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**SECTION: BA1**

**CSO 101 LAB ASSIGNMENT-4: DECISION MAKING AND  
LOOPS**

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**SOLUTIONS**

**1)** Write a C program to find GCD and LCM of two Numbers.

```
#include <stdio.h>
int main()
{
    int a, b;
    printf("Enter two numbers: ");
    scanf("%d %d", &a, &b);
    // gcd
    int hcf;
    int x, y;
    if (a > b)
    {
        x = a;
        y = b;
    }
    else
    {
        x = b;
        y = a;
    }
    if (a == b)
    {
        hcf = a;
    }
    else
    {
        int cx = x, cy = y;
        hcf = cy;
        while (cx % cy > 0)
        {
            int r = cx % cy;
            cx = cy;
            cy = r;
        }
        hcf = cy;
    }
    printf("The GCD is %d.\n", hcf);

    // lcm
    int lcm;
    for (int i=x; i<=(x*y); i++)
    {
        if (i%x==0 && i%y==0)
        {
            lcm=i;
            break;
        }
    }
}
```

```

        else
        continue;
    }
    printf("The LCM is %d.\n", lcm);
    return 0;
}

```

## SAMPLE OUTPUT

```

PS C:\Users\91933\Documents\CSO\Assignments\Lab assignments\S4> cd "c:\Users\91933\Documents\CSO\Assignments\Lab assignments\S4\" ; if ($?) { gcc q1.c -o q1 } ; if ($?) { .\q1 }
Enter two numbers: 34 56
The GCD is 2.
The LCM is 952.
PS C:\Users\91933\Documents\CSO\Assignments\Lab assignments\S4> cd "c:\Users\91933\Documents\CSO\Assignments\Lab assignments\S4\" ; if ($?) { gcc q1.c -o q1 } ; if ($?) { .\q1 }
Enter two numbers: 45 65
The GCD is 5.
The LCM is 585.
PS C:\Users\91933\Documents\CSO\Assignments\Lab assignments\S4>

```

## 2) Write a C Program to Display Factors of a Number.

```

1  #include<stdio.h>
2  int main()
3  {
4      int n;
5      printf("Enter a number: ");
6      scanf("%d",&n);
7      printf("The factors of the number are:- \n");
8      for (int i=1;i<(n+1);i++)
9      {
10         if (n%i==0)
11             printf("%d ",i);
12     }
13     return 0;
14 }

```

## SAMPLE OUTPUT

```

PS C:\Users\91933\Documents\CSO\Assignments\Lab assignments\S4> cd "c:\Users\91933\Documents\CSO\Assignments\Lab assignments\S4\" ; if ($?) { gcc q2.c -o q2 } ; if ($?) { .\q2 }
Enter a number: 50
The factors of the number are:-
1 2 5 10 25 50
PS C:\Users\91933\Documents\CSO\Assignments\Lab assignments\S4> cd "c:\Users\91933\Documents\CSO\Assignments\Lab assignments\S4\" ; if ($?) { gcc q2.c -o q2 } ; if ($?) { .\q2 }
Enter a number: 46
The factors of the number are:-
1 2 23 46
PS C:\Users\91933\Documents\CSO\Assignments\Lab assignments\S4>

```

### 3) Write a C Program to Display Armstrong Number Between Two Intervals.

```
#include<stdio.h>
#include<math.h>
int main()
{
    long int a,b;
    printf("Enter a and b: ");
    scanf("%ld %ld",&a,&b);
    printf("The Armstrong numbers between %ld and %ld are:-\n",a,b);
    if (a==0)
    {
        printf("0\n");
        a=a+1;
    }
    for (int i=a;i<(b+1);i++)
    {
        //calculating number of digits in the number
        int c=0;
        int c1=i;
        while ((c1>0))
        {
            c=c+1;
            c1=c1/10;
        }
        long int copy=i;
        long int sum=0;
        while (copy>0)
        {
            int m=copy%10,prod=1;
            for (int k=1;k<(c+1);k++)
            {
                prod=prod*m;
            }
            sum=sum+prod;
            copy=copy/10;
        }
        if (sum==i)
            printf("%ld\n",i);
    }
    return 0;
}
```

