Labsheet 3-B

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Lab 3 Hardware Exercise

Name:
Student ID:
Section (Day/Time):

Lab 3 Hardware Exercise

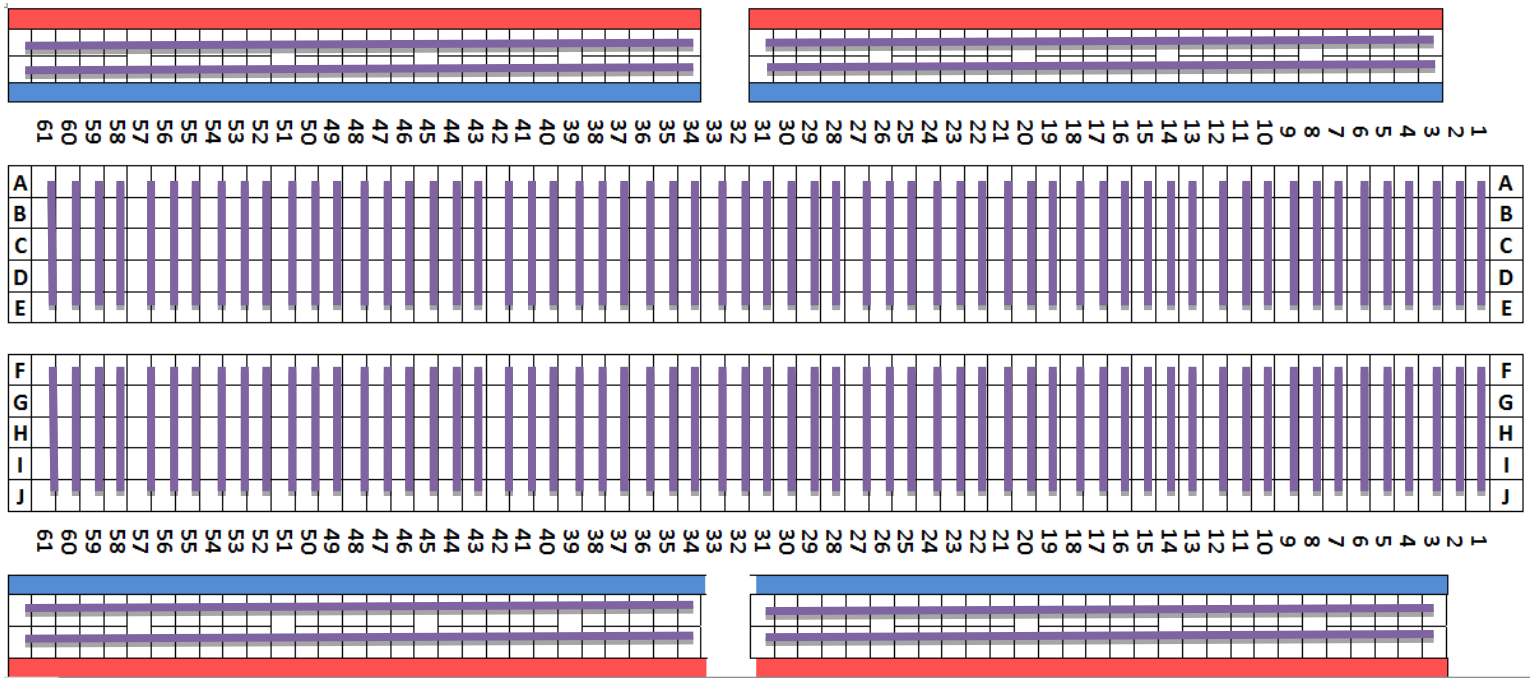
In this tutorial we will guide you through the steps to build your first hardware circuit, it is a simple circuit based on 16F84A PIC which drives a 7-segment display to show the numbers from 0 to 9 continuously. **The PIC is already programmed and placed for you!**

This basic circuit uses the following components (you should have read the "Guide to Hardware I" by now and familiarized yourself with all the hardware components listed before coming to the lab!):

We will use a 16F84A PIC, A 7805 regulator, two 22pF capacitors, a 7-segment display and required resistors!

