

11-Dec-17 (Structures and Unions)

1. Write a "C" program to accept two inputs (int type) from user and implement arithmetic functionalities using function and returning result in a structure. Display the results of arithmetic operations. Write a function to accept two values (of int) and return the structure containing the results of the arithmetic operations (+, -, *, /, %).
2. Write a "C" program to find the difference between two time periods. Each time period to be stored in a structure which contains 3 variables of type int storing time in hours, minutes and seconds. Take two structure variables to store startTime and stopTime. Accept this times as user inputs (give input as below separating time with a ':'), calculate time difference accordingly and print the difference. Repeat the above process until user enters 0 for hours, minutes and seconds for Start Time.

Following is sample output, need to implement generic code.

```
$ ./a.out
```

```
Enter Start Time (Hours, Minutes and Seconds respectively): 08:12:25
```

```
Enter Stop Time (Hours, Minutes and Seconds respectively): 12:34:05
```

```
Difference between the times is: 04:21:40
```

```
Enter Start Time (Hours, Minutes and Seconds respectively): 08:12:25
```

```
Enter Stop Time (Hours, Minutes and Seconds respectively): 12:34:35
```

```
Difference between the times is: 04:22:10
```

```
Enter Start Time (Hours, Minutes and Seconds respectively): 0:0:0
```

```
End of the program
```

3. Write a "C" program to perform addition, subtraction and multiplication of two complex numbers. Use structure to store complex number either in integer or float. (Ex: for int is struct complexnumber { int real, int imag;}). Accept complex numbers as user input. Write 3 functions to perform addition, subtraction and multiplication of two complex numbers.

For addition and subtraction operations, accept 2 inputs as two complex numbers and return result of operation as structure variable.

For multiplication operation, accept 3 inputs of which first two are input complex numbers and 3rd one is result of operation. This function need to return void.

Repeat the process until user enters real and imaginary of 1st number as 0, as follows (this is sample code, implement generic code):

Enter 1st Complex Number (Real): 5

Enter 1st Complex Number (Imaginary): 2

Enter 2nd Complex Number (Real): 3

Enter 2nd Complex Number (Imaginary): 4

The sum of 5+2i and 3+4i is 8+6i

The difference of 5+2i and 3+4i is 2-2i

The multiplication of 5+2i and 3+4i is 7+26i

Enter 1st Complex Number (Real): 2

Enter 1st Complex Number (Imaginary): 3

Enter 2nd Complex Number (Real): 4

Enter 2nd Complex Number (Imaginary): 5

The sum of 2+3i and 4+5i is 6+8i

The difference of 2+3i and 4+5i is -2-2i

The multiplication of 2+3i and 4+5i is -7+22i

Enter 1st Complex Number (Real): 0

Enter 1st Complex Number (Imaginary): 0

End of the program

4. Write a "C" program to store an integer, string of 4 characters and array of 2 short integers in a union.

- Assign integer with Hexadecimal value, access the union with integer, string of characters and array of short integers. And print the addresses and values
- Assign a value of Hexadecimal in each character, access the union with integer, string of characters and array of short integers. And print the addresses and values
- Assign short integers with Hexadecimal values, access the union with integer, string of characters and array of short integers. And print the addresses and values

5. Write a "C" program to declare a structure containing 2 elements one integer and a char. Take a structure variable and a pointer to a structure variable, assign values through the structure pointer and print the values.