# **1)Natural Logarthim Program**

**The natural logarithm can be approximated by the following series.**

**(x-1)/x + 1/2((x-1)/x)^2 + 1/2((x-1)/x)^3 + ...+ 1/2((x-1)/x)^n**

**If x and n are accepted from user write a program to calculate the sum of first n terms of this series.Use user defined function to calculate and return sum**

**Input:**

**n and x**

**Constraints**

**0>x<100**

**1<=n<=20**

Sample input

5

2

Sample output

0.74

Explanation: In sample input first value indicates value of n i.e 5 and second line indicates value of x i.e 2. Sum of series will be 0.73.

#include <stdio.h>  
int main() {  
 float n,x,a,c=1,t=2,sum=0,b=1;  
/\* Enter your code here. Read input from STDIN. Print output to STDOUT \*/  
 scanf("%f%f",&n,&x);  
 sum=(x-1)/x;  
 a=(x-1)/x;  
 while(n>1){  
   
 while(c<=t){b=b\*a;  
 c++;  
 }  
 b=b\*0.5;  
 sum=sum+b;  
 n--;  
 c=1;  
 t++;  
 b=1;  
 }  
 printf("%0.2f",sum);  
return 0;  
}

# **2)Pattern**

Write a program to accept a number and print following pattern

Input 5

Output

5

45

345

2345

12345

Constraints

0<n<=10

#include <stdio.h>

int main() {

int a,i,s,n,b;

scanf("%d",&a);

b=a;

for(i=a;i>0;i--){

printf(" ");

for(s=1;s<=i-1;s++)printf(" ");

for(n=s;n<=a;n++){printf("%d",n);}

printf("\n");

}

/\* Enter your code here. Read input from STDIN. Print output to STDOUT \*/

return 0;

}

# **3)Set Bits of an integer**

You have been given a task to accept an integer number from the user and count the number of set bits in its binary representation.

Constraints

1<=N<=1000

Sample Input

7

Sample output

3

Sample Input

10

Sample output

2

#include <math.h>

#include <stdio.h>

#include <string.h>

#include <stdlib.h>

#include <assert.h>

#include <limits.h>

#include <stdbool.h>

int main() {

long long int a,c=0;

scanf("%lld",&a);

if(a>=1&&a<=1000){

while(a>0){

if(a&1)c++;

a=a>>1;

}

printf("%lld",c);

}

/\* Enter your code here. Read input from STDIN. Print output to STDOUT \*/

return 0;

}

# **4)Square of an integer number\***

You have been given a task of accepting an integer from user.Find the square of this number without using \*,/ and pow() function.

Use bit wise operators to calculate square of this number.

1<=N<100

Sample Input

2

Sample Output

4

Sample Input

16

Sample Output

256

#include <math.h>

#include <stdio.h>

#include <string.h>

#include <stdlib.h>

#include <assert.h>

#include <limits.h>

#include <stdbool.h>

int main() {

long long int a,c=0,b;

scanf("%lld",&a);

b=a;

while(a>0){

c++;

a=a>>1;

}

b=b<<(c-1);

printf("%d",b);

return 0;

}

# 

# **5)Change Bits**

Accept two integers A and B from the keyboard. Write a program to determine the number of bits required to change integer A to integer B.

Constraint:

A>0 && A<2147483647

B>0 && B<2147483647

Sample Input

31 14

Sample Output

2

Explanation:

In the above test case two values are entered A=31 and B=14. Binary of A is 11111 and B is 01110. Therefore to covert A to B only two bits are required to change.

#include <math.h>

#include <stdio.h>

#include <string.h>

#include <stdlib.h>

#include <assert.h>

#include <limits.h>

#include <stdbool.h>

int main() {

int c=0,a,b,d;

/\* Enter your code here. Read input from STDIN. Print output to STDOUT \*/

scanf("%d%d",&a,&b);

while(a>0||b>0){

if((a&1)!=(b&1))

c++;

a=a>>1;

b=b>>1;

}

printf("%d",c);

return 0;

}

# **6)Count 1's in binary**

You have been given a task of accepting n numbers from the user.Write a program to count

number 1's in binary representation of each number.

Sample Input

2

8

10

Sample output

1

2

#include <math.h>

#include <stdio.h>

#include <string.h>

#include <stdlib.h>

#include <assert.h>

#include <limits.h>

#include <stdbool.h>

int main() {

long long int a,n,c=0;

/\* Enter your code here. Read input from STDIN. Print output to STDOUT \*/

scanf("%lld",&n);

while(n--){

scanf("%lld",&a);

while(a>0){

if(a&1)c++;

a=a>>1;

}

printf("%lld\n",c);

c=0;

}

return 0;

}

# **7)Trailing Zero's**

# You have been given a task of accepting n numbers from the user.

# Write a program to count number of trailing zero's in each given number.

# 

# Sample Input

# 3

# 7

# 10

# 12

# Sample Output

# 0

# 1

# 2

#include <math.h>

#include <stdio.h>

#include <string.h>

#include <stdlib.h>

#include <assert.h>

#include <limits.h>

#include <stdbool.h>

int main() {

long long int a,n,c=0,a1=0;

/\* Enter your code here. Read input from STDIN. Print output to STDOUT \*/

scanf("%lld",&n);

while(n--){

scanf("%lld",&a);

while(a>0){

if((a&1)==0)

c++;

else break;

a=a>>1;

}

printf("%lld\n",c);

c=0;

}

return 0;

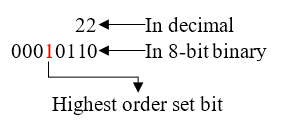
}

# **8)Highest order bit**

Write a C program to input any number from user and find the highest order set bit of given number using bitwise operator.

