WEEK 4

Bitwise Operators Problems(week3)

1.

```c
// Online C compiler to run C program online
#include <stdio.h>

int main() {

    int num;
    printf("Enter the number: ");
    scanf("%d", &num);
    if(num & 1)
        printf("LSB of %d is set (1).", num);
    else
        printf("LSB of %d is unset (0).", num);

    return 0;
}
```

```
/tmp/SWGONHUc4U.o
Enter the number: 55
LSB of 55 is set (1).
```

2.

```c
// Online C compiler to run C program online
#include <stdio.h>
#define BITS sizeof(int) * 8
int main() {

    int num, msb;
    printf("Enter any number: ");
    scanf("%d", &num);

    msb = 1 << ( BITS - 1);

    if(num & msb)
        printf("MSB of %d is set (1).", num);
    else
        printf("MSB of %d is unset (0).", num);

    return 0;
}
```

```
/tmp/SWGONHUc4U.o
Enter any number: -7
MSB of -7 is set (1).
```

3.

```c
// Online C compiler to run C program online
#include <stdio.h>
#define BITS sizeof(int) * 8
int main() {

    int num, n, bitStatus;

    printf("Enter any number: ");
    scanf("%d", &num);

    printf("Enter nth bit to check (0-31): ");
    scanf("%d", &n);

    bitStatus = (num >> n) & 1;

    printf("The %d bit is set to %d", n, bitStatus);

    return 0;
}
```

```
/tmp/SWG0NHUc4U.o
Enter any number: 5
Enter nth bit to check (0-31): 4
The 4 bit is set to 0
```

4.

```c
// Online C compiler to run C program online
#include <stdio.h>
#define BITS sizeof(int) * 8
int main() {

    int num, n, newNum;
    printf("Enter any number: ");
    scanf("%d", &num);
    printf("Enter nth bit to set (0-31): ");
    scanf("%d", &n);
    newNum = (1 << n) | num;

    printf("Number after setting %d bit: %d in decimal\n", n, newNum
        );

    return 0;
}
```

```
/tmp/SWG0NHUc4U.o
Enter any number: 10
Enter nth bit to set (0-31): 0
Number after setting 0 bit: 11 in decimal
```

5.

```c
// Online C compiler to run C program online
#include <stdio.h>
#define BITS sizeof(int) * 8
int main() {

    int num, n, newNum;
    printf("Enter any number: ");
    scanf("%d", &num);
    printf("Enter nth bit to clear (0-31): ");
    scanf("%d", &n);
    newNum = num & (~(1 << n));
    printf("Number after clearing %d bit: %d in decimal\n", n, newNum
        );
    return 0;
}
```

```
/tmp/SWG0NHUc4U.o
Enter any number: 11
Enter nth bit to clear (0-31): 0
Number after clearing 0 bit: 10 in decimal
```

6.

```c
// Online C compiler to run C program online
#include <stdio.h>
#define BITS sizeof(int) * 8
int main() {

    int num, n, newNum;
    printf("Enter any number: ");
    scanf("%d", &num);
    printf("Enter nth bit to toggle (0-31): ");
    scanf("%d", &n);
    newNum = num ^ (1 << n);
    printf("Number after toggling %d bit: %d in decimal\n", n, newNum
        );
    return 0;
}
```

```
/tmp/SWGONHUc4U.o
Enter any number: 10
Enter nth bit to toggle (0-31): 1
Number after toggling 1 bit: 8 in decimal
```

11.

```c
// Online C compiler to run C program online
#include <stdio.h>
int main() {

    int num, flippedNumber;
    printf("Enter any number: ");
    scanf("%d", &num);
    flippedNumber = ~num;
    printf("Number after bits are flipped = %d in decimal",
        flippedNumber);
    return 0;
}
```

```
/tmp/SWGONHUc4U.o
Enter any number: 15
Number after bits are flipped = -16 in decimal
```

16.

```c
// Online C compiler to run C program online
#include <stdio.h>
int main() {

    int num;
    printf("Enter any number: ");
    scanf("%d", &num);

    if(num & 1)
    {
        printf("%d is odd.", num);
    }
    else
    {
        printf("%d is even.", num);
    }

    return 0;
}
```

```
/tmp/SWGONHUc4U.o
Enter any number: 15
15 is odd.
```

If Statements - Problems: 4, 7, 8, 12, 14, 16, 19, 20

4.

```c
// Online C compiler to run C program online
#include <stdio.h>

int main() {
    // Write C code here
    int num ;
    printf(" enter the number: ");
    scanf("%d",&num);
    if(num%5==0&&num%11==0)
    printf("the number %d is divisible by 5 and 11\n",num);
    else
    printf("the number %d is not divisible by 5 and 11",num);

    return 0;
}
```

