**Day 4 – (Loop control structure)**

**Assignment no:-20A**

**Print the following pattern:**

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**\*\*\*\***

**\*\*\*\*\***

***Program code:***

#include<stdio.h>

#include<math.h>

void main()

{

int num,org\_num,rem,result=0,nod=0;

printf("Enter a number: ");

scanf("%d",&num);

org\_num=num;

while(org\_num!=0)

{

org\_num/=10;

++nod;

}

org\_num=num;

while(org\_num!=0)

{

rem=org\_num%10;

result+=pow(rem,nod);

org\_num/=10;

}

if(result==num)

printf("Armstrong number");

else

printf("Not an Armstrong number");

}

***Output:***

Enter the number of rows: 7

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**Assignment no:-20B**

**Print the following pattern:**

**1**

**12**

**123**

**1234**

**12345**

***Program code:***

#include<stdio.h>

void main()

{

int row;

printf("Enter the number of rows: ");

scanf("%d",&row);

for(int i=1;i<=row;i++)

{

for(int j=1;j<=(row-i);j++)

{

printf(" ");

}

for(int k=1;k<=i;k++)

{

printf("%d",k);

}

printf("\n");

}

}

***Output:***

Enter the number of rows: 7

1

12

123

1234

12345

123456

1234567

**Assignment no:-20C**

**Print the following pattern:**

**\***

**\*\*\***

**\*\*\*\*\***

**\*\*\*\*\*\*\***

**\*\*\*\*\*\*\*\*\***

***Program code:***

#include<stdio.h>

void main()

{

int row,i,j,k,l;

printf("Enter the number of rows: ");

scanf("%d",&row);

for(i=1;i<=row;i++)

{

for(j=1;j<=(row-i);j++)

printf(" ");

for(k=1;k<=((2\*i)-1);k++)

printf("\*");

printf("\n");

}

}

***Output:***

Enter the number of rows: 5

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**Assignment no:-20D**

**Print the following pattern:**

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***Program code:***

#include<stdio.h>

void main()

{

int row,n,i,j,k;

printf("Enter the number of rows: ");

scanf("%d",&row);

if((row%2)==0)

printf("Invalid! enter odd number of rows");

else

{

n=(row+1)/2;

for(i=1;i<=n;i++)

{

for(j=1;j<=(n-i);j++)

printf(" ");

for(k=1;k<=((2\*i)-1);k++)

printf("\*");

printf("\n");

}

for(i=1;i<=(n-1);i++)

{

for(j=1;j<=i;j++)

printf(" ");

for(k=1;k<=((2\*(n-i))-1);k++)

printf("\*");

printf("\n");

}

}

}

***Output***:

Enter the number of rows: 5

\*

\*\*\*

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\*

**Assignment no:-20E**

**Print the following pattern:**

**\*\*\*\*\*\*\***

**\*\*\*\*\***

**\*\*\***

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**\*\*\***

**\*\*\*\*\***

**\*\*\*\*\*\*\***

***Program code:***

#include<stdio.h>

void main()

{ int row,n,i,j,k;

printf("Enter the number of rows(odd): ");

scanf("%d",&row);

if((row%2)==0)

printf("It is not an odd number");

else

{

n=(row+1)/2;

for(i=1;i<=n;i++)

{

for(j=1;j<=(i-1);j++)

printf(" ");

for(k=1;k<=((2\*(n-i))+1);k++)

printf("\*");

printf("\n");

}

for(i=1;i<=(n-1);i++)

{

for(j=1;j<=(n-i-1);j++)

printf(" ");

for(k=1;k<=((2\*i)+1);k++)

printf("\*");

printf("\n");

}

}

}

***Output:***

Enter the number of rows(odd): 7

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**Assignment no:-21**

**Input two numbers and find their HCF and LCM.**

***Program code:***

#include<stdio.h>

void main()

{

int num1,num2;

printf("Enter two numbers: ");

scanf("%d %d",&num1,&num2);

if((num1==0)||(num2==0))

printf("Wrong input(one of the input is 0)");

else

{

int divisor,divident,rem,gcd,lcm;

divisor=num1;

divident=num2;

rem = divident % divisor;

while(rem != 0)

{

divident = divisor;

divisor = rem;

rem = (divident % divisor);

}

gcd = divisor;

lcm = (num1 \* num2) / gcd;

printf("GCD & LCM are respectively: %d, %d",gcd,lcm);

}

}

***Output:***

Enter two numbers: 45 32

GCD & LCM are respectively: 1, 1440

**Assignment no:-22**

**Input a number and find:**

1. **Fibonacci series up to n**

***Program code:***

#include<stdio.h>

void main() /\* Fibonacci series upto n \*/

{

int ul,a=0,b=1,sum=0;

printf("Enter the upper limit: ");

scanf("%d",&ul);

while(sum<=ul)

{ printf("%d ",sum);

a=b;

b=sum;

sum=a+b;

}

printf("\n");

