Week 2: Programs on Input, Output Functions And Control Structures

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1	**Write a program to calculate the grade of the student according to the specified marks.** Grade A:Marks(>85 and <=100) Grade B:Marks(>60 and <=85) Grade C:Marks(>40 and <=60) Grade D:Marks(>30 and <=40) Fail: Marks(<30) **Sample Input:** Enter your marks:60 **Sample Output:** You got grade C

	Program:
	
	#include <stdio.h>
	
	int main()
	{
	printf("Enter the marks: ");
	int marks;
	scanf("%d", &marks);
	
	if (marks>80 && marks<=100)
	printf("Grade A\n");
	else if (marks>60 && marks<=85)
	printf("Grade B\n");

```
else if (marks>40 && marks<=60)
printf("Grade C\n");

else if (marks>30 && marks<=40)
printf("Grade D\n");

else
printf("FAIL\n");
}
```

Output Screenshot:

```
jacob@jacob-Vostro-3501:~/Documents/Classes/Sem2/C_LAB/Code$ ./Question1_Assignment2
Enter the marks: 60
Grade C
jacob@jacob-Vostro-3501:~/Documents/Classes/Sem2/C_LAB/Code$
```

2 **Write a Program to convert all characters in a given line from lower case to upper case.**

Sample Input:
Enter characters to convert case
I am student of 2nd Semester!
Sample Output:
I AM STUDENT OF 2ND SEMESTER!

Program:

```
#include <stdio.h>

int main()
{
char ch;
```

```
while ((ch =getchar()) != '\n')
{
putchar(toupper(ch));
}
printf("\n");
}
```

Output Screenshot:

```
jacob@jacob-Vostro-3501:~/Documents/Classes/Sem2/C_LAB/Code$ ./Question2_Assignment2
We love Computer!!!
WE LOVE COMPUTER!!!
jacob@jacob-Vostro-3501:~/Documents/Classes/Sem2/C_LAB/Code$
```

3 **Write a C program using bitwise operators for the following:**

i) check whether specified bit is set or not
ii) set the specified bit and print the result
iii) clear the specified bit and print the result

Sample Input/Output:

Enter the number which you want check
25
Input number is 25
Enter the bit position, starts from zero
2
bit is not set
Enter the bit position, which you want to set
4
set : 16
The number after set is 25
Enter the bit position, which bit you want to clear
3
set : 0
The number after clear is 17

Description:

1. **To check whether the first bit is set or not**
   N&(1<<I) is zero then at I bit its not set
   Is zero then at I bit its set

25: 1 1 0 0 1
2^1 2^0
I is the bit number

2. **To set at particluar bit**
   N|(1<<I)

Program:

For Question 1:

```
#include <stdio.h>

int main()

{

int num, n;

printf("Enter the number that you want to check\n");

scanf("%d", &num);

printf("Input number is %d\n", num);

printf("Enter the bit position, starts from zero\n");

scanf("%d", &n);

if (num & (1<<n))

printf("Bit is set\n");

else

printf("Bit is not set\n");

}
```

For Part 2:

```
#include<stdio.h>

int main()

{

int n, k, num;

printf("Enter the number\n");
```

```
scanf("%d", &num);
printf("Enter the bit position which you want to set\n");
scanf("%d", &k);
printf("set : ");
scanf("%d", &n);
num = (num | (1 << (k - n)));
printf("The number after set is %d\n", num);
}
```

For Part 3:

```
#include <stdio.h>


int main()
{
int n, k, num;
printf("Enter the number\n");
scanf("%d", &num);
printf("Enter the bit position which you want to clear\n");
scanf("%d", &k);
printf("set : ");
scanf("%d", &n);
num = (num & (~(1 << (k - n))));
printf("The number after clear is %d\n", num);
}
```

Output Screenshot:

```
jacob@jacob-Vostro-3501:~/Documents/Classes/Sem2/C_LAB/Code$ gcc -o Assignment2_Question3 Assignment2_Question3.c
jacob@jacob-Vostro-3501:~/Documents/Classes/Sem2/C_LAB/Code$ ./Assignment2_Question3
Enter the number that you want to check
25
Input number is 25
Enter the bit position, starts from zero
2
Bit is not set
jacob@jacob-Vostro-3501:~/Documents/Classes/Sem2/C_LAB/Code$
```

```
jacob@jacob-Vostro-3501:~/Documents/Classes/Sem2/C_LAB/Code$ gcc -o Assignment2_Question3 Assignment2_Question3.c
jacob@jacob-Vostro-3501:~/Documents/Classes/Sem2/C_LAB/Code$ ./Assignment2_Question3
Enter the number
25
Enter the bit position which you want to set
4
set : 0
The number after set is 25
jacob@jacob-Vostro-3501:~/Documents/Classes/Sem2/C_LAB/Code$
```

```
jacob@jacob-Vostro-3501:~/Documents/Classes/Sem2/C_LAB/Code$ gcc -o Assignment2_Question3 Assignment2_Question3.c
jacob@jacob-Vostro-3501:~/Documents/Classes/Sem2/C_LAB/Code$ ./Assignment2_Question3
Enter the number
25
Enter the bit position which you want to clear
3
set : 0
The number after clear is 17
jacob@jacob-Vostro-3501:~/Documents/Classes/Sem2/C_LAB/Code$
```

4 **a)Write a program to generate a multiplication table using for loop**
b)Write a program to print the following pattern

```
*
* *
* * *
* * * *
* * * * *
```