#### **Highest order set bit**

Highest position of a set bit from left to right in a number is said to be highest order set bit of that number.

\

Sample Input

2

22

10

Sample Output

4

3

#include <math.h>

#include <stdio.h>

#include <string.h>

#include <stdlib.h>

#include <assert.h>

#include <limits.h>

#include <stdbool.h>

int main() {

long long int a,n,c=0,p,t;

/\* Enter your code here. Read input from STDIN. Print output to STDOUT \*/

scanf("%lld",&n);

while(n--){

scanf("%lld",&a);

t=0;p=0;

while(a>0){

if(a&1)p=t;

a=a>>1;t++;

}

printf("%lld\n",p);

c=0;

}

return 0;

}

# **9)Monk and his friends**

Monk has a very good friend, Puchi. As weird as his name, are the games he plays.

One fine day, they decided to play a game to test how diverse their choices are. Both of them choose exactly one integer each. Monk chooses an integer M and Puchi chooses an integer P.

The diversity of their choices is defined as the number of bits whose status is different in the binary representation of M and P , i.e. , count of bits that are ,either set in M and unset in P or set in P and unset inM.

Find the answer to their game.

Input:

First line contains T. T test cases follow.

Each test case consists of 2 space-separated integers P and M.

Output:

Print the answer to each test case in a new line.

Constraints:

1 ≤ T ≤ 104

0 ≤ M, P ≤ 1016

Sample Input

4  
1 4  
3 3  
5 1  
8 7

Sample Output

2  
0  
1  
4

Explanation

1 (0001) and 4 (0100) differ in 2 bits.

The two numbers are identical.

5 (0101) and 1(0001) differ in 1 bit.

8 (1000) and 7(0111) differ in 4 bits.

#include <math.h>

#include <stdio.h>

#include <string.h>

#include <stdlib.h>

#include <assert.h>

#include <limits.h>

#include <stdbool.h>

int main() {

long long int a,b,n,c=0,a1,b1;

scanf("%lld",&n);

while(n--){

scanf("%lld %lld",&a,&b);

while(a>0||b>0){

a1=a&1;

b1=b&1;

if(a1!=b1)c++;

a=a>>1;b=b>>1;

}

printf("%lld\n",c);

c=0;

}

return 0;

}

# **10)Pattern1**

U have been given the task to print the following pattern

Sample Input

5

Sample Output

1

24

135

2468

13579

#include <math.h>

#include <stdio.h>

#include <string.h>

#include <stdlib.h>

#include <assert.h>

#include <limits.h>

#include <stdbool.h>

int main() {

long long int a,i,j,k,e;

scanf("%lld",&a);

for(i=1;i<=a;i++){

if(i%2==0){e=2;for(j=1;j<=i;j++){printf("%lld",e);e+=2; }}

else {e=1;for(j=1;j<=i;j++){printf("%lld",e);e+=2; }}

printf("\n");

}

/\* Enter your code here. Read input from STDIN. Print output to STDOUT \*/

return 0;

}

# **11)pattern2**

u have been given the task to accept a number from the user and display the following pattern

Sample Input

5

Sample Output

\*

\*\*

\*\*\*

\*\*\*\*

\*\*\*\*\*

\*\*\*\*

\*\*\*

\*\*

\*

#include <math.h>

#include <stdio.h>

#include <string.h>

#include <stdlib.h>

#include <assert.h>

#include <limits.h>

#include <stdbool.h>

int main() {

int i,j,a;

scanf("%d",&a);

for(i=1;i<=a;i++){

for(j=1;j<=i;j++)printf("\*");

printf("\n");

}

for(i=a;i>0;i--){

for(j=1;j<i;j++)printf("\*");

printf("\n");

}

/\* Enter your code here. Read input from STDIN. Print output to STDOUT \*/

return 0;

}

# **12)pattern**

U have been given the task to accept a number and display the following pattern

Sample Input

5

SampleOutput

\*

\*\*

\*\*\*

\*\*\*\*

\*\*\*\*\*

\*\*\*\*

\*\*\*

\*\*

\*

#include <math.h>

#include <stdio.h>

#include <string.h>

#include <stdlib.h>

#include <assert.h>

#include <limits.h>

#include <stdbool.h>

int main() {

int a,s,i,j;

/\* Enter your code here. Read input from STDIN. Print output to STDOUT \*/

scanf("%d",&a);

for(i=1;i<=a;i++){

for(s=a;s>i;s--)printf(" ");

for(j=1;j<=i;j++)printf("\*");

printf("\n");

