%f",&percentage2);
107    displayDetailsSudentsPercentageRange(students,numberStudents,percentage1,percentage2);
108
109    printf("\nSort the array in ascending order of marks.\n");
110    sortArrayInAscendingOrderMark(students,numberStudents);
111    printf("\n");
112    getch();
113    getch();
114 }

```

Output:

```

PS C:\learning-languages\cpp-programming> cd "c:\learning-languages\cpp-programming\lab-klit\lab-1-oop\" ; if ($?) { gcc structFunc.c -o structFunc } ; if ($?) {
.\structFunc
Enter the number of students: 2
Enter the student's name: Prajukta Dey
Enter the student's roll number: 21052263
Enter the student's mark 1: 98
Enter the student's mark 2: 97
Enter the student's mark 3: 90
Enter the student's mark 4: 89
Enter the student's mark 5: 90

Enter the student's name: Khushi Roy
Enter the student's roll number: 21052267
Enter the student's mark 1: 78
Enter the student's mark 2: 90
Enter the student's mark 3: 90
Enter the student's mark 4: 98
Enter the student's mark 5: 90

Enter the student's roll number to search: 21052263
The student's name: Prajukta Dey
The student's roll number: 21052263
The student's marks
98 97 90 89 90
The student's total marks: 464
The student's percentage: 92.80

```

Question 3: Write a program 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 in a tabular form, using pointer to structure.

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

```
C pointerStructure.c X
lab-kiit > lab-1-oop > C pointerStructure.c > main()
1  #include<stdio.h>
2  struct employee
3  {
4      int id;
5      char name[50];
6      float age;
7      float bs;
8      float gs;
9  };
10 int main()
11 {
12     int n;
13     float da, hra;
14     printf("Enter number of employee : ");
15     scanf("%d",&n);
16     struct employee s[n];
17     struct employee *emp;
18     emp = &s[0];
19     for(int i=0; i<n; i++)
20     {
21         printf("Enter id of employee : ");
22         scanf("%d",&(emp+i)->id);
23         printf("Enter name of employee : ");
24         scanf("%s",&(emp+i)->name);
25         printf("Enter age of employee : ");
26         scanf("%f",&(emp+i)->age);
27         printf("Enter gross salary of employee : ");
28         scanf("%f",&(emp+i)->bs);
29         da=0.8*((emp+i)->bs);
30         hra=0.1*((emp+i)->bs);
31         (emp+i)->gs=(emp+i)->bs+da+hra;
32     }
33     printf("Displaying Employee Details: ");
34     printf("\n");
35     for(int i=0; i<n; i++)
36     {
37         printf("Employee %d:\t",i+1);
38         printf("\n");
39         printf("Id : %d\t", (emp+i)->id);
40         printf("\n");
41         printf("Name : %s\t", (emp+i)->name);
42         printf("\n");
43         printf("Age : %0.2f\t", (emp+i)->age);
44         printf("\n");
45         printf("Basic Salary : %0.2f\t", (emp+i)->bs);
46         printf("\n");
47         printf("Gross Salary : %0.2f\t", (emp+i)->gs);
48         printf("\n");
49     }
50     return 0;
51 }
52 }
```

Output:

```
PS C:\learning-languages\cpp-programming> cd "c:\learning-languages\cpp-programming\lab-kiit\lab-1-oop" ; if ($?) { gcc pointerStructure.c -o pointerStructure }
; if ($?) { .\pointerStructure }
Enter number of employee : 2
Enter id of employee : 1234
Enter name of employee : Raj
Enter age of employee : 23
Enter gross salary of employee : 12000
Enter id of employee : 1235
Enter name of employee : Manu
Enter age of employee : 24
Enter gross salary of employee : 34500
Displaying Employee Details:
Employee 1:
Id : 1234
Name : Raj
Age : 23.00
Basic Salary : 12000.00
Gross Salary : 22800.00
Employee 2:
Id : 1235
Name : Manu
Age : 24.00
Basic Salary : 34500.00
Gross Salary : 65500.00
PS C:\learning-languages\cpp-programming\lab-kiit\lab-1-oop> 
```