

NOTE:

- Create a folder on Desktop to save your works.
- Use comment `//` to write your name, ID, Group and Lab Question in each program.
- Save your file as `.c`

REMINDER!

Write your particulars in the program.

LAB OBJECTIVES

At the end of this lab activity, the students should be able to:

- Use structure to solve programming problems.
- Apply array of structure in programming.
- Passing struct to a function (as an argument or as reference).

QUESTION 1

Write a program based on the following descriptions.

➤ Create a structure called **SalaryRecord** that holds the following elements:

- Employee no : type – int
- Basic salary : type – float
- EPF amount : type – float
- Tax amount : type – float
- Net salary : type – float

➤ In **main()** function:

- Declare a structure array called **staff** that can store 4 records.
- Prompt user to enter employee ID and basic salary for 4 staff. (*Use for loop*)
- Call function **calcNetSalary(...)**, and pass the structure array of **staff**.
- Display all employee salary records as shown in the output screen. (*Use for loop*)

➤ In function **calcNetSalary(...)**:

- Using a *for* loop:
 - Calculate the EPF amount with formula: $basicSalary \times 11\%$
 - Then determine the tax based on the salary (refer to the table below)

Salary	Tax Percentage
salary \geq RM10,000	15%
RM5,000 \leq salary $<$ RM10,000	10%
RM3,000 \leq salary $<$ RM5,000	8%
salary $<$ RM3,000	0%

- Calculate the net salary with this formula:

$$Net\ salary = basic\ salary - EPF\ amount - tax\ amount$$

Sample Output

```

Employee 1
    Enter employee ID          : 10011
    Enter employee basic salary : RM 2570
Employee 2
    Enter employee ID          : 10023
    Enter employee basic salary : RM 3565
Employee 3
    Enter employee ID          : 10034
    Enter employee basic salary : RM 4001
Employee 4
    Enter employee ID          : 10047
    Enter employee basic salary : RM 5679

*****
                Salary Records
*****

    Employee ID          : 10011
    Employee Basic       : RM 2570.00
    Employee EPF         : RM 282.70
    Employee Tax         : RM 0.00
    Employee Net Salary  : RM 2287.30

    Employee ID          : 10023
    Employee Basic       : RM 3565.00
    Employee EPF         : RM 392.15
    Employee Tax         : RM 285.20
    Employee Net Salary  : RM 2887.65

    Employee ID          : 10034
    Employee Basic       : RM 4001.00
    Employee EPF         : RM 440.11
    Employee Tax         : RM 320.08
    Employee Net Salary  : RM 3240.81

    Employee ID          : 10047
    Employee Basic       : RM 5679.00
    Employee EPF         : RM 624.69
    Employee Tax         : RM 567.90
    Employee Net Salary  : RM 4486.41

```

QUESTION 2

Write a full program to determine the rank of Malaysian Air Force team based on the following instructions.

- Declare a structure of Malaysian Air Force record called ***AirForceTeam*** that has:
 - Name : *name (string)*
 - Age : *age (integer)*
 - Salary : *salary (float)*
 - Rank : *rank (string)*
- In function ***main()*** :
 - Create a structure variable array called ***Member*** with 3 elements.
 - Using *for loop*:
 - Ask user to enter *name, age, and salary*.
 - Call function ***getRank(...)*** and pass the ***Member*** of each record as reference.
 - Display the rank.
- In function ***getRank(...)***:
 - Using *for loop*, determine the rank based on the salary. Refer to the table below.

Salary (RM)	Rank
More than 10,000	Marshal
More than 7000 and less than or equal to 10,000	General
More than 5000 and less than or equal to 7000	Colonel

SAMPLE OUTPUT:

```

Name: John M.
Age: 45
Salary (RM): 8900
Rank: General

Name: Chong Tee
Age: 53
Salary (RM): 5500
Rank: Colonel

Name: George B.
Age: 44
Salary (RM): 15000
Rank: Marshal

```

QUESTION 3

Write a complete program to compute the grade of students based on their coursework and final marks. Then, determine the overall failure rate. Refer to the sample output as your reference. The requirements of the program are:

- Declare a constant named **numStudent** which represents the number of students using *#define* with the value 3.
- Create a structure named as **Marks** which contains:
 - name : character size 30
 - midterm : float
 - assignment : float
 - lab : float
 - quizzes : float
 - coursework : float
 - final exam : float
 - total mark : float
 - grade : character
- Declare a structure array named **studentMark** with the size of numStudent.
- In **main()** function:
 - Call function *get_marks()*.
 - Call function *compute_marks()*.
 - Call function *compute_grade()*.
 - Call function *display_marks()*.
- In function **get_marks()**:
 - Using a *for-loop*, prompt the user for the following inputs and store into array structure *studentMark*: *name, midterm, assignment, quizzes, lab, final exam*.
- In function **compute_marks(...)**:
 - Using a *for-loop*, calculate the coursework and total marks of each student, then store the results into array structure *studentMark*:
 - *coursework* = *midterm* + *assignment* + *quizzes* + *lab*
 - *total mark* = *coursework* + *final exam*
- In function **compute_grade(...)**:
 - Using *if-else*, determine grade based on the total mark, then store the grade accordingly into array structure *studentMark*.

Total Mark	Grade
80 to 100	A
70 to < 80	B
50 to < 70	C
0 to < 50	F

- In function ***display_marks(...)***:
 - Using *for-loop*, display the name, total mark and grade from the array structure *studentMark*.
 - Count how many students obtained F.
 - Based on the number of failure, calculate the failure rate percentage and display it.

SAMPLE OUTPUT:

```

STUDENT 1
-----
Student Name      : Mat Dan
Midterm (15)      : 3.5
Assignment (15)    : 4
Quizzes (10)      : 6
Lab (10)          : 5.5
Final Exam (50)   : 21

STUDENT 2
-----
Student Name      : Nancy Chi
Midterm (15)      : 12
Assignment (15)    : 11
Quizzes (10)      : 6.5
Lab (10)          : 8
Final Exam (50)   : 41.5

STUDENT 3
-----
Student Name      : Kumar K.
Midterm (15)      : 15
Assignment (15)    : 10
Quizzes (10)      : 9
Lab (10)          : 10
Final Exam (50)   : 40.5

-----
Student 1 Name    : Mat Dan
Total Mark        : 40.00
Grade             : F

Student 2 Name    : Nancy Chi
Total Mark        : 79.00
Grade             : B

Student 3 Name    : Kumar K.
Total Mark        : 84.50
Grade             : A

The failure rate is 33.33%
```