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Answer to the question no - 1 (a)

Delay calculation:

Crystal frequency = 13.0592

DS89c420 clock per MC = 1

$13.0592 / 1 = 13.0592$

$\therefore MC = \frac{1}{13.0592}$

$= 0.077\ \mu s$

```
#include <reg52.h>
#define blink P2;
sbit sw = P2^6

void timedelay(void);
void main(void)
{
  unsigned char j;
```

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```
while (1)
{
    sw = 1;
    if (sw == 0)
    {
        blink = ~blink;
        for (j=0; j<30; j++)
        { timedelay();
        }
    }
    else
    {
        blink = ~blink;
        for (j=0; j<26; j++)
        {
            timedelay();
        }
    }
}
```

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```
void Timedelay (void)
{
    TMOD = 0x10;
    TL1  = 0xBA;
    TH1  = 0xFE
    TR1  = 1;
    while (TF1==0)
    { TR1=0;
      TF1=0;
    }
}
```

FEBA = 65210 in dec
65536 - 65210 = 326
326 × 0.077 = 25
30 × 25 = 750 ms
26 × 25 = 650 ms

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Answer to the question no- 1(b)

```
#include <reg51.h>
void main(void)
{
    unsigned char mydata[] = {0x35, 0x65
                              ,0x5F, 0x57H, 0xE7};
    unsigned char sum=0;
    unsigned char x;
    unsigned char chksumbyte;
    for (x=0; x<5; x++)
    {
        sum = sum + mydata[x];
    }
    chksumbyte = ~sum+1;
    chksumbyte = chksumbyte + sum;
    if (chksumbyte ==0)
    {
        P1 ='G';
    }
    else
    {   P1 = 'B';
    }
}
```

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Answer to the question no- 2(a)

For first Line:-

10 + 00 + 00 + 00 + 75 + 80 + 55 + 75 + 90 + 55 + 75
+ A0 + 55 + 7D + FA + 11 + 1C + 75 + 90 + AA = 771

After drop the carry = 71 H

71 = $(0111\ 0001)_2$

After 1's complement of 71 : 1000 1110

After 2's " " " : 1000 1110
+ 1
= 1000 1111
= 8F

It did not mated with checksum FF.

now, 771 + FF = 870

After drop the carry we did get 00

So data are corrupted.

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For 2nd line:

10 + 00 + 10 + 00 + 75 + 90 + AA + 75 + A0 + AA + 7D + FA + 11 + 1C + 80 + E4 + 7C + 2B + 7C + 4F = 800

After dropping the carry = 00

After 2's complement = 00

it didn't match with checksum

now,

800 + 03 = 803

After dropping the carry we did not get 00 so data are corrupted.

For 3rd line:

07 + 00 + 20 + 00 + DB + FE + DC + FF + DD + FG + 22 = 5D0

After dropping the carry = D0

" 2's complement = 30

it didn't match with check sum

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now

$$500 + 45 = 615$$

After dropping the carry we did not get 00. so data are corrupted.

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Answer to the question no - 2(b)

```
# include <reg51.h>

void main (void)
{
    A = 5;
    R1 = 0;
    unsigned char bedbyte;
    unsigned char w = A;
    unsigned char z = R1;

    w = w & 0x0F;
    w = w<<4;
    z = z & 0x0F;
    bedbyte = w | z;

    R2 = bedbyte;
}
```

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Answer to the question no-3(a)

To Build a sensor based automated locker system we need 1 Arduino UNO, 1 servo motor, 1 PIR sensor and 3 led with different color.

Now first connect the PIR sensor ~~with~~ to arduino's pin 2 and ~~power~~ 5V & GND pin. Then servo motor to Pin 9, 5V and GND pin. ~~Then~~ Then connect 3 led to 7, 8, 12

Now if any object came around to PIR sensor locker will be open by servo and green led will be on.

Appropriat figure and code given below.

