Assignment-1

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Question.1) Take a decimal number from command line and convert into binary number.

Answer:

C file

```c
#include<stdio.h>
#include<stdlib.h>
#include "coa1_1.h"

int main(int argc, char *d[])
{
     long long int b = dtob(atoi(d[1]));

     printf("The binary number of %d is %lld.\n", atoi(d[1]),b);
}
```

Header file:

```c
long long int dtob(long long int decimal)
{
       long long int binary=0,x=1;
       while((x*2)<=decimal)
            x*=2;

       while(x>0)
       {
            long long int a=decimal/x;
            decimal-=a*x;
            x/=2;
            binary=binary*10+a;
       }
    return binary;
```

```
}
```

Output:

```
PS C:\Users\Dharmesh\Desktop\HEMANSHI\C Program> gcc coa1_1.c
PS C:\Users\Dharmesh\Desktop\HEMANSHI\C Program> ./a.exe 12
The binary number of 12 is 1100.
PS C:\Users\Dharmesh\Desktop\HEMANSHI\C Program> ./a.exe 123
The binary number of 123 is 1111011.
PS C:\Users\Dharmesh\Desktop\HEMANSHI\C Program> ./a.exe 1234
The binary number of 1234 is 10011010010.
PS C:\Users\Dharmesh\Desktop\HEMANSHI\C Program> ./a.exe 12345
The binary number of 12345 is 11000000111001.
PS C:\Users\Dharmesh\Desktop\HEMANSHI\C Program>
```

Question.2) Take a binary number from command line and convert into decimal number.

Answer:

C file:

```c
#include <stdio.h>
#include <stdlib.h>
#include "coa1_2.h"

int main(int argc, char *argv[])
{
    printf("The decimal number of %d is %d.\n",atoi(argv[1]),btod(atoi(argv[1]
)));
    return 0;
}
```

Header file:

```c
int btod(int x)
{
    int r,answer=0,i=1;
    while(x)
    {
        r=x%10;
        answer+=r*i;
```

```
        x=x/10;
        i=i*2;
    }
    return answer;
}
```

Output:

```
PS C:\Users\Dharmesh\Desktop\HEMANSHI\C Program> gcc coa1_2.c
PS C:\Users\Dharmesh\Desktop\HEMANSHI\C Program> ./a.exe 100
The decimal number of 100 is 4.
PS C:\Users\Dharmesh\Desktop\HEMANSHI\C Program> ./a.exe 1001
The decimal number of 1001 is 9.
PS C:\Users\Dharmesh\Desktop\HEMANSHI\C Program> ./a.exe 10011
The decimal number of 10011 is 19.
PS C:\Users\Dharmesh\Desktop\HEMANSHI\C Program>
```

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

Answer:

C file:

```
#include<stdio.h>
#include<stdlib.h>
#include "coa1_3.h"

int main(int argc, char *argv[])
{
    printf("The factorial of %d is %d.\n",atoi(argv[1]),facto(atoi(argv[1])));
    return 0;
}
```

Header file:

```
int facto(int x)
{
    if(x==0 || x==1)
    {
        return 1;
    }
    return x*facto(x-1);
}
```

Output:

```
PS C:\Users\Dharmesh\Desktop\HEMANSHI\C Program> gcc coa1_3.c
PS C:\Users\Dharmesh\Desktop\HEMANSHI\C Program> ./a.exe 5
The factorial of 5 is 120.
PS C:\Users\Dharmesh\Desktop\HEMANSHI\C Program> ./a.exe 6
The factorial of 6 is 720.
PS C:\Users\Dharmesh\Desktop\HEMANSHI\C Program> ./a.exe 8
The factorial of 8 is 40320.
PS C:\Users\Dharmesh\Desktop\HEMANSHI\C Program> ./a.exe 10
The factorial of 10 is 3628800.
PS C:\Users\Dharmesh\Desktop\HEMANSHI\C Program>
```

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

Answer:

Header file for both questions (4&5):

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


// Function for binary to decimal convertion

long long int btod(long long int x)
{
    long long int answer=0,r=0,i=1;
    while(x)
    {
        r=x%10;
        answer+=r*i;
        x=x/10;
        i=i*2;
    }
    return answer;
}


// Function for decimal to binary convertion
long long int dtob(long long int x)
{
    long long int y=x,answer=0,p=10,i=1;;
    long long int reminder;
```

```
    while(y)
    {
        reminder=y%2;
        if(y==x){
            i=1;
        }
        else{
            i=10*i;
        }
        answer+=i*reminder;
        y=y/2;
    }
    return answer;
}

// addition of Unsigned binary two numbers
void addition_of_unsigned_binary_numbers(long long int x, long long int y)
{
    long long int a,b;
    a=btod(x);
    b=btod(y);

    printf("%lld",dtob(a+b));

}


// addition of two signed binary numbers
void addition_of_signed_binary_numbers(char *x, char *y)
{
    int s1=0,s2=0;

    if(x[0]=='1')
    {
        s1=1;
    }
    if(y[0]=='1')
    {
        s2=1;
    }

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

```
    long long int p,q;
    p=btod(atoll(h));
    q=btod(atoll(j));

    if(s1)
    {
        p=p*(-1);
    }
    if(s2)
    {
        q=q*(-1);
    }

    long long int answer=p+q;

    if(answer<0)
    {
        printf("1");
        answer=answer*(-1);
    }
    else
    {
        printf("0");
    }
    printf("%lld",dtob(answer));
}
```

C file:

```
#include <stdio.h>
#include <stdlib.h>
#include "myheader.h"

int main (int argc, char *argv[])
{
    printf("The addition of two binary numbers %lld and %lld is ",atoll(argv[1
]),atoll(argv[2]));
    addition_of_unsigned_binary_numbers(atoll(argv[1]),atoll(argv[2]));
    return 0;
}
```

Output:

```
PS C:\Users\Dharmesh\Desktop\HEMANSHI\C Program> gcc coa1_4.c
PS C:\Users\Dharmesh\Desktop\HEMANSHI\C Program> ./a.exe 11001010 11110000
The addition of two binary numbers 11001010 and 11110000 is 110111010
PS C:\Users\Dharmesh\Desktop\HEMANSHI\C Program>
```

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

Answer:

C file:

```c
#include <stdio.h>
#include <stdlib.h>
#include"myheader.h"

int main(int argc, char *argv[])
{
    printf("The addition of two binary numbers %s and %s is ",argv[1],argv[2])
;
    addition_of_signed_binary_numbers(argv[1],argv[2]);
    return 0;
}
```

Output:

```
PS C:\Users\Dharmesh\Desktop\HEMANSHI\C Program> gcc coa1_5.c
PS C:\Users\Dharmesh\Desktop\HEMANSHI\C Program> ./a.exe 01011000 11001000
The addition of two binary numbers 01011000 and 11001000 is 010000
PS C:\Users\Dharmesh\Desktop\HEMANSHI\C Program> ./a.exe 11101100 01011100
The addition of two binary numbers 11101100 and 01011100 is 110000
PS C:\Users\Dharmesh\Desktop\HEMANSHI\C Program>
```