Instituto Politécnico Nacional

Escuela Superior de Computo

Materia:

Introducción a los microcontroladores.

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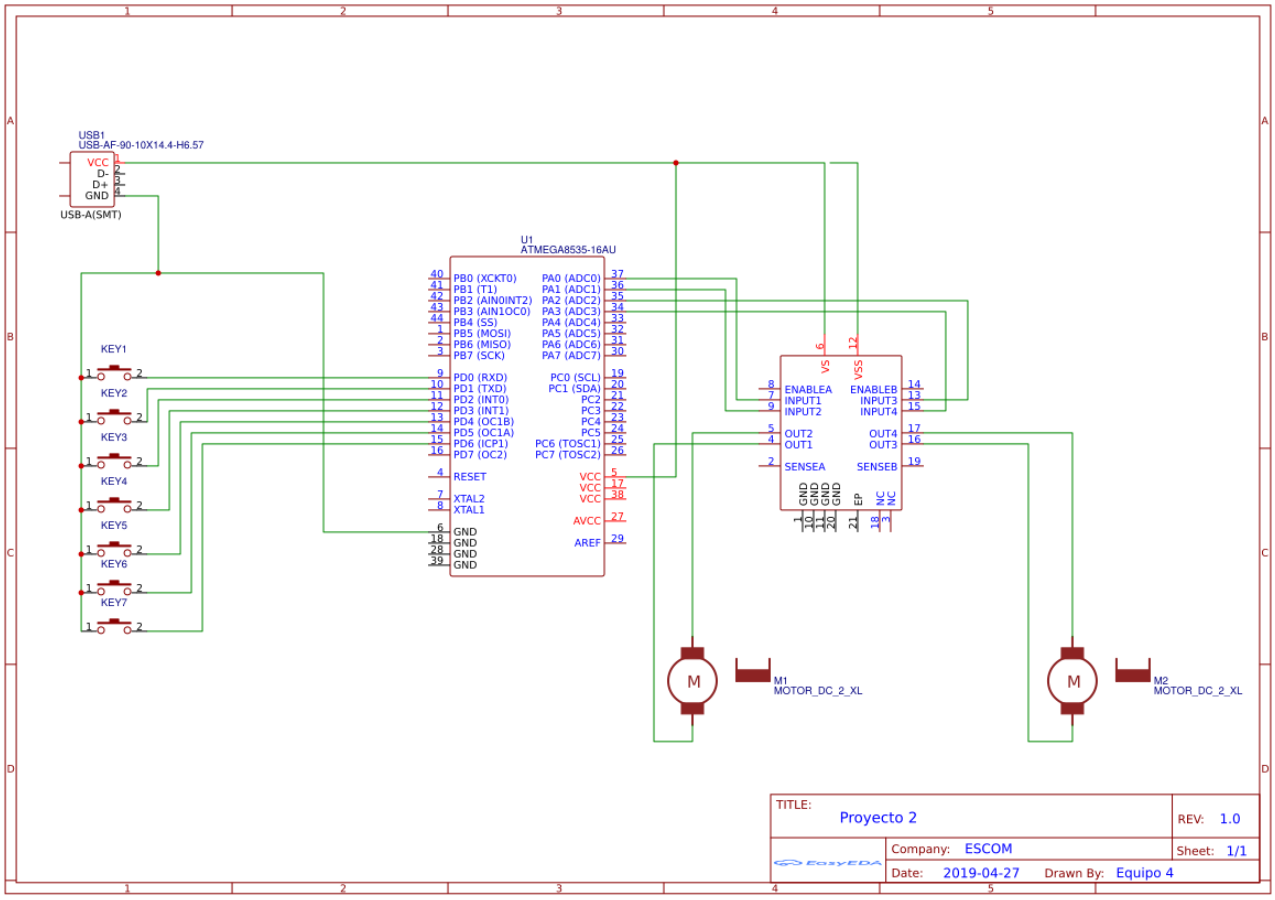
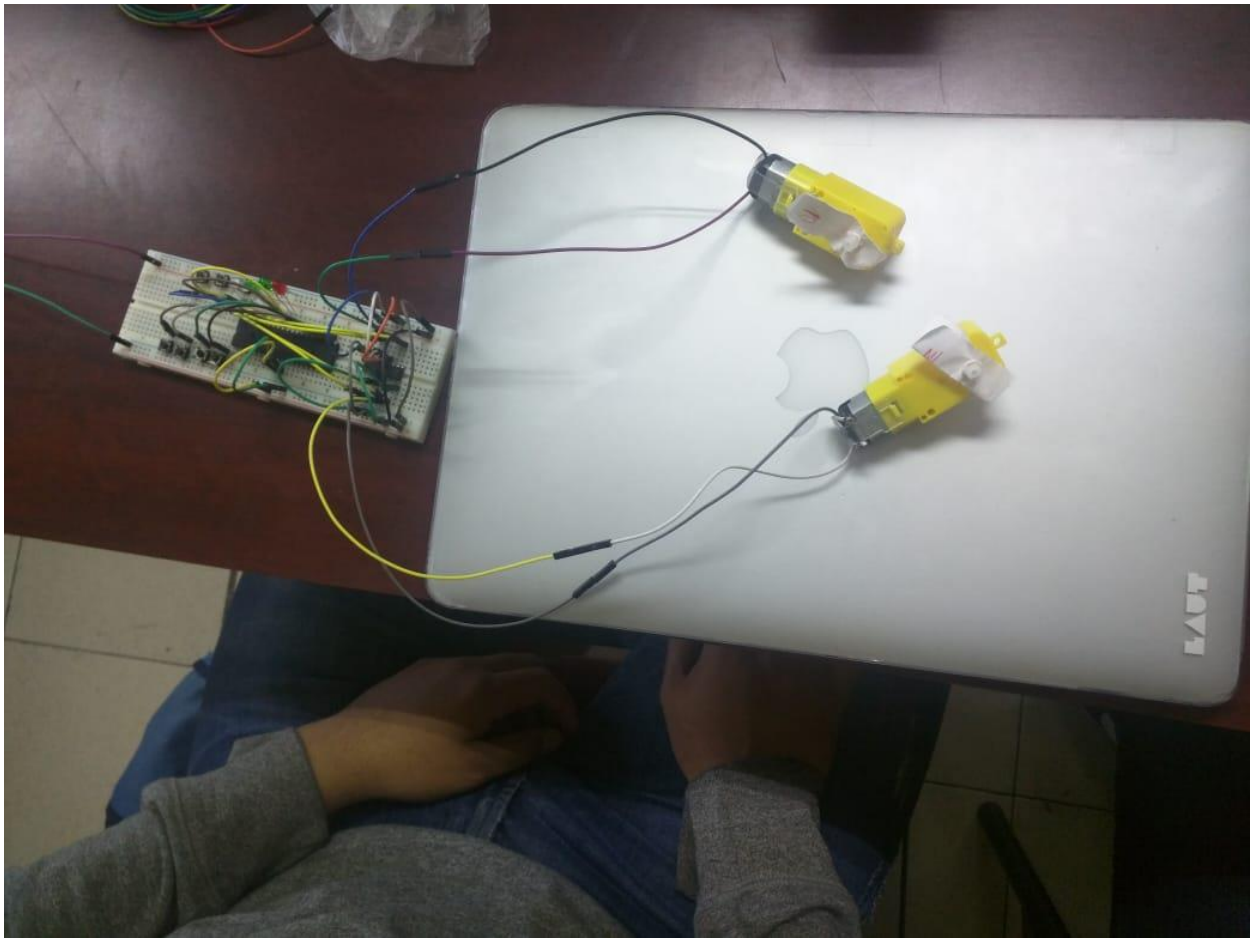
Proyecto 2


USB1
USB-AF-90-10X14.4-H6.57
VCC
D-
D+
GND
USB-A(SMT)
U1
ATMEGA8535-16AU
PB0 (XCKT0)
PB1 (T1)
PB2 (AIN0INT2)
PB3 (AIN1OC0)
PB4 (SS)
PB5 (MOSI)
PB6 (MISO)
PB7 (SCK)
PD0 (RXD)
PD1 (TXD)
PD2 (INT0)
PD3 (INT1)
PD4 (OC1B)
PD5 (OC1A)
PD6 (ICP1)
PD7 (OC2)
RESET
XTAL2
XTAL1
GND
PA0 (ADC0)
PA1 (ADC1)
PA2 (ADC2)
PA3 (ADC3)
PA4 (ADC4)
PA5 (ADC5)
PA6 (ADC6)
PA7 (ADC7)
PC0 (SCL)
PC1 (SDA)
PC2
PC3
PC4
PC5
PC6 (TOSC1)
PC7 (TOSC2)
VCC
AVCC
AREF
KEY1
KEY2
KEY3
KEY4
KEY5
KEY6
KEY7
ENABLEA
INPUT1
INPUT2
OUT2
OUT1
SENSEA
ENABLEB
INPUT3
INPUT4
OUT4
OUT3
SENSEB
M1
MOTOR_DC_2_XL
M2
MOTOR_DC_2_XL
TITLE:
Proyecto 2
REV: 1.0
Company: ESCOM
Sheet: 1/1
Date: 2019-04-27
Drawn By: Equipo 4



```
/*****************************************************
This program was created by the
CodeWizardAVR V2.60 Evaluation
Automatic Program Generator
© Copyright 1998-2012 Pavel Haiduc, HP InfoTech s.r.l.
