EASTERN UNIVERSITY SRI LANKA

DEPARTMENT OF MATHEMATICS

FIRST EXAMINATION IN SCIENCE – 2008/2009

FIRST SEMESTER (March/April, 2010)

CS 152 – PRACTICAL WORK ON CS 103

(Proper and Repeat)

Time: 2 Hours

Declare a structure for a student record consisting of the following fields:

```
St_name
St_id
subject_1_marks
subject_2_marks
subject_3_marks
Total_marks
Average_marks
```

Write a C++ programme to do the following:

- Read the necessary data (`St_name, St_id, subject_1_marks, subject_2_marks, subject_3_marks`) from the keyboard for 5 students.
- Calculate the total marks and Average marks for each student and store them in the fields `Total_marks, Average_marks.`
- Write a function that prints the grade (`Pass /Fail`) depend on the following criteria:
  - A student passes if all three subjects are passed.
  - Additionally a student may pass if only one subject is failed and the overall average is greater than or equal to 50.
  - The pass mark for an individual subject is 40.
- Display *all students' details* with *grade.*
- Write a function that returns the *maximum average* of all five students
- Write a function that returns the *minimum average* of all five students.
- Print *maximum average* and *minimum average* of all five students.

13

The sample run of the program is illustrated below:

```
Enter student 1 name: Ravi
Enter student 1 id: CS1
Enter subject 1 marks of student 1: 34
Enter subject 2 marks of student 1: 56
Enter subject 3 marks of student 1: 78

Enter student 2 name: Raja
Enter student 2 id: CS2
Enter subject 1 marks of student 2: 64
Enter subject 2 marks of student 2: 25
Enter subject 3 marks of student 2: 55

Enter student 3 name: Viji
Enter student 3 id: CS3
Enter subject 1 marks of student 3: 90
Enter subject 2 marks of student 3: 63
Enter subject 3 marks of student 3: 75

Enter student 4 name: Hari
Enter student 4 id: CS4
Enter subject 1 marks of student 4: 23
Enter subject 2 marks of student 4: 39
Enter subject 3 marks of student 4: 58

Enter student 5 name: Nithy
Enter student 5 id: CS5
Enter subject 1 marks of student 5: 15
Enter subject 2 marks of student 5: 25
Enter subject 3 marks of student 5: 35
```

Name	Id	Marks1	Marks2	Marks3	Total	Average	Grade
Ravi	CS1	34	56	78	168	56	pass
Raja	CS2	64	25	55	146	48	fail
Viji	CS3	90	63	75	230	76	pass
Hari	CS4	23	39	58	120	40	fail
Nithy	CS5	15	25	35	75	25	fail

```
Maximum average: 76
Minimum average: 25
```

Note:

1. Save all your works with the file name 'indexNo.cpp' (e.g. phy9999.cpp or bs9999.cpp) in the given storage device.
2. The marks will be awarded for the structure of the programme code, its readability, use of suitable comments, choice of meaningful names for the identifiers, its correctness and efficiency.

Q4. a. Describe the functionalities of *referencing operator (&)* and *dereferencing operator (*).*

b. Declare and define the following:

i. A pointer variable **`pi`** pointing to an integer.

ii. A pointer variable **`ppi`** pointing to a pointer to an integer.

iii. A pointer variable **`pf`** pointing to a float.

c. What is the output of the following programme?

```
# include<iostream.h>
void main()
{
   int a=65;
   int b=65;
   int *p=&a;
   int *q=&b;
   int **r=&p;

   cout<<++a<<endl;
   cout<<(*p)++<<endl;
   cout<< --(*q)<<endl;
   cout<< -b<<endl;
   cout<< **r<<endl;
}
```


d. Given the following declaration :

```
int myArray[20];
```

Write a C++ programme that fills the whole array using pointers.