Since this is your first hands-on experience with hardware, and to ensure that the circuit works with you we will specify all the interconnects you need, this is necessary for many students have no basic foundation in electronics or basic circuit construction.

The Breadboard layout below is to refresh your knowledge about breadboard structure: (The line in Purple represents that these spaces are internally one node)



Follow the following steps to construct the circuit

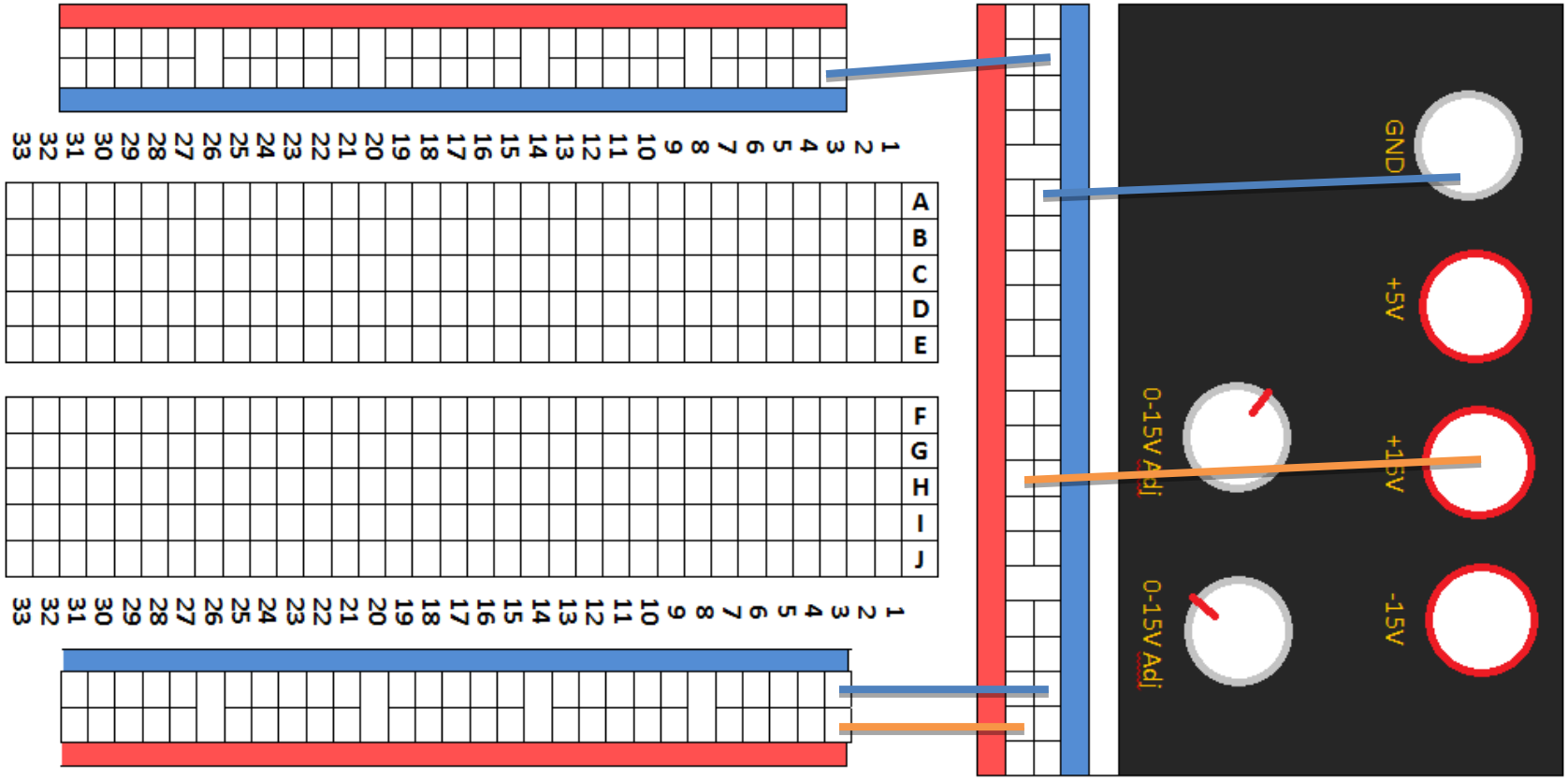
Step 1: Ensure that the power connections are as follows, We will use the +15V adjustable power knob as Input power source to the regulator, place the knob at the direction indicated, this means an approximate power of 7 – 8 volts!