http://www.hpinfotech.com

Project :
Version :
Date    : 6/3/2019
Author  : Equipo 4
```

```
Company :
Comments:


Chip type               : ATmega8515
Program type            : Application
AVR Core Clock frequency: 1.000000 MHz
Memory model            : Small
External RAM size       : 0
Data Stack size         : 128
*****************************************************/

#include <mega8515.h>

#include <io.h>
#include <delay.h>
#define boton6 PINC.6
#define boton5 PINC.5
#define boton4 PINC.4
#define boton3 PINC.3
#define boton2 PINC.2
#define boton1 PINC.1
#define boton PINC.0

bit botonp;
bit botonp1;
bit botonp2;
bit botonp3;
bit botonp4;
bit botonp5;
bit botonp6;

bit botona;
bit botonb;
bit botonc;
bit botond;
bit botone;
bit botonf;
bit botong;

int control=0, control2=0, control3=0, i=0, control4=0;
int movimientos[10]={0,0,0,0,0,0,0,0,0,0};

void mover( int movimientos[] ){
   for(i=0; i<10; i++){
        if (movimientos[i]==0){

        delay_ms(500);

        }
        else if(movimientos[i]==1){  //Adelante
            PORTA=0x0A;
            delay_ms(500);
        }else if( movimientos[i]==2){   //Atras
            PORTA=0x0A;

            delay_ms(500);
        }else if( movimientos[i]==3){   //A la derecha
            PORTA=0x08;

            delay_ms(500);
```

```
        }else if( movimientos[i]==4){   //A la izquierda
            PORTA=0x02;

            delay_ms(500);
        }
         //BOTON PAUSA
         if (boton6==0)
         botong=0;
         else
         botong=1;
            if ((botonp6==1)&&(botong==0)) //hubo cambio de flanco de 1 a 0
            {
            PORTA=0x00;

                while (control4<1)
                      {
                         //BOTON GO
                         if (boton4==0)
                         botone=0;
                         else
                         botone=1;
                         if ((botonp4==1)&&(botone==0)) //hubo cambio de flanco de 1 a 0
                         {
                            control4=1;
                         }
                         if ((botonp4==0)&&(botone==1)) //hubo cambio de flanco de 0 a 1
                         delay_ms(30);
                                botonp4=botone;
                             }
                       control4=0;
                   }
                if ((botonp6==0)&&(botong==1)) //hubo cambio de flanco de 0 a 1
                delay_ms(5);
                botonp6=botong;
          }
          PORTA=0x00;
       }

       void main(void)
       {
       // Declare your local variables here

       // Input/Output Ports initialization
       // Port A initialization
       // Function: Bit7=In Bit6=In Bit5=In Bit4=In Bit3=Out Bit2=Out Bit1=Out Bit0=Out
       DDRA=(0<<DDA7) | (0<<DDA6) | (0<<DDA5) | (0<<DDA4) | (1<<DDA3) | (1<<DDA2) | (1<<DDA1) | (1<<DDA0);
       // State: Bit7=T Bit6=T Bit5=T Bit4=T Bit3=0 Bit2=0 Bit1=0 Bit0=0
       PORTA=(0<<PORTA7) | (0<<PORTA6) | (0<<PORTA5) | (0<<PORTA4) | (0<<PORTA3) | (0<<PORTA2) | (0<<PORTA1) | (0<<PORTA0);

       // Port B initialization
       // Function: Bit7=In Bit6=In Bit5=In Bit4=In Bit3=In Bit2=In Bit1=In Bit0=In
       DDRB=(0<<DDB7) | (0<<DDB6) | (0<<DDB5) | (0<<DDB4) | (0<<DDB3) | (0<<DDB2) | (0<<DDB1) | (0<<DDB0);
       // State: Bit7=T Bit6=T Bit5=T Bit4=T Bit3=T Bit2=T Bit1=T Bit0=T
```

```
126.       PORTB=(0<<PORTB7) | (0<<PORTB6) | (0<<PORTB5) | (0<<PORTB4) | (0<<PORTB3)
    | (0<<PORTB2) | (0<<PORTB1) | (0<<PORTB0);
127.