Program:

A)

```
#include <stdio.h>


int main()
```

```
{
int n;
printf("Enter the number that you want to get the multiplication table : ");
scanf("%d", &n);
for (int i=1;i<=10;i++)
printf("%d X %d = %d\n", n, i, n*i);
}
```

B)

```
#include <stdio.h>

int main()
{
int n = 4;
for (int i = 0; i < n; i++)
{
for (int j = 0; j <= i; j++)
printf("*");
printf("\n");
}
}
```

Output Screenshot:

```
jacob@jacob-Vostro-3501:~/Documents/Classes/Sem2/C_LAB/Code$ gcc -o Question4_Assignment2 Question4_Assignment2.c
jacob@jacob-Vostro-3501:~/Documents/Classes/Sem2/C_LAB/Code$ ./Question4_Assignment2
Enter the number that you want to get the multiplication table : 6
6 X 1 = 6
6 X 2 = 12
6 X 3 = 18
6 X 4 = 24
6 X 5 = 30
6 X 6 = 36
6 X 7 = 42
6 X 8 = 48
6 X 9 = 54
6 X 10 = 60
jacob@jacob-Vostro-3501:~/Documents/Classes/Sem2/C_LAB/Code$
```

```
jacob@jacob-Vostro-3501:~/Documents/Classes/Sem2/C_LAB/Code$ gcc -o Question4_Assignment2 Question4_Assignment2.c
jacob@jacob-Vostro-3501:~/Documents/Classes/Sem2/C_LAB/Code$ ./Question4_Assignment2
*
**
***
****
jacob@jacob-Vostro-3501:~/Documents/Classes/Sem2/C_LAB/Code$
```

5 **Write a program to implement a Simple Calculator using switch Statement**

Sample input:
Enter an operator (+, -, *,): +
Enter two operands: 3 4
Sample Output:
3.0 + 4.0 = 7.0
Sample input:
Enter an operator (+, -, *,): -
Enter two operands: 7 6
Sample Output:
7.0 - 6.0 = 1.0

Program:

```
#include <stdio.h>

int

main()

{

double a, b;

char oper;
```

```
printf("Choose the operator(+, -, *, /) : ");
scanf("%c", &oper);

printf("Enter the two operands\n");
scanf("%lf%lf", &a, &b);
switch (oper)
{
case '+':
printf("%lf + %lf = %lf\n", a, b, a + b);
break;
case '-':
printf("%lf - %lf = %lf\n", a, b, a - b);
break;
case '*':
printf("%lf * %lf = %lf\n", a, b, a * b);
break;
case '/':
printf("%lf / %lf = %lf\n", a, b, a / b);
break;
default:
printf("Error! Invalid operator");
}
}
```

Output Screenshot:

```
jacob@jacob-Vostro-3501:~/Documents/Classes/Sem2/C_LAB/Code$ gcc -o Question5_Assignment2 Question5_Assignment2.c
jacob@jacob-Vostro-3501:~/Documents/Classes/Sem2/C_LAB/Code$ ./Question5_Assignment2
Choose the operator(+, -, *, /) : /
Enter the two operands
6.0 5.0
6.000000 / 5.000000 = 1.200000
jacob@jacob-Vostro-3501:~/Documents/Classes/Sem2/C_LAB/Code$
```

6 **Write a program to validate a given date and find the next date**

Sample input:
Enter the date 12
Enter the month 12
Enter the year 2000
Sample Output:
Date is valid & next date is: 13/12/2000
Sample input:
Enter the date 1
Enter the month 13
Enter the year 2000
Sample Output:
Month is invalid

Program:

```
#include <stdio.h>

int main()

{

int dd;

int mm;

int yy;

int max1;


printf("Enter the date\n");

scanf("%d", &dd);

printf("Enter the month\n");
```

```
scanf("%d", &mm);
printf("Enter the year\n");
scanf("%d", &yy);

if (mm == 1 || mm == 3 || mm == 5 || mm == 7 || mm == 8 || mm == 10 || mm == 12)
max1 = 31;
else if (mm == 4 || mm == 6 || mm == 9 || mm == 11)
max1 = 30;
else if (yy % 4 == 0 && yy % 100 != 0 || yy % 400 == 0)
max1 = 29;
else
max1 = 28;

if (mm < 1 || mm > 12)
printf("The month is invalid\n");
else if (dd < 1 || dd > max1)
printf("The date is invalid\n");
else if (dd == max1 && mm != 12)
{
dd = 1;
mm = mm + 1;
printf("Date is valid and next date is :%d/%d/%d\n", dd, mm, yy);
}
else if (dd == max1 && mm == 12)
{
```

```
dd = 1;
mm = 1;
yy = yy + 1;
printf("Date is valid and next date is :%d/%d/%d\n", dd, mm, yy);
}
else
{
dd = dd + 1;
printf("Date is valid and next date is :%d/%d/%d\n", dd, mm, yy);
}
}
```

Output Screenshot:

```
jacob@jacob-Vostro-3501:~/Documents/Classes/Sem2/C_LAB/Code$ gcc -o Question6_Assignment2 Question6_Assignment2.c
jacob@jacob-Vostro-3501:~/Documents/Classes/Sem2/C_LAB/Code$ ./Question6_Assignment2
Enter the date
30
Enter the month
06
Enter the year
2002
Date is valid and next date is :1/7/2002
jacob@jacob-Vostro-3501:~/Documents/Classes/Sem2/C_LAB/Code$
```