## SAMPLE OUTPUT

```
Enter a and b: 0 10000
The Armstrong numbers between 0 and 10000 are:-
0
1
2
3
4
5
6
7
8
9
153
370
371
407
1634
8208
9474
```

- 4)** Write a C Program to count the number of Digits in an Integer.

```
1  #include<stdio.h>
2  int main()
3  {
4      long int n;
5      printf("Enter a number: ");
6      scanf("%ld",&n);
7      int c=0;
8      long int copy=n;
9      while (copy>0)
10     {
11         c=c+1;
12         copy=copy/10;
13     }
14     printf("The number of digits in the number is: %d",c);
15     return 0;
16 }
```

## SAMPLE OUTPUT

```
PS C:\Users\91933\Documents\CS0\Assignments\Lab assignments\S4> cd "c:\Users\91933\Documents\CS0\Assignments\Lab assignments\S4\" ; if ($?) { gcc q4.c -o q4 } ; if ($?) { .\q4 }

Enter a number: 56433
The number of digits in the number is: 5
PS C:\Users\91933\Documents\CS0\Assignments\Lab assignments\S4> 
```

**5)** Write a C Program to print the following output using nested loops.

i)

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

```
1  #include<stdio.h>
2  int main()
3  {
4      int n;
5      printf("Enter number: ");
6      scanf("%d",&n);
7      for (int i=1;i<(n+1);i++)
8      {
9          for (int j=1;j<(i+1);j++)
10             printf("* ");
11             printf("\n");
12     }
13     return 0;
14 }
```

### SAMPLE OUTPUT

```
Enter number: 5
*
* *
* * *
* * * *
* * * * *
```

ii)

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

```
1  #include <stdio.h>
2  int main()
3  {
4      int n;
5      printf("Enter number: ");
6      scanf("%d", &n);
7      int sp = n;
8      for (int i = 1; i < (2*n + 1); i+=2)
9      {
10         for (int k = 1; k < (sp); k++)
11             printf(" ");
12         sp = sp - 1;
13         for (int j = 1; j < (i + 1); j++)
14             printf("*");
15         printf("\n");
16     }
17     return 0;
18 }
```

## SAMPLE OUTPUT

```
Enter number: 5
      *
    ***
  *****
*****
```

**6)** Write a C Program to print Pascal's triangle.

```
#include <stdio.h>
int main()
{
    int n;
    printf("Enter number: ");
    scanf("%d", &n);
    int sp = n;
    for (int i = 1; i < (2 * n + 1); i += 2)
    {
        for (int k = 1; k < (sp); k++)
            printf(" ");
        sp = sp - 1;
        for (int j = 1; j < (i + 1); j++)
        {
            int x=(i - 1) / 2;
            int y=(j - 1) / 2;
            if (j % 2 != 0)
            {
                int val1, val2, val3, val;
                if (x == 0)
                    val1 = 1;
                if (y == 0)
                    val2 = 1;
                int copy1 = x, copy2 = y, copy3 = x - y;
                int fact1 = 1, fact2 = 1, fact3 = 1;
                while (copy1 > 0)
                {
                    fact1 = fact1 * (copy1);
                    copy1 = copy1 - 1;
                }
                while (copy2 > 0)
                {
                    fact2 = fact2 * (copy2);
                    copy2 = copy2 - 1;
                }
                while (copy3 > 0)
                {
                    fact3 = fact3 * (copy3);
                    copy3 = copy3 - 1;
                }
                val = fact1 / (fact2 * fact3);
                printf("%d", val);
            }
            else
                printf(" ");
        }
    }
}
```



```
    }  
    printf("\n");  
}  
return 0;  
}
```

## SAMPLE OUTPUT

```
Enter number: 6  
1  
1 1  
1 2 1  
1 3 3 1  
1 4 6 4 1  
1 5 10 10 5 1
```