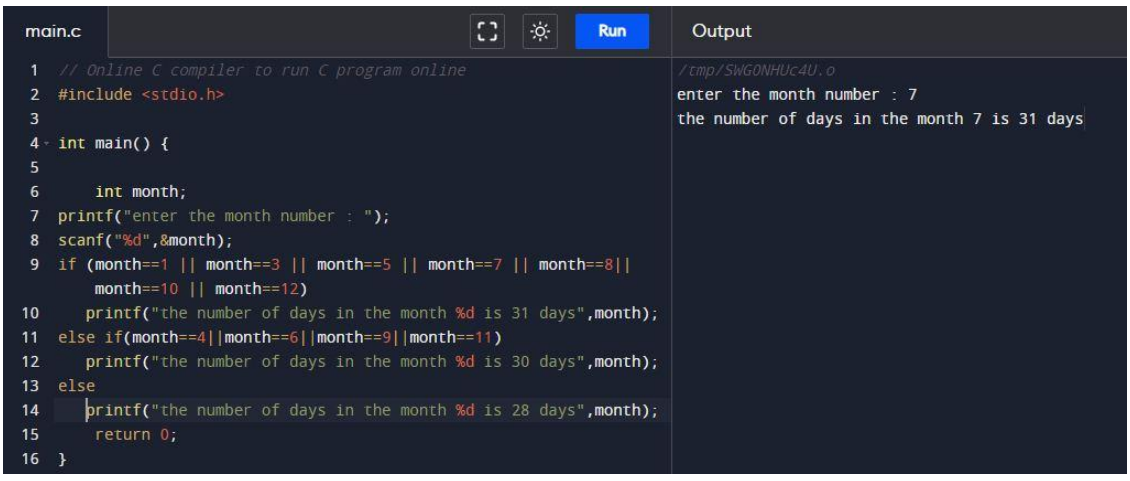
```
/tmp/SWG0NHUc4U.o
enter the number: 55
the number 55 is divisible by 5 and 11
```

7.

```c
// Online C compiler to run C program online
#include <stdio.h>

int main() {

    char ch;
    printf("Enter a character: ");
    scanf("%c", &ch);
    if((ch >= 'a' && ch <= 'z') || (ch >= 'A' && ch <= 'Z'))
        printf("Character %c is an alaphabet.",ch);
    else
        printf("Character%c is not alaphabet.",ch);


    return 0;
}
```

```
/tmp/SWG0NHUc4U.o
Enter a character: y
Character y is an alaphabet.
```

8.



```c
// Online C compiler to run C program online
#include <stdio.h>

int main() {

    int month;
printf("enter the month number : ");
scanf("%d",&month);
if (month==1 || month==3 || month==5 || month==7 || month==8||
    month==10 || month==12)
   printf("the number of days in the month %d is 31 days",month);
else if(month==4||month==6||month==9||month==11)
   printf("the number of days in the month %d is 30 days",month);
else
   printf("the number of days in the month %d is 28 days",month);
    return 0;
}
```

```
/tmp/SWG0NHUc4U.o
enter the month number : 7
the number of days in the month 7 is 31 days
```

12.

main.c

```c
// Online C compiler to run C program online
#include <stdio.h>

int main() {

    int month;
printf("enter the month number : ");
scanf("%d",&month);
if (month==1 || month==3 || month==5 || month==7 || month==8||
    month==10 || month==12)
   printf("the number of days in the month %d is 31 days",month);
else if(month==4||month==6||month==9||month==11)
   printf("the number of days in the month %d is 30 days",month);
else
   printf("the number of days in the month %d is 28 days",month);
    return 0;
}
```

Output

```
/tmp/SWGONHUc4U.o
enter the month number : 7
the number of days in the month 7 is 31 days
```

14.

main.c

```c
// Online C compiler to run C program online
#include <stdio.h>

int main() {

    float ang1,ang2,ang3,total;
    printf("enter the first angle: \n");
    scanf("%f",&ang1);
     printf("enter the second angle: \n");
    scanf("%f",&ang2);
    printf("enter the third angle: \n");
    scanf("%f",&ang3);
    total=ang1+ang2+ang3;
    if (total <=180)
       printf("these angles are valid");
    else
       printf("these angles are not valid");

    return 0;
}
```

Output

```
/tmp/SWGONHUc4U.o
enter the first angle:
100
enter the second angle:
50
enter the third angle:
40
these angles are not valid
```

16.

main.c

```c
// Online C compiler to run C program online
#include <stdio.h>

int main() {

    float ang1,ang2,ang3;
    printf("enter the first angle: \n");
    scanf("%f",&ang1);
     printf("enter the second angle: \n");
    scanf("%f",&ang2);
    printf("enter the third angle: \n");
    scanf("%f",&ang3);

    if (ang1==ang2 && ang1==ang3 && ang2==ang3)
       printf("the triangle is equilateral");
    else if(ang1==ang2 || ang1==ang3 || ang2==ang3)
       printf("the triangle is isosceles");
    else
       printf("the triangle is scalene triangle.");

    return 0;
}
```