128.       // Port C initialization
129.       // Function: Bit7=In Bit6=In Bit5=In Bit4=In Bit3=In Bit2=In Bit1=In Bit0=
    In
130.       DDRC=(0<<DDC7) | (0<<DDC6) | (0<<DDC5) | (0<<DDC4) | (0<<DDC3) | (0<<DDC2)
     | (0<<DDC1) | (0<<DDC0);
131.       // State: Bit7=P Bit6=P Bit5=P Bit4=P Bit3=P Bit2=P Bit1=P Bit0=P
132.       PORTC=(1<<PORTC7) | (1<<PORTC6) | (1<<PORTC5) | (1<<PORTC4) | (1<<PORTC3)
    | (1<<PORTC2) | (1<<PORTC1) | (1<<PORTC0);
133.
134.       // Port D initialization
135.       // Function: Bit7=In Bit6=In Bit5=In Bit4=In Bit3=In Bit2=In Bit1=In Bit0=
    In
136.       DDRD=(0<<DDD7) | (0<<DDD6) | (0<<DDD5) | (0<<DDD4) | (0<<DDD3) | (0<<DDD2)
     | (0<<DDD1) | (0<<DDD0);
137.       // State: Bit7=T Bit6=T Bit5=T Bit4=T Bit3=T Bit2=T Bit1=T Bit0=T
138.       PORTD=(0<<PORTD7) | (0<<PORTD6) | (0<<PORTD5) | (0<<PORTD4) | (0<<PORTD3)
    | (0<<PORTD2) | (0<<PORTD1) | (0<<PORTD0);
139.
140.       // Port E initialization
141.       // Function: Bit2=In Bit1=In Bit0=In
142.       DDRE=(0<<DDE2) | (0<<DDE1) | (0<<DDE0);
143.       // State: Bit2=T Bit1=T Bit0=T
144.       PORTE=(0<<PORTE2) | (0<<PORTE1) | (0<<PORTE0);
145.
146.       // Timer/Counter 0 initialization
147.       // Clock source: System Clock
148.       // Clock value: Timer 0 Stopped
149.       // Mode: Normal top=0xFF
150.       // OC0 output: Disconnected
151.       TCCR0=(0<<PWM0) | (0<<COM01) | (0<<COM00) | (0<<CTC0) | (0<<CS02) | (0<<CS
    01) | (0<<CS00);
152.       TCNT0=0x00;
153.       OCR0=0x00;
154.
155.       // Timer/Counter 1 initialization
156.       // Clock source: System Clock
157.       // Clock value: Timer1 Stopped
158.       // Mode: Normal top=0xFFFF
159.       // OC1A output: Disconnected
160.       // OC1B output: Disconnected
161.       // Noise Canceler: Off
162.       // Input Capture on Falling Edge
163.       // Timer1 Overflow Interrupt: Off
164.       // Input Capture Interrupt: Off
165.       // Compare A Match Interrupt: Off
166.       // Compare B Match Interrupt: Off
167.       TCCR1A=(0<<COM1A1) | (0<<COM1A0) | (0<<COM1B1) | (0<<COM1B0) | (0<<WGM11)
    | (0<<WGM10);
168.       TCCR1B=(0<<ICNC1) | (0<<ICES1) | (0<<WGM13) | (0<<WGM12) | (0<<CS12) | (0<
    <CS11) | (0<<CS10);
169.       TCNT1H=0x00;
170.       TCNT1L=0x00;
171.       ICR1H=0x00;
172.       ICR1L=0x00;
173.       OCR1AH=0x00;
174.       OCR1AL=0x00;
175.       OCR1BH=0x00;
176.       OCR1BL=0x00;
```

```
177.
178.       // Timer(s)/Counter(s) Interrupt(s) initialization
179.       TIMSK=(0<<TOIE1) | (0<<OCIE1A) | (0<<OCIE1B) | (0<<TICIE1) | (0<<TOIE0) |
   (0<<OCIE0);
180.
181.       // External Interrupt(s) initialization
182.       // INT0: Off
183.       // INT1: Off
184.       // INT2: Off
185.       MCUCR=(0<<SRE) | (0<<SRW10) | (0<<ISC11) | (0<<ISC10) | (0<<ISC01) | (0<<I
   SC00);
186.       EMCUCR=(0<<SRL2) | (0<<SRL1) | (0<<SRL0) | (0<<SRW01) | (0<<SRW00) | (0<<S
   RW11) | (0<<ISC2);
187.
