

WEEK 11

Makefile for all programs:

```
a.out: functions.o q1.o
    gcc functions.c q1.c
functions.o: functions.c
    gcc -c functions.c
q1.o: q1.c server.h
    gcc -c q1.c
run:
    ./a.out
```

Question1

1)Write a C program to compare 2 dates and print appropriate message using structures.

Code

Q1.c

```
#include<stdio.h>
#include"server.h"

int main(){
    struct date d1, d2;
    readDate(&d1);
    readDate(&d2);
    compDate(d1, d2);
    return 0;
}
```

Functions.c

```
#include"server.h"
```

```
#include<stdio.h>
```

```
void readDate(struct date * d){
```

```
    printf("Enter date in dd/mm/yyyy format: ");
```

```
    scanf("%d/%d/%d", &d->dd, &d->mm, &d->yy);
```

```
    printf("Date read successfully...!\n");
```

```
}
```

```
void compDate(struct date d1 ,struct date d2){
```

```
    if (d1.yy>d2.yy) {
```

```
        printf("Date 1 is greater than second");
```

```
        return;
```

```
    }
```

```
    if (d1.yy<d2.yy) {
```

```
        printf("Date 2 is greater than the first");
```

```
        return;
```

```
    }
```

```
    if (d1.mm>d2.mm) {
```

```
        printf("Date 1 is greater than second");
```

```
        return;
```

```
    }
```

```
    if (d1.mm<d2.mm) {
```

```
        printf("Date 2 is greater than the first");
```

```
        return;
```

```
    }
```

```
    if (d1.dd>d2.dd) {
```

```
        printf("Date 1 is greater than second");
```

```
        return;
```

```
    }
```

```
    if (d1.dd<d2.dd) {
```

```
        printf("Date 2 is greater than the first");
```

```
        return;
```

```
    }
```

```
    printf("They are equal\n");
```

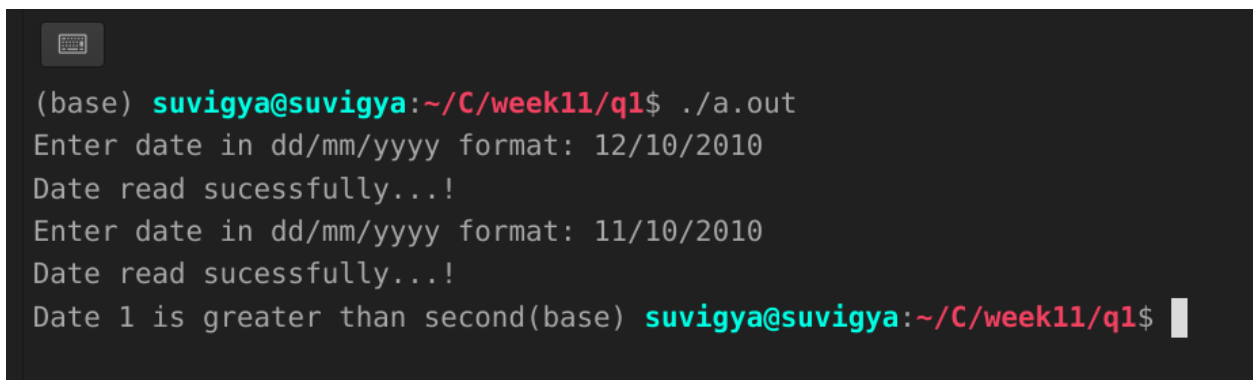
```
}
```

Server.h

```
struct date{
    int dd, mm, yy;
};

void readDate(struct date * d);
void compDate(struct date d1 ,struct date d2);
```

Output



```
(base) suvigya@suvigya:~/C/week11/q1$ ./a.out
Enter date in dd/mm/yyyy format: 12/10/2010
Date read sucessfully...!
Enter date in dd/mm/yyyy format: 11/10/2010
Date read sucessfully...!
Date 1 is greater than second(base) suvigya@suvigya:~/C/week11/q1$
```

Question2

2)Write a C program to read students details as given in the table and compute division and print the result, using an array of structures.