Output

```
/tmp/SWGONHUc4U.o
enter the first angle:
50
enter the second angle:
50
enter the third angle:
80
the triangle is isosceles
```

19.

```c
// Online C compiler to run C program online
#include <stdio.h>

int main() {

    float phy,chem,bio,math,comp,persentage;
    printf("enter the marks of physics : \n");
    scanf("%f",&phy);
    printf("enter the marks of chemistry: \n");
    scanf("%f",&chem);
    printf("enter the marks of biology: \n");
    scanf("%f",&bio);
    printf("enter the marks of math : \n");
    scanf("%f",&math);
    printf("enter the marks of computer: \n");
    scanf("%f",&comp);
    persentage=((phy+chem+bio+math+comp)/500)*100;
    if (persentage >=90)
       printf("Your grad is A");
    else if(persentage >=80)
       printf("Your grad is B");
    else if(persentage >=70)
       printf("Your grad is C");
    else if(persentage >=60)
       printf("Your grad is D");
    else if(persentage >=40)
       printf("Your grad is E");
    else if(persentage <40)
       printf("Your grad is F");

    return 0;
}
```

```
/tmp/SWGONHUc4U.o
enter the marks of physics :
80
enter the marks of chemistry:
90
enter the marks of biology:
85
enter the marks of math :
95
enter the marks of computer:
92
Your grad is B
```

20.

```c
// Online C compiler to run C program online
#include <stdio.h>

int main() {

     float basic, da, hra, gross;

    printf("enter basic salary: \n");
    scanf("%f", &basic);

    if(basic <= 10000)
    {
        da  = basic * 0.8;
        hra = basic * 0.2;
    }
    else if(basic <= 20000)
    {
        da  = basic * 0.9;
        hra = basic * 0.25;
    }
    else
    {
        da  = basic * 0.95;
        hra = basic * 0.3;
    }
    gross = basic + hra + da;

    printf("the gross salary = %.1f", gross);
    return 0;
}
```

```
/tmp/SWGONHUc4U.o
enter basic salary:
30000
the gross salary = 67500.0
```

Switch Case - Problems: 1, 7, 8.

1.

```c
#include <stdio.h>

int main() {

    int week;


    printf("enter the day number in the week(1-7): ");
    scanf("%d", &week);

    switch(week)
    {
        case 1:
            printf("Saturday");
            break;
        case 2:
            printf("Sunday");
            break;
        case 3:
            printf("Monday");
            break;
        case 4:
            printf("Tuesday");

            break;
        case 5:
            printf("Wednesday");
            break;
        case 6:
            printf("Thursday");
            break;
        case 7:
            printf("Friday");
            break;

    }
    return 0;
}
```

```
enter the day number in the week(1-7): 6
Thursday
```

7.

```c
// Online C compiler to run C program online
#include <stdio.h>

int main() {
    // Write C code here
    float a, b, c;
    float root1, root2, imaginary;
    float discriminant;

    printf("Enter values of a, b, c of quadratic equation (aX^2
        + bX + c): ");
    scanf("%f%f%f", &a, &b, &c);

    discriminant = (b * b) - (4 * a * c);


    switch(discriminant > 0)
    {
        case 1:
            root1 = (-b + sqrt(discriminant)) / (2 * a);
            root2 = (-b - sqrt(discriminant)) / (2 * a);

            printf("Two distinct and real roots exists: %.1f
```

```
/tmp/IOJqfXfrjO.o
Enter values of a, b, c of quadratic equation (aX^2 + bX + c): 3 2 6
Two distinct complex roots exists: -0.3 + i1.4 and -0.3 - i1.4
```

```
            break;

        case 0:
            switch(discriminant < 0)
            {
                case 1:
                    root1 = root2 = -b / (2 * a);
                    imaginary = sqrt(-discriminant) / (2 * a);

                    printf("Two distinct complex roots exists:
                        %.1f + i%.1f and %.1f - i%.1f",
                    root1, imaginary, root2, imaginary
                        );
                    break;

                case 0:
                    root1 = root2 = -b / (2 * a);

                    printf("Two equal and real roots exists: %
                        .1f and %.1f", root1, root2);

                    break;
            }
```

8.

```
// Online C compiler to run C program online
#include <stdio.h>

int main() {

      char op;
    float num1, num2, result=0.0f;


    printf("Enter [number 1] [+, -, *, /] [number 2]\n");
    scanf("%f %c %f", &num1, &op, &num2);
    switch(op)
    {
        case '+':
            result = num1 + num2;
            break;

        case '-':
            result = num1 - num2;
            break;

        case '*':
            result = num1 * num2;
            break;

        case '/':
            result = num1 / num2;
            break;

        default:
            printf("Invalid operator");
    }

    printf("%.1f %c %.1f = %.1f", num1, op, num2, result);
    return 0;
}
```

```
/tmp/SWGONHUc4U.o
Enter [number 1] [+, -, *, /] [number 2]
3 + 7
3.0 + 7.0 = 10.0
```

Loop Statements - Problems: 2, 5, 6, 9, 10, 15, 16, 21, 40.