}

***Output:***

Enter the upper limit: 50

0 1 1 2 3 5 8 13 21 34

1. **n th Fibonacci number**

***Program code:***

#include<stdio.h>

void main() /\* The nth fibonacci number \*/

{

int terms,a=0,b=1,sum=0;

printf("Enter the position: ");

scanf("%d",&terms);

for(int i=1;i<terms;i++)

{

a=b;

b=sum;

sum=a+b;

}

printf("%d\n",sum);

}

***Output:***

Enter the position: 8

13

1. **Fibonacci series of n terms**

***Program code:***

#include<stdio.h>

void main() /\* Fibonacci series of n terms \*/

{

int terms,a=0,b=1,sum=0;

printf("Enter the number of terms: ");

scanf("%d",&terms);

for(int i=1;i<=terms;i++)

{

printf("%d ",sum);

a=b;

b=sum;

sum=a+b;

}

printf("\n");

}

***Output:***

Enter the number of terms: 10

0 1 1 2 3 5 8 13 21 34

**Assignment no:-23**

**Input a number and find the sum of its digits using while/do-while loop.**

***Program code:***

#include<stdio.h>

void main()

{

int num,sum=0,digit;

printf("Enter a number: ");

scanf("%d",&num);

while(num>0)

{

digit=num%10;

sum=sum+digit;

num=num/10;

}

printf("Sum is %d",sum);

}

***Output:***

Enter a number: 56

Sum is 11

**Assignment no:-24**

**Input a number and reverse its using while/do-while loop.**

***Program code:***

#include<stdio.h>

void main()

{

int num,rev=0,rem;

printf("Enter a number: ");

scanf("%d",&num);

while(num != 0)

{

rem = num % 10;

rev = (rev \* 10) + rem;

num = num/10;

}

printf("Reverse of the number is %d",rev);

}

***Output:***

Enter a number: 2345

Reverse of the number is 5432

**Assignment no:-25**

**Input a number and check if it is a prime number or not.**

***Program code:***

#include<stdio.h>

void main()

{

int num,count=0;

printf("Enter a number: ");

scanf("%d",&num);

for(int i=1;i<=num;i++)

if((num % i) == 0)

count++;

if(count==2)

printf("It is a prime number");

else

printf("It is not a prime number");

}

***Output:***

Enter a number: 234

It is not a prime number

Enter a number: 23

It is a prime number

**Assignment no:-26**

**According to the Goldbach conjecture, every even number greater than two is the sum of two prime numbers. Input an even numbers and decompose it into two primes.**

***Program code:***

#include<stdio.h>

int is\_prime(int);

void goldbach(int);

void main()

{

int n;

printf("Enter a number: ");

scanf("%d",&n);

if(((n%2)==0) && (n>2))

goldbach(n);

else

printf("Invalid input");

}

int is\_prime(int num)

{

int flag=1;

for(int i=2;i<=(num/2);i++)

if((num % i) == 0)

return(flag-1);

return(flag);

}

void goldbach(int g)

{

for(int i=2;i<=(g/2);i++)

if(is\_prime(i) && is\_prime(g-i))

printf("%d + %d = %d\n",i,(g-i),g);

}

***Output:***

Enter a number: 67

Invalid input

Enter a number: 234

5 + 229 = 234

7 + 227 = 234

11 + 223 = 234

23 + 211 = 234

37 + 197 = 234

41 + 193 = 234

43 + 191 = 234

53 + 181 = 234

61 + 173 = 234

67 + 167 = 234

71 + 163 = 234

83 + 151 = 234

97 + 137 = 234

103 + 131 = 234

107 + 127 = 234

**Assignment no:-27**

**Input a number and check whether it is an Automorphic number or not using while/do-while loop.**

***Program code:***

#include<stdio.h>

#include<math.h>

void main()

{

int num,temp,last,nod=0;

long int sqr;

printf("Enter a number: ");

scanf("%d",&num);

sqr=num\*num;

temp=num;

while(temp!=0)

{

nod++;

temp = temp/10;

}

last = sqr % (int)(pow(10,nod));

if(last==num)

printf("Automorphic number");

else

printf("Not Automorphic");

}

***Output:***

Enter a number: 34

Not Automorphic

Enter a number: 25

Automorphic number

**Assignment no:-28**

**Input a number and check whether it is an Armstrong number or not using while/do-while loop.**

***Program code:***

#include<stdio.h>

#include<math.h>

void main()

{

int num,org\_num,rem,result=0,nod=0;

printf("Enter a number: ");

scanf("%d",&num);

org\_num=num;

while(org\_num!=0)

{

org\_num/=10;

++nod;

}

org\_num=num;

while(org\_num!=0)

{

rem=org\_num%10;

result+=pow(rem,nod);

org\_num/=10;

}

if(result==num)

printf("Armstrong number");

else

printf("Not an Armstrong number");

}

***Output:***

Enter a number: 345

Not an Armstrong number

Enter a number: 153

Armstrong number