Code

Q2.c

```

#include "server.h"
#include <stdio.h>

int main(){
    struct marks M[10];
    int n;
    printf("Enter number of students: ");
    scanf("%d", &n);
    for(int i =0; i < n; i++){
        readMarks(&M[i]);
    }
    printf("All input read successfully\n\n");
    for(int i = 0; i < n; i++){
        printRes(M[i]);
    }
    printf("End of program execution..\n");
    return 0;
}

```

Functions.c

```

#include <stdio.h>
#include "server.h"

void readMarks(struct marks * m){
    printf("Enter Name: ");
    scanf("%s", m->Name);
    printf("Enter SRN: ");
    scanf("%s",m->Roll);
    printf("Enter Marks in :\n");
    printf("Problem solving with C: "); scanf("%d", &m->c);
    printf("Maths: "); scanf("%d", &m->math);
    printf("Mech: "); scanf("%d", &m->mech);
    printf("Electronics: "); scanf("%d", &m->elect);
    printf("Physics: "); scanf("%d", &m->phys);
}

```

```

        return;
    }
void printRes(struct marks m){
    printf("Name: %s\n", m.Name);
    printf("SRN: %s\n", m.Roll);
    printf("Problem solving with C: %d \n", m.c);
    printf("Maths: %d \n", m.math);
    printf("Mech: %d \n", m.mech);
    printf("Electronics: %d \n", m.elect);
    printf("Physics: %d \n", m.phys);
    int tot = m.phys+m.elect+m.math+m.c+m.mech;
    printf("Total: %d\n", tot);
    printf("Average: %d\n", tot/5);
    int avg = tot/5;
    if(avg>85)printf("Result:Pass \nDivision: FIRST CLASS WITH
DISTINCTION\n");
    else if(avg>60) printf("Result:Pass \nDivision: FIRST CLASS\n");
    else if(avg>50) printf("Result:Pass \nDivision: SECOND CLASS\n");
    else if(avg>40) printf("Result:Pass \nDivision: THIRD CLASS\n");
    else printf("Result:Fail \nDivision: F\n");
    printf("\n");
}

```

Server.h

```

struct marks{
    char Name[20];
    char Roll[20];
    int phys, math, mech, c, elect;
};

void readMarks(struct marks * m);
void printRes(struct marks m);

```

Output

```
Enter Name: suvigya      2      gcc functions.c q2.c
Enter SRN: CS529        3      functions.o: functions.c
Enter Marks in :       4      gcc -c functions.c
Problem solving with C: 90 5      q2.o: q2.c server.h
Maths: 90              6      gcc -c q2.c
Mech: 90              7      run:
Electronics: 90       8      ./a.out
Physics: 90          9
All input read successfully
Name: suvigya
SRN: CS529
Problem solving with C: 90
Maths: 90
Mech: 90
Electronics: 90
Physics: 90
Total: 450
Average: 90
Result: Pass
Division: FIRST CLASS WITH DISTINCTION

End of program execution..
Press any key to continue..|
```

Question3

3) Write a program to add two distances in inch-feet using structure.

Code

Q3.c

```

#include "server.h"
#include <stdio.h>

int main(){
    struct dist d1, d2, d3;
    readDist(&d1);
    readDist(&d2);
    getSum(d1, d2, &d3);
    printDist(d3);
    return 0;
}

```

Functions.c

```

#include "server.h"
#include <stdio.h>

void readDist(struct dist * d1){
    printf("Enter distance in (feet' inches\"): ");
    scanf("%d\'%d\'", &d1->feet, &d1->inches);
}

void getSum(struct dist d1, struct dist d2, struct dist * d3){
    d3->feet = 0;
    d3->inches = 0;
    d3->inches += (d1.inches + d2.inches)%12;
    if((d1.inches + d2.inches)/12 != 0){
        d3->feet += 1;
    }
    d3->feet += (d1.feet + d2.feet);
}

void printDist(struct dist d3){
    printf("The distance is %d feet, %d inches\n", d3.feet, d3.inches);
}

```

Server.h

```
struct dist{
    int feet;
    int inches;
};

void readDist(struct dist * d1);
void getSum(struct dist d1, struct dist d2, struct dist * d3);
void printDist(struct dist d3);
```

Output

```
File Edit View Search Terminal Help
Enter distance in (feet' inches"): 5'11"
Enter distance in (feet' inches"): 6'3"
The distance is 12 feet, 2 inches
Press any key to continue...|
```

Practice Questions

1) Write a program to add, subtract and multiply two complex numbers using structures to function.