2.

```c
// Online C compiler to run C program online
#include <stdio.h>

int main() {

        int i, n;
    printf("enter the first number: ");
    scanf("%d", &n);
    i=n;
    while(i>=1)
    {
        printf("%d\n", i);
        i--;
    }
    return 0;
}
```

```
/tmp/SWGONHUc4U.o
enter the first number: 15
15
14
13
12
11
10
9
8
7
6
5
4
3
2
1
```

5.

```c
// Online C compiler to run C program online
#include <stdio.h>

int main() {

        int i;

    for(i=1;i<=100;i=i+2)
    {
        printf("%d\n", i);

    }
    return 0;
}
```

```
/tmp/SWGONHUc4U.o
1
3
5
7
9
11
13
15
17
19
21
23
25
27
29
31
33
35
37
39
41
43
45
```

6.

```c
// Online C compiler to run C program online
#include <stdio.h>

int main() {

        int i,n,sum=0;
    printf("enter the limit: ");
    scanf("%d",& n);
    for(i=1;i<=n;++i)
    {
        sum=sum+i;
    }
    printf("the sum of the numbers from %d to 1 is %d", i-1, sum);
    return 0;
}
```

```
/tmp/SWG0NHUc4U.o
enter the limit: 50
the sum of the numbers from 50 to 1 is 1275
```

9.

```c
// Online C compiler to run C program online
#include <stdio.h>

int main() {

    int i, num;

    printf("Enter number to the table: ");
    scanf("%d", &num);

    for(i=1; i<=10; i++)
    {
        printf("%d * %d = %d\n", num, i, (num*i));
    }
    return 0;
}
```

```
/tmp/SWG0NHUc4U.o
Enter number to the table: 6
6 * 1 = 6
6 * 2 = 12
6 * 3 = 18
6 * 4 = 24
6 * 5 = 30
6 * 6 = 36
6 * 7 = 42
6 * 8 = 48
6 * 9 = 54
6 * 10 = 60
```

10.

```c
// Online C compiler to run C program online
#include <stdio.h>

int main() {

    int num, count = 0;

    printf("Enter the number: ");
    scanf("%d", &num);

    do
    {
        count++;

        num /= 10;
    }
    while(num != 0);

    printf("Total digits: %d", count);
    return 0;
}
```

```
/tmp/SWG0NHUc4U.o
Enter the number: 456
Total digits: 3
```

15.

```c
// Online C compiler to run C program online
#include <stdio.h>

int main() {
    int num, rem, prod = 1;

    printf("Enter a number: ");
    scanf("%d", &num);

    while(num != 0)
    {
        rem = num % 10;
        prod *= rem;
        num /=  10;
    }

    printf("%d", prod);

    return 0;

    return 0;
}
```

```
/tmp/IOJqfXfrjO.o
Enter a number: 123
6
```

16.

```c
// Online C compiler to run C program online
#include <stdio.h>

int main() {

   int num, r = 0;

  printf("Enter a number to reverse\n");
  scanf("%d", &num);

  while (num != 0)
  {
    r = r * 10;
    r = r + num%10;
    num = num/10;
  }

  printf("Reverse of the number = %d\n", r);
    return 0;
}
```

```
/tmp/SWGONHUc4U.o
Enter a number to reverse
7654321
Reverse of the number = 1234567
```

21.

```c
// Online C compiler to run C program online
#include <stdio.h>

int main() {

    int base, exp,result = 1;

    printf("Enter a base number: ");
    scanf("%d", &base);
    printf("Enter an exponent: ");
    scanf("%d", &exp);

    while (exp != 0)
    {
        result *= base;
        --exp;
    }
    printf("Answer = %d", result);
    return 0;
}
```

```
/tmp/SWGONHUc4U.o
Enter a base number: 5
Enter an exponent: 2
Answer = 25
```

40.

```c
// Online C compiler to run C program online
#include <stdio.h>

int main() {

    int num, decimal_num = 0, base = 1, rem;
    printf (" Enter a binary number \n");
    scanf (" %d", &num);


    while ( num > 0)
    {
        rem = num % 10;
        decimal_num = decimal_num + rem * base;
        num = num / 10;
        base = base * 2;
    }

    printf (" \n The decimal number is %d \t", decimal_num);
    return 0;
}
```

```
/tmp/SWGONHUc4U.o
Enter a binary number
1101
The decimal number is 13
```