CO - ASSIGNMENT 1

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<u>Header file</u>

```c
#include <stdio.h>
#include <stdlib.h>
#include <string.h>

long long int factorial(long long int num){
    if (num>=1)
        return num*factorial(num-1);
    else
        return 1;
}

long long int addition_unsigned_binary_numbers_U20CS001(long long int a, long long int b){
    int remainder=0,i=0,sum[20];
    while ((a!=0)||(b!=0)){
        sum[i]=((a%10)+(b%10)+remainder)%2;
        remainder=((a%10)+(b%10)+remainder)/2;
        i++;
        a/=10;
        b/=10;
    }

    if(remainder!=0)
        sum[i++] = remainder;

    printf("Hence the sum of two unsigned binary numbers is ");
    for(int j=(i-1);j>=0;j--){
        printf("%d",sum[j]);
    }
    printf(".\n");
    return 0;
}

long long int bin_dec(long long int x){
    long long int ans=0,reminder=0,i=1;
```

```c
    while(x){
        reminder=x%10;
        ans+=reminder*i;
        x=x/10;
        i=i*2;
    }
    return ans;
}


long long int dec_bin(long long int x){
    long long int y=x,ans=0,p=10,i=1;;
    long long int rem;
    while(y){
        rem=y%2;
        if(y==x){
            i=1;
        }
        else{
            i=10*i;
        }
        ans+=i*rem;
        y=y/2;
    }
    return ans;
}


void addition_signed_binary_numbers_U20CS001(char *x, char *y){
    int first_neg=0,second_neg=0;

    if(x[0]=='1'){
        first_neg=1;
    }
    if(y[0]=='1'){
        second_neg=1;
    }

    char s[10]={'\0'},p[10]={'\0'};
    int i;
    for(i=1;i<8;i++){
        s[i-1]=x[i];
        p[i-1]=y[i];
    }
```

```
    p[i]='\0';
    s[i]='\0';

    long long int first_dec,second_dec;
    first_dec=bin_dec(atoll(s));
    second_dec=bin_dec(atoll(p));

    if(first_neg){
        first_dec=first_dec*(-1);
    }
    if(second_neg){
        second_dec=second_dec*(-1);
    }

    long long int ans=first_dec+second_dec;

    printf("The sum of the two signed binary numbers is ");
    if(ans<0){
        printf("1");
        ans=ans*(-1);
    }
    else{
        printf("0");
    }
    printf("%lld.",dec_bin(ans));
}
```

Question 1: Take a decimal number from the command line and convert it into a binary number.

```
#include <stdio.h>
#include <stdlib.h>
#include "header.h"
int main(int argc, char* argv[]) {
    if(argc==2){
        printf("The argument supplied is %s.\n", argv[1]);
        long long int x=atoi(argv[1]);
        printf("The binary number of the given number is %d.",dec_bin(x));
    }
```

```c
    else if(argc>2){
        printf("Too many arguments supplied.\n");
    }
    else{
        printf("One argument expected.\n");
    }
    return 0;
}
```

Question 2: Take a binary number from the command line and convert it into a decimal number.

```c
#include <stdio.h>

#include <stdlib.h>

#include "header.h"

int main(int argc, char* argv[]) {

    if(argc==2){

        printf("The argument supplied is %s.\n", argv[1]);

        long long int x=atoi(argv[1]);

        printf("The decimal number of the given number is %d.\n",bin_dec(x));

    }

    else if(argc>2){

        printf("Too many arguments supplied.\n");

    }

    else{

        printf("One argument expected.\n");

    }

    return 0;

}
```

Question 3: Take a decimal number from the command line and display its factorial using recursion.

```c
#include <stdio.h>

#include <stdlib.h>

#include "header.h"

int main(int argc, char* argv[]) {

    if(argc==2){

        printf("The argument supplied is %s.\n", argv[1]);

        long long int x=atoi(argv[1]);

        printf("The Factorial of the given number is %d.\n",factorial(x));

    }

    else if(argc>2){

        printf("Too many arguments supplied.\n");

    }

    else{

        printf("One argument expected.\n");

    }

    return 0;

}
```

Question 4: Add two 8-digits unsigned binary given from command line.

```c
#include <stdio.h>

#include <stdlib.h>

#include "header.h"
```

```
int main(int argc, char* argv[]) {

    if(argc==3){

        printf("The arguments supplied are %s & %s.\n", argv[1], argv[2]);

        long long int x=atoi(argv[1]);

        long long int y=atoi(argv[2]);

        addition_unsigned_binary_numbers_U20CS001(x,y);

    }

    else if(argc>3){

        printf("Too many arguments supplied.\n");

    }

    else{

        printf("Two arguments expected.\n");

    }

    return 0;

}
```

Question 5: Add two 8-digits signed binary given from command line.

```
#include <stdio.h>

#include <stdlib.h>

#include "header.h"

int main(int argc, char* argv[]) {

    if(argc==3){

        printf("The arguments supplied are %s & %s.\n", argv[1], argv[2]);

        addition_signed_binary_numbers_U20CS001(argv[1], argv[2]);

    }

    else if(argc>3){
```

```c
        printf("Too many arguments supplied.\n");
    }
    else{
        printf("Two arguments expected.\n");
    }
    return 0;
}
```