# Experiment 6

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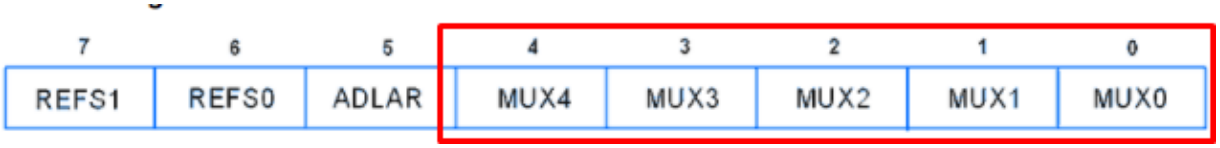
## Question 1 - part one

**Show a temperature in lcd with module LM35**

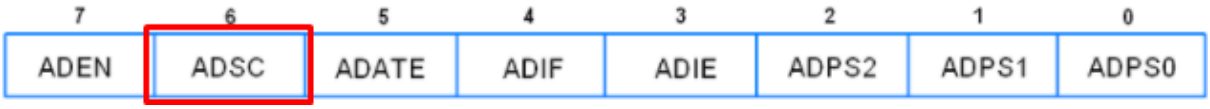
**First we need analog to digital convert -> For setup this in atmega16 we need use these steps:**

**1- Enable ADC with ADCSRA Register and bit ADEN**

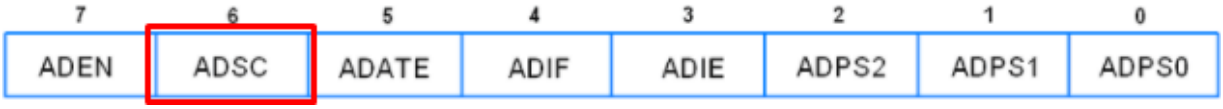

2- **Use ADMUX to set which analog port to use:**



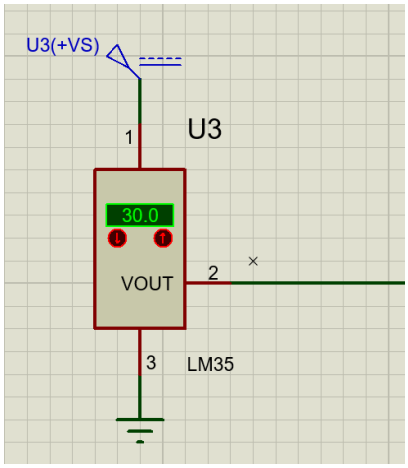

3- **Start conversion with enable ADSC in ADCSRA Register**



4- **Wait until the conversion to check this we need use ADSC bit in ADCSRA Register**




**Second we use a bottom circuit that can increase or**




**decrease temperature:**

**Note: Each step of LM35 is 10mv and also we know**

$$10mv = \frac{Vref}{1024} \rightarrow \text{Vref} = 10.24$$

**atmega16 have 1024 resolution so use this formula:**

**Note2: Result video of project attached in directory.**

**References:**


- **Avr Atmega Atmega1632 Adc | Avr Atmega**
- **Avr Atmega Lm35 Temperature Sensor Interfacing With Atmega1632 | ...**

# Question 1 - part two

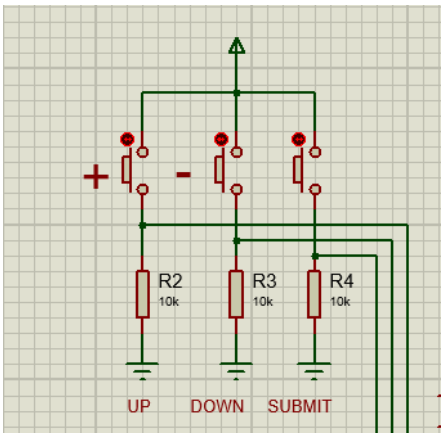
**Add a cooling system when the temperature gets higher than the custom value.**

**In this part first we need to initialize a sensor temp when the microcontroller runs, and for this we use a 3 push button:**

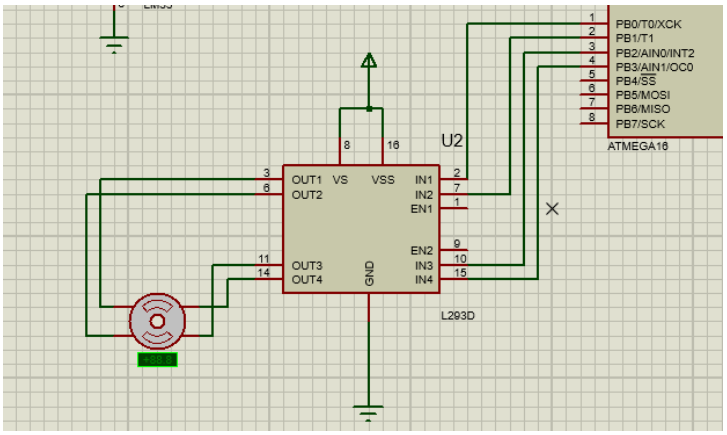
**UP -> Increase default temp sensor**

**value DOWN -> Decrease value**

**Submit -> Submit and start system**




**Second we need to add a stepper motor that only starts when the LM35 gets higher than the sensor value (initialized in the first step)**



**Note: Result video of project attached in directory.**