188.       // USART initialization
189.       // USART disabled
190.       UCSRB=(0<<RXCIE) | (0<<TXCIE) | (0<<UDRIE) | (0<<RXEN) | (0<<TXEN) | (0<<U
   CSZ2) | (0<<RXB8) | (0<<TXB8);
191.
192.       // Analog Comparator initialization
193.       // Analog Comparator: Off
194.       ACSR=(1<<ACD) | (0<<ACBG) | (0<<ACO) | (0<<ACI) | (0<<ACIE) | (0<<ACIC) |
   (0<<ACIS1) | (0<<ACIS0);
195.
196.       // SPI initialization
197.       // SPI disabled
198.       SPCR=(0<<SPIE) | (0<<SPE) | (0<<DORD) | (0<<MSTR) | (0<<CPOL) | (0<<CPHA)
   | (0<<SPR1) | (0<<SPR0);
199.
200.
201.       while (1)
202.             {
203.
204.                //BOTON GO
205.                if (boton4==0)
206.                botone=0;
207.                else
208.                botone=1;
209.                if ((botonp4==1)&&(botone==0)) //hubo cambio de flanco de 1 a 0
210.                {
211.                   control=3;
212.                }
213.                if ((botonp4==0)&&(botone==1)) //hubo cambio de flanco de 0 a 1
214.                delay_ms(30);
215.                botonp4=botone;
216.
217.                //BOTON CLEAR
218.                if (boton5==0)
219.                botonf=0;
220.                else
221.                botonf=1;
222.                   if ((botonp5==1)&&(botonf==0)) //hubo cambio de flanco de 1 a
   0
223.                   {
224.                   control=1;
225.                   }
226.                if ((botonp5==0)&&(botonf==1)) //hubo cambio de flanco de 0 a 1
227.                delay_ms(30);
228.                botonp5=botonf;
229.
230.                   if(control==0)
```

```
231.                     {
232.                         while(control2<1){
233.                             //Avanza adelante
234.                             if (boton==0)
235.                             botona=0;
236.                             else
237.                             botona=1;
238.                                 if ((botonp==1)&&(botona==0)) //hubo cambio de fla
    nco de 1 a 0
239.                                 {
240.                                 
241.                                  movimientos[control]=1;
242.                                  control++;
243.                                 }
244.                             if ((botonp==0)&&(botona==1)) //hubo cambio de flanco
    de 0 a 1
245.                             delay_ms(30);
246.                             botonp=botona;
247.                              //Boton atras
248.                             if (boton1==0)
249.                             botonb=0;
250.                             else
251.                             botonb=1;
252.                                 if ((botonp1==1)&&(botonb==0)) //hubo cambio de fl
    anco de 1 a 0
253.                                 {
254.                                 
255.                                 movimientos[control]=2;
256.                                 control++;
257.                                 }
258.                             if ((botonp1==0)&&(botonb==1)) //hubo cambio de flanco
     de 0 a 1
259.                             delay_ms(30);
260.                             botonp1=botonb;
261.                             
262.                             //Avanza derecha
263.                             if (boton2==0)
264.                             botonc=0;
265.                             else
266.                             botonc=1;
267.                                 if ((botonp2==1)&&(botonc==0)) //hubo cambio de fl
    anco de 1 a 0
268.                                 {
269.                                 
270.                                 movimientos[control]=3;
271.                                 control++;
272.                                 }
273.                             if ((botonp2==0)&&(botonc==1)) //hubo cambio de flanco
     de 0 a 1
274.                             delay_ms(30);
275.                             botonp2=botonc;
276.                             
277.                             //Avanza izquierda
278.                             if (boton3==0)
279.                             botond=0;
280.                             else
281.                             botond=1;
282.                                 if ((botonp3==1)&&(botond==0)) //hubo cambio de fl
    anco de 1 a 0
283.                                 {
284.                                 
```

```
                                movimientos[control]=4;
                               control++;
                               }
                            if ((botonp3==0)&&(botond==1)) //hubo cambio de flanco de 0 a 1
                            delay_ms(30);
                            botonp3=botond;

                            if(control==10){
                               control2=1;
                               control=10;
                            }
                        }
                    control2=0;
                    }else if(control==1){

                        while(control3<8){

                             movimientos[control]=0;
                            control3++;
                        }
                        control3=0;
                        control=0;
                    }else if(control==3){
                        mover(movimientos);
                        control=10;
                    }


            }
      }
```