In this experiment we will use the following color coding:

Blue: to connect to ground!

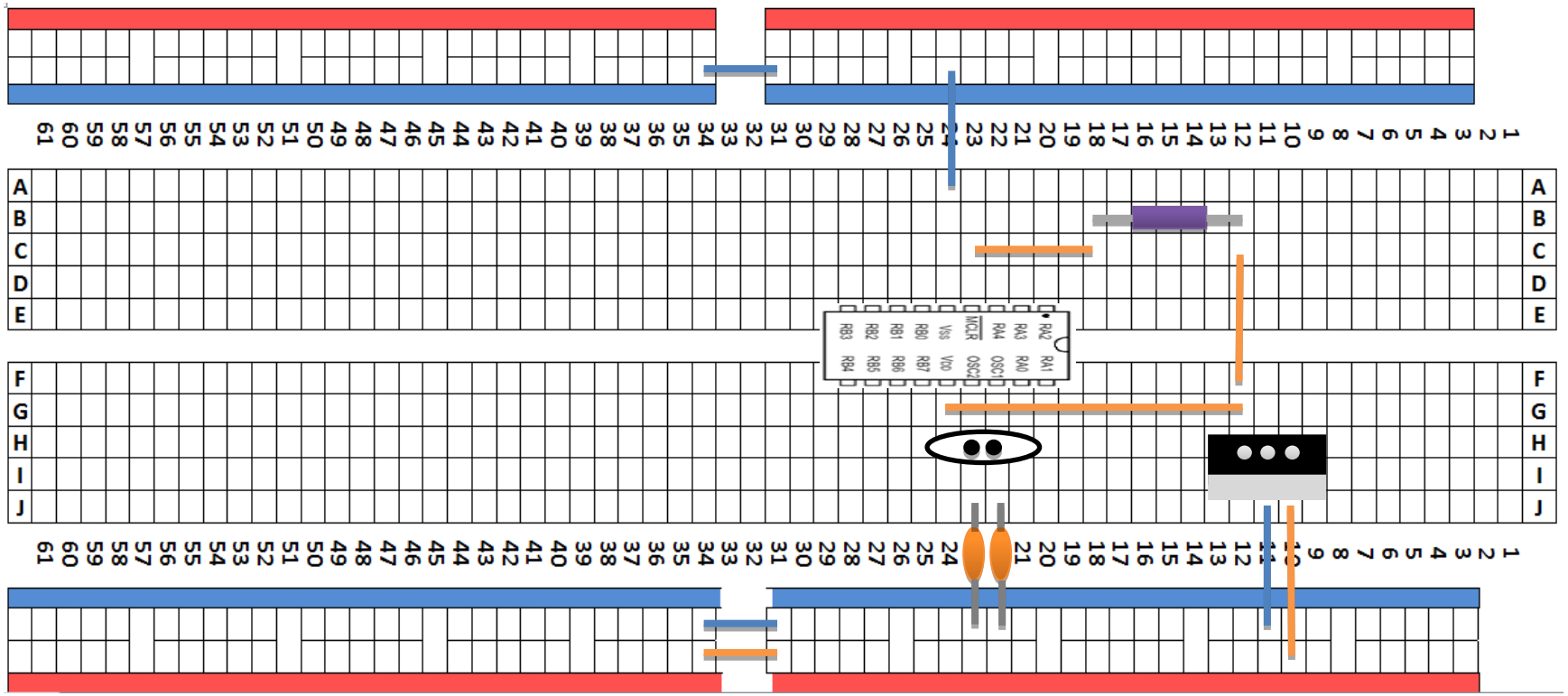
Orange: To connect to power supply

Green: to connect between all other components!