}

for(i=a-1;i>0;i--){

for(s=a;s>i;s--)printf(" ");

for(j=1;j<=i;j++)printf("\*");

printf("\n");

}

return 0;

}

# **13)Convert Binary To Decimal**

U have been given the task to accept a binary number and display the decimal equivalent of it

Sample Input

1111

Sample Output

15

#include <math.h>

#include <stdio.h>

#include <string.h>

#include <stdlib.h>

#include <assert.h>

#include <limits.h>

#include <stdbool.h>

int main() {

long long int x,t,sum=0,a,p=1;

scanf("%lld",&x);

while(x>0){

a=x%2;

sum=sum+a\*p;

x=x/10;

p=p\*2;

}

printf("%lld",sum);

/\* Enter your code here. Read input from STDIN. Print output to STDOUT \*/

return 0;

}

# **14)Convert Decimal To Binary**

U have been given the task to accept a decimal number and display Binary Equivalent of it

Sample Input

15

Sample Output

1111

#include <math.h>

#include <stdio.h>

#include <string.h>

#include <stdlib.h>

#include <assert.h>

#include <limits.h>

#include <stdbool.h>

int main() {

long long int x,sum=0,t,a=1;

scanf("%lld",&x);

while(x>0){

if(x&1)t=1;

else t=0;

sum=sum+t\*a;

x=x>>1;

a=a\*10;

}

printf("%lld",sum);

/\* Enter your code here. Read input from STDIN. Print output to STDOUT \*/

return 0;

}

# **15)Cosine Series\***

U have been given the task to accept n term and x (degrees) and display Sum of Cosine Series

cos(x) = 1 - x^2/2! + x^4/4! - x^6/6! + x^8/8! - ...

Sample Input

5 60

Sample Output

Sum=.50

Explanation

5 is number of terms 60 is degrees

#include <math.h>

#include <stdio.h>

#include <string.h>

#include <stdlib.h>

#include <assert.h>

#include <limits.h>

#include <stdbool.h>

#define PI 3.14159265

int main() {

int t=1;

long long int fact=1;

long double n,p=0,f,sum=0,x,t1;

scanf("%Lf%Lf",&n,&x);

if(x<0)x=-x;

x = (x\*PI) / 180;

while(n--){

if(t%2==0) t1=-pow(x,p);

else t1=pow(x,p);

f=p;

while(f>0){

fact=fact\*f;

f--;

}

sum=sum+t1/fact;

p+=2;

t++;fact=1;

}

printf("Sum=%0.2Lf",sum);

return 0;

}

# **16)Sine Series\***

U have been given the task to accept term n and value x and display sum of the series

sin(x) = x - x^3/3! + x^5/5! - x^7/7! + x^9/9! - ...

Sample Input

2 3

Sample Output

0.71

Explanatation:

x^1/1!-x^3/3!=-1.50

#include <math.h>

#include <stdio.h>

#include <string.h>

#include <stdlib.h>

#include <assert.h>

#include <limits.h>

#include <stdbool.h>

int main() {

int t=1;

float n,p=1,f,sum=0,x,fact=1,t1;

scanf("%f%f",&n,&x);

while(n--){

if(t%2==0) t1=-pow(x,p);

else t1=pow(x,p);

f=p;

while(f>0){

fact=fact\*f;

f--;

}

sum=sum+t1/fact;

p+=2;

t++;fact=1;

}

printf("%0.2f",sum);

return 0;

}

# **17)Arithmetic progression**

U have been given the task to accept first term ,difference of Arithmetic progression and total terms in Ap and display the sum of series

Sample Input

3 5 5

Sample Output

3+8+13+18+23=65

Explanation:

3 is first term

5 is the difference

5 is total term

#include <math.h>

#include <stdio.h>

#include <string.h>

#include <stdlib.h>

#include <assert.h>

#include <limits.h>

#include <stdbool.h>

int main() {

int a,d,n,sum=0,x=0,t;

scanf("%lld%lld%lld",&a,&d,&n);

while(n--){

t=a+x\*d;

sum=sum+t;

if(n==0)printf("%lld",t);

else printf("%lld+",t);

x++;

}

printf("=%lld",sum);

return 0;

}

# **18)Geometric Progression**

U have been given the task to accept number of terms,first term and common ratio and display series and sum of the series

Sample Input

6 2 4

Sample Output

2 8 32 128 512 2048

Sum=2730

#include <math.h>

#include <stdio.h>

#include <string.h>

#include <stdlib.h>

#include <assert.h>

#include <limits.h>

#include <stdbool.h>

int main() {

long long int n,a,b,r,t=0,sum=0;

scanf("%lld%lld%lld",&n,&a,&b);

while(n>0){

a=2;

r=pow(b,t);

t++;

printf("%lld ",a\*r);

sum=sum+a\*r;

n--;

}

printf("\nSum=%lld",sum);

/\* Enter your code here. Read input from STDIN. Print output to STDOUT \*/

return 0;

}