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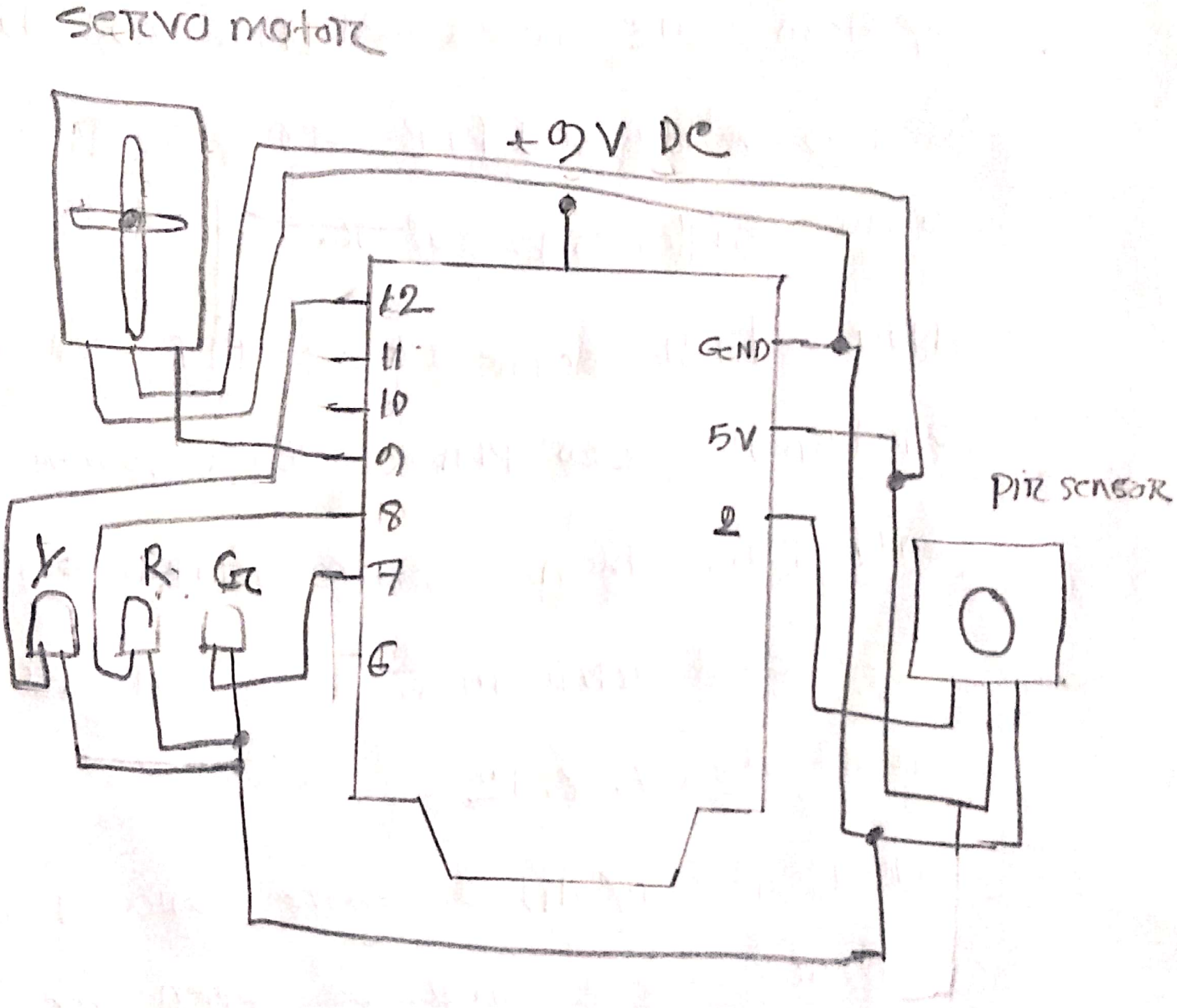

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```
#include<Servo.h>
#define ledG 7
#define ledR 8
#define ledY 12

Servo object_servo;
int interruptcount=0;

void setup()
{
  pinMode(ledG, OUTPUT);
  pinMode(LedR, OUTPUT);
  pinMode(LedY, OUTPUT);

  digitalwrite(ledG, LOW);
  digitalwrite(ledR, LOW);
  digitalwrite(ledY, LOW);

  serial begin(9600);
  object_servo.attach(9);
  attachInterrupt(0, change, RISING)
  object_servo.write(0);
}
```

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```
void loop()
{
  interrcounter++;
  digitalwrite(ledR, HIGH);
  digitalwrite(ledG, LOW);
  delay(300);
  digitalwrite(ledR, LOW);
  digitalwrite(ledG, HIGH);
  delay(300);
  if (interrcount == 10)
  {
    interrcount=0;
    digitalwrite(ledy, LOW);
    object_servo.write(0);
  }
}
void change()
{
  digitalwrite(ledy, HIGH);
  object_servo.write(90);
}
```

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Answer to the question no - 3(b)

```
        MOV  A, #DE7H
        SETB P1.5
        SETB P1.5
        SETB P1.5
        Mov  R5, #8
Here:   RRC  A
        MOV  P1.5, C
        DJNZ R5, Here
        SETB P1.5
        SETB P1.5
        SETB P1.5
```

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Answer to the question no- 4(a)

(a) T = 1/35 = 28.57 ms, the period of square wave.

(b) 1/2 of it for high and low portion of the pulse is 14.285 ms.

(c) 14/285 ÷ 1.085 us = 13165 and 65536 - 13165 = 52371 and in hex it is CC93.

(d) TL = 93 and TH = CC (hex).

```
        MOV  TMOD, # 01H
Again:  MOV  TL0, # 93 H
        MOV  TH0, # 0CC H
        SETB TR0
Back:   JNB  TF0, Back
        CLR  TR0
        CLR  P2.3
        [illegible]
        [illegible]
        CLR  TF0
        SJMP Again
```

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Answer to the question no-4(b)

```
        MOV   R0, #40H
        MOV   R2, #5
        CLR   A
        MOV   R5, A
Again:  ADD.  A, @R0
        DA    A
        JNC   Next
        INC   R5
Next:   INC   R0
        DJNZ  R2, Again
```