Code

```
#include <stdio.h>

struct comp{
    float a, b;
};
```



```

void getNum(struct comp* c1){
    printf("Enter num in format (a + ib): ");
    scanf("%f + i%f", &c1->a, &c1->b);
}

void add(struct comp c1, struct comp c2){
    printf("The sum is %f + i%f\n",c1.a+c2.a, c1.b+c2.b);
}

void sub(struct comp c1, struct comp c2){
    printf("The difference is %f + i%f\n",c1.a-c2.a, c1.b-c2.b);
}

void mul(struct comp c1, struct comp c2){
    float a, b;
    a = (c1.a*c2.a)-(c1.b*c2.b);
    b = (c1.a*c2.b)+(c1.b*c2.a);
    printf("The product is %f + i%f\n",a, b);
}

int main(){
    struct comp c1, c2;
    getNum(&c1);
    getNum(&c2);
    int ch = 1;
    while (ch!=4) {
        printf("Menu...\n1.Add\n2.Subtract\n3.Multiply\nChoice: ");
        scanf("%d", &ch);
        switch (ch) {
            case 1:add(c1, c2); break;
            case 2:sub(c1, c2); break;
            case 3:mul(c1, c2); break;
            case 4:break;
        }
    }
}

```

Output

```
(base) suvigya@suvigya:~/C/week11$ gcc p1.c
(base) suvigya@suvigya:~/C/week11$ ./a.out
Enter num in format (a + ib): 1 + i3
Enter num in format (a + ib): 1 + i1
Menu...:
1.Add
2.Subtract
3.Multiply
Choice: 1
The sum is 2.000000 + i4.000000
Menu...:
1.Add
2.Subtract
3.Multiply
Choice: 2
The difference is 0.000000 + i2.000000
Menu...:
1.Add
2.Subtract
3.Multiply
Choice: 3
The product is -2.000000 + i4.000000
Menu...:
1.Add
2.Subtract
3.Multiply
```

Practice Questions

2) Write a program for bill generator using structures to read and display each item along with its unit price, quantity purchased and the total price. And also calculate and print the total cost of all items purchased by the customer.

Code

```
#include <stdio.h>

struct item{
    char name[20];
    int qty;
    float price;
    float total;
};

void input(struct item * a){
    printf("Item: ");scanf("%s", a->name);
    printf("Quantity: ");scanf("%d", &a->qty);
    printf("Unit Price: ");scanf("%f", &a->price);
    a->total = a->qty * a->price;
}

void print(struct item * a, int n){
    float tot = 0;
    printf("\n\n***BILL***\n\n");
    for(int i =0; i < n; i++){
        printf("Item: %s\n", (*a).name);
        printf("Quantity: %d\n", (*a).qty);
        printf("Unit Price: %f\n", (*a).price);
        printf("Total: %f\n\n", (*a).total);
        tot += a->total;
        a++;
    }
    printf("Bill Total: %f\n",tot);
}

int main(){
    struct item bill[15];
    int n;
    printf("How many items in the bill?: ");
    scanf("%d", &n);
    for(int i=0; i<n; i++){
        input(&bill[i]);
    }
    print(bill, n);
}
```

}

Output

```
How many items in the bill?: 2
Item: pen
Quantity: 2
Unit Price: 10
Item: pencil
Quantity: 10
Unit Price: 5
***BILL***
Item: pen
Quantity: 2
Unit Price: 10.000000
Total: 20.000000
Item: pencil
Quantity: 10
Unit Price: 5.000000
Total: 50.000000
Bill Total: 70.000000
Press any key to continue...
```