INTERNATIONAL UNIVERSITY
SCHOOL OF ELECTRICAL ENGINEERING

Programming For Engineers Laboratory

Course ID: EE058IU

Lab 6

Working with Structures

Full name + Student ID: ……

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Class: ……

Group: ……

Date: ……

I. Objectives

This laboratory exercise examines structures in C language

Get familiar with the skill for working with structures.

II. Pre-Lab Preparation

Exercise 0.

10.6 Given the following `struct` and variable definitions:

```
struct customer {
   char lastName[15];
   char firstName[15];
   unsigned int customerNumber;

   struct {
      char phoneNumber[11];
      char address[50];
      char city[15];
      char state[3];
      char zipCode[6];
   } personal;
} customerRecord, *customerPtr;

customerPtr = &customerRecord;
```

write an expression that accesses the `struct` members in each of the following parts:

a) Member `lastName` of `struct customerRecord`.
b) Member `lastName` of the `struct` pointed to by `customerPtr`.
c) Member `firstName` of `struct customerRecord`.
d) Member `firstName` of the `struct` pointed to by `customerPtr`.
e) Member `customerNumber` of `struct customerRecord`.
f) Member `customerNumber` of the `struct` pointed to by `customerPtr`.
g) Member `phoneNumber` of member `personal` of `struct customerRecord`.
h) Member `phoneNumber` of member `personal` of the `struct` pointed to by `customerPtr`.
i) Member `address` of member `personal` of `struct customerRecord`.
j) Member `address` of member `personal` of the `struct` pointed to by `customerPtr`.

k) Member `city` of member `personal` of `struct customerRecord`.
l) Member `city` of member `personal` of the `struct` pointed to by `customerPtr`.
m) Member `state` of member `personal` of `struct customerRecord`.
n) Member `state` of member `personal` of the `struct` pointed to by `customerPtr`.
o) Member `zipCode` of member `personal` of `struct customerRecord`.
p) Member `zipCode` of member `personal` of the `struct` pointed to by `customerPtr`.

III. In-Lab Procedure

Exercise 1

Write a C program that read a person's information (last name, first name, age, nationality, height, weight, job tittle) and then print again. **(Using structure)**

Output

Enter first name: Kien
Enter last name: Trang
Enter nationality: Vietnamese
Enter age: 26
Enter height: 1.70
Enter weight: 62
Enter job tittle: Lecturer

Here is the information
Full name: Kien Trang
Age: 26
Nationality: Vietnamese
Height: 1.7 (m)
Weight: 62.0 (kg)
Job tittle: Lecturer

Exercise 2

Write a C program that add two or more complex numbers **using structure.**

Output

Enter the first complex: 15 3

Enter the second complex: 21 -6

Sum: 36.0 - 3.0i

Exercise 3

Assume you are a manager of a store selling two different kinds of items: books and T-shirts.

Write a C program to enter and store the information of books (title, number of pages, author, price) and T-shirts (size, color, price). Your program should use **structure and union to have minimum memory usage.**

In your lab report, you should explain how your Union could save memory space.

Output

Input the information of Book

Enter the book title: Physics4Everyone

Enter # page: 200

Enter author: Michael Faraday

Enter price(USD): 25.99

Input the information of T-shirt

Enter the size: XXL

Enter the color: Red

Enter price(USD): 3.99

Exercise 4

Write a C program that calculates the time with 3 different options **using structure and pointers**, in which:

Option 1: convert a hour format from hh.mm.ss to second

Option 2: convert second to a hour format hh:mm:ss

Option 3: add two times (hh:mm:ss)

Output

Enter your option: 1

Please enter an hour formatted as hh:mm:ss : 3:28:35

The converted number of seconds is: 12515

Do you want to continue? y

Enter your option: 2

Please enter a number of seconds: 7265

The converted hour is: 02:01:05

Do you want to continue? y

Enter your option: 3

Enter 1st time----

Please enter an hour formatted as hh:mm:ss : 5:35:50

Enter 2nd time----

Please enter an hour formatted as hh:mm:ss : 3:42:25

The total time = 9:18:15

Do you want to continue? n

End Program

THE END