ASSIGNMENT-1

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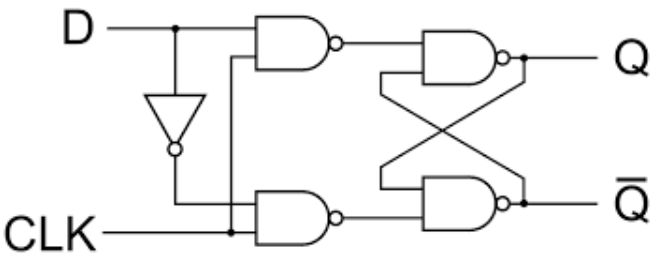

Figure 1: D flipflop circuit

1 QUESTIONS

1.1 Design a 3 bit up counter using D flipflop. Display the output on LEDs.

LOGIC FUNCTION

```
#include "Arduino.h"
int dff(int D)
{
  int S,R,Q=0,NQ=1,s,r,CK=1;
  S=D;
  R=!D;
  s=!(CK&&S);
  r=!(CK&&R);
  Q=!(s&&NQ);
  NQ=!(r&&Q);
  return Q;
}
```

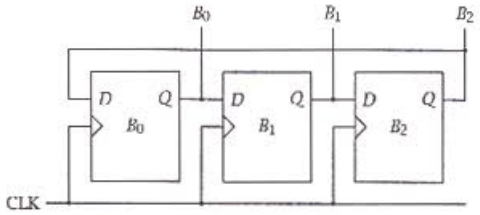

Figure 2: 3 bit Up Counter Circuit

PROGRAM

```
#include "Arduino.h"
#include "dff.h"
int A,B,C,E,F,G;
void setup()
{
  pinMode(6,OUTPUT);
  pinMode(7,OUTPUT);
  pinMode(8,OUTPUT);
  Serial.begin(9600);
}
void loop()
{
  A=0;
  B=0;
  C=0;
  for(int i=1;i<=8;i++)
  {
    E=dff(A);
    F=dff(B);
    G=dff(C);
    Serial.println(E);
    digitalWrite(6,E);
    digitalWrite(7,F);
    digitalWrite(8,G);
    delay(1000);
    if(i%4==0)
    A=!A;
    if (i%2==0)
    B=!B;

    C=!C;
  }
}
```

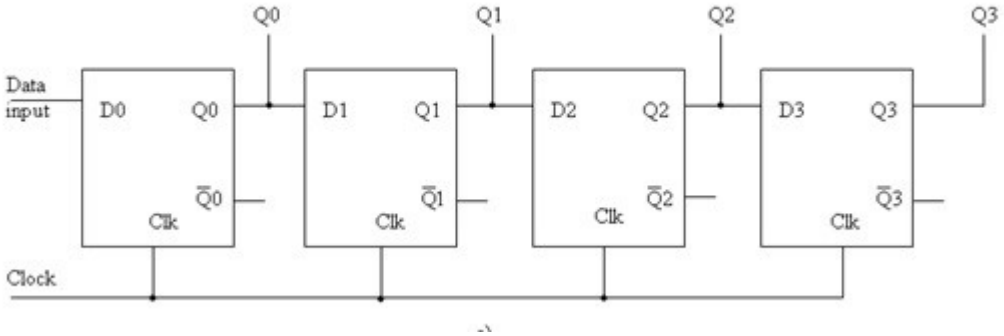

Figure 3: 4 bit Up Counter Circuit

1.2 Design a 4 bit up counter using D flipflop. Display the output on SSD using 7447 IC

PROGRAM

```
#include "Arduino.h"
#include "dff.h"
int A,B,C,E,F,G,H,Z;
void setup()
{
  pinMode(6,OUTPUT);
  pinMode(7,OUTPUT);
  pinMode(8,OUTPUT);
  pinMode(9,OUTPUT);
  Serial.begin(9600);
}
void loop()
{
  A=0;
  B=0;
  C=0;
  Z=0;
  for(int i=1;i<=10;i++)
  {
    E=dff(A);
    F=dff(B);
    G=dff(C);
    H=dff(Z);
    Serial.println(E);
    digitalWrite(6,H);
    digitalWrite(7,G);
    digitalWrite(8,F);
```

```
      digitalWrite(9,E);
      delay(1000);
      if(i%8==0)
      A=!A;
      if  (i%4==0)
      B=!B;
      if(i%2==0)
      C=!C;

      Z=!Z;
   }
}
```