

# Hydroplant



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## Abstract

In the following project, a program was carried out with MPLAB X and a PIC16F877A for a plot of plants which helps the farmer to see how the soil humidity and the ambient temperature are to better maintain his crop.

**Keywords:** *MPLAB, Plants, Farmer, Humidity*

## Introduction.

The project that is presented is a water irrigator for plots of plants or crops, which with the climatographic conditions in places that have high temperatures. This project seeks to help peasants and farmers to control the irrigation of their plants when high temperatures occur that can affect crops or crops in any area, by

being able to configure the irrigation time helps to have an optimal level of water in each one of their plots.

## Methodology.

To do the following project, the problem that occurs in places with high temperatures was planned. With the help of a PIC16F877A a code was made with which a humidity sensor, a temperature sensor and a 16x2 LCD, thanks to this project those sensed levels, the farmer can observe that if the soil humidity is  $\geq 30\%$  and the temperature is  $\geq 34^{\circ}\text{C}$ , the farmer with the help of some buttons can control the irrigation time for his farm, and thus can have an updated data on soil moisture and thus have in good conditions for cultivation.

## Results.

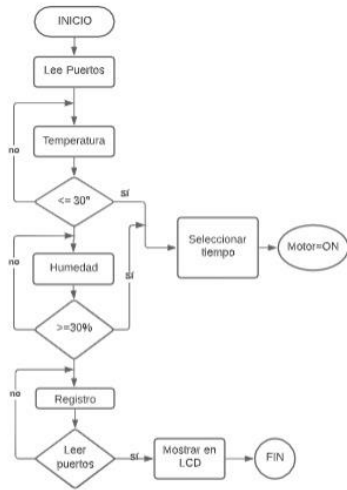


Image 1. Flow chart

```

void main()
{
    INI();
    while(1)
    {
        Boton_Aumento = PORTBbits.RB0;
        Boton_Decremento = PORTBbits.RB1;
        Boton_Aceptar = PORTBbits.RB2;

        switch (ESTADO)
        {
            case 0:
                Lcd_Command(LCD_CLEAR);
                Lcd_ConstText (1, 1, "TIMER");
                Lcd_ConstText (2, 1, "TIEMPO:");
                Lcd_ConstText (2, 11, "SEG");
                ESTADO = 1;
                break;
        }
    }
}
  
```

Image 2. LCD

```

if (channel == 0b01000000)
{
    SENSOR1 = (VOLTAJE*100);
    sprintf(SEN1, "%i", SENSOR1);
}

if (channel == 0b01001000)
{
    SENSOR2 = (VOLTAJE*100);
    sprintf(SEN2, "%i", SENSOR2);
}
}
  
```

Image 3. Sensors

```

if (Boton_Aumento == 0)
{
    __delay_ms(250);
    TIEMPO = TIEMPO + 1;
    if (TIEMPO > 60)
    {
        TIEMPO = 0;
    }
    sprintf(TIEM, "%i", TIEMPO);
    Lcd_ConstText (2, 9, TIEM);
}
  
```

Image 4. Increase Button

```

if (Boton_Decremento == 0)
{
    __delay_ms(250);
    TIEMPO = TIEMPO - 1;
    if (TIEMPO < 0)
    {
        TIEMPO = 60;
    }
    sprintf(TIEM, "%i", TIEMPO);
    Lcd_ConstText (2, 9, TIEM);
}
  
```

Image 5. decrement Button

```

if (Boton_Aceptar == 0)
{
    __delay_ms(250);
    ESTADO = 2;
}
  
```

Image 6. Start Button

```

if (SENSOR1 >= 30)
{
    PORTDbits.RD0 = 1;
    for (int i = 0; i < TIEMPO; i++)
    {
        __delay_ms(1000);
    }
    PORTDbits.RD0 = 0;
}

if (SENSOR2 <= 30)
{
    PORTDbits.RD0 = 1;
    for (int i = 0; i < TIEMPO; i++)
    {
        __delay_ms(1000);
    }
    PORTDbits.RD0 = 0;
}

break;
}

```

**Image 7. Sensor initialization**

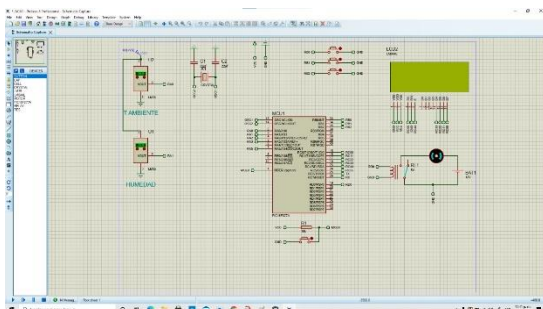
```

case 2:
    Lcd_Command(LCD_CLEAR);
    Lcd_ConstText (1, 5, "PROCESO OK");
    ESTADO = 3;
    break;

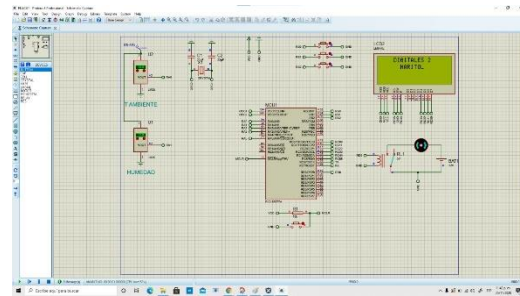
case 3:
    search_channel(0b01000000);
    search_channel(0b01001000);
    Lcd_ConstText (2, 1, "TEMPERATURA: ");
    Lcd_ConstText (2, 15, SEN1);
    Lcd_ConstText (3, 1, "HUMEDAD: ");
    Lcd_ConstText (3, 11, SEN2);

```

**Image 8. Display Demonstration.**



**Image 9. Project Assembly.**



**Image 10. Test Run.**

## Conclusions.

- Thanks to the results that are presented by obtaining them from the sensors, it reduces the work of farmers or peasants and helps better water management.
- The system that is implemented reduces water consumption and helps crop production as it helps reduce crop death due to lack of water. Thanks to a time, automation it helps to have a low water consumption and helps to minimize costs.
- Thanks to the advancement of technology, it helps to measure soil moisture at low cost.

## BIBLIOGRAPHY.

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- MicroChip. (2003), from <https://ww1.microchip.com/download/en/devicedoc/39582b.pdf>

GitHub link.

<https://github.com/Luis23310/Proyect>  
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