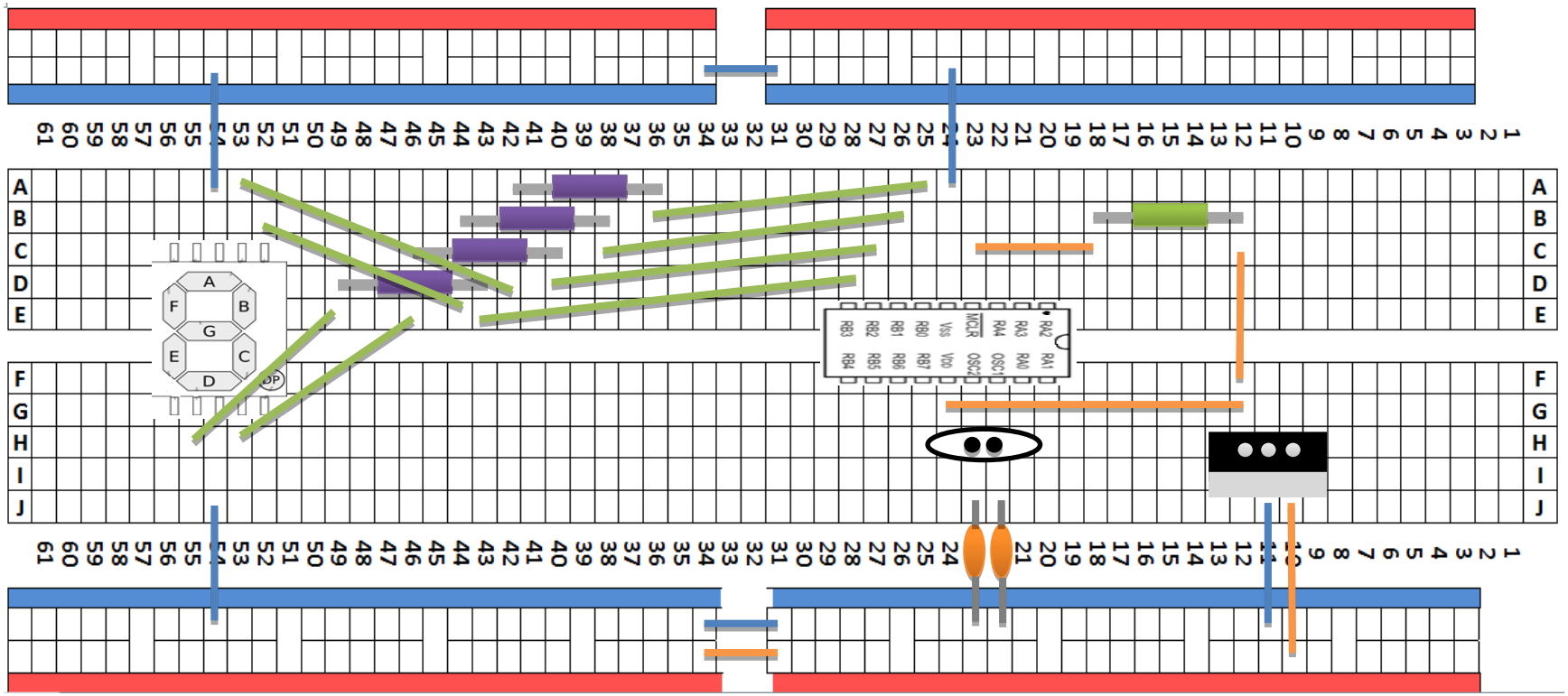


Step 2: Interfacing all the necessary components to power up the PIC and provide oscillation! Connect the 7805 regulator, the 4MHz oscillator (with the required 22pF capacitors) and the MCLR pin as follows:

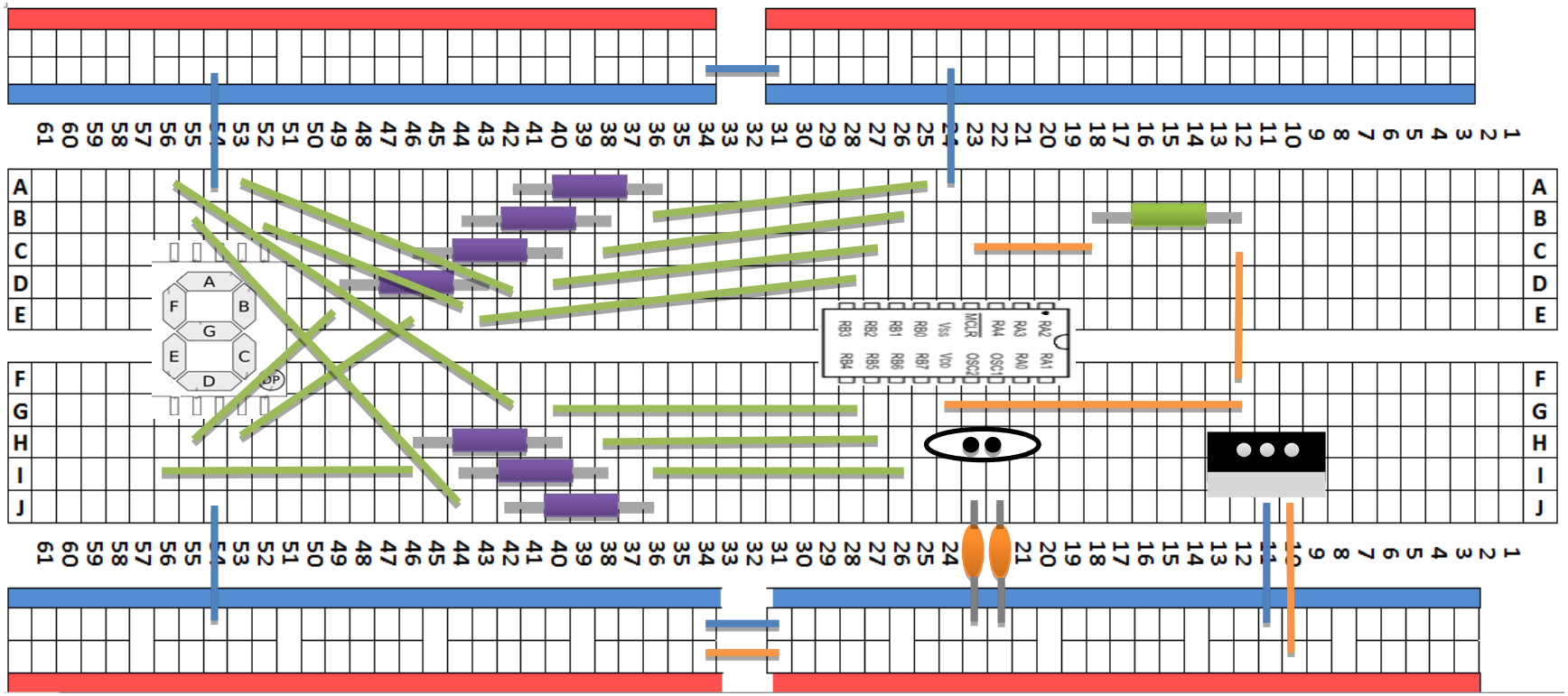
The dots inside the regulator and the oscillator indicate that the pins are directly below them such that you will know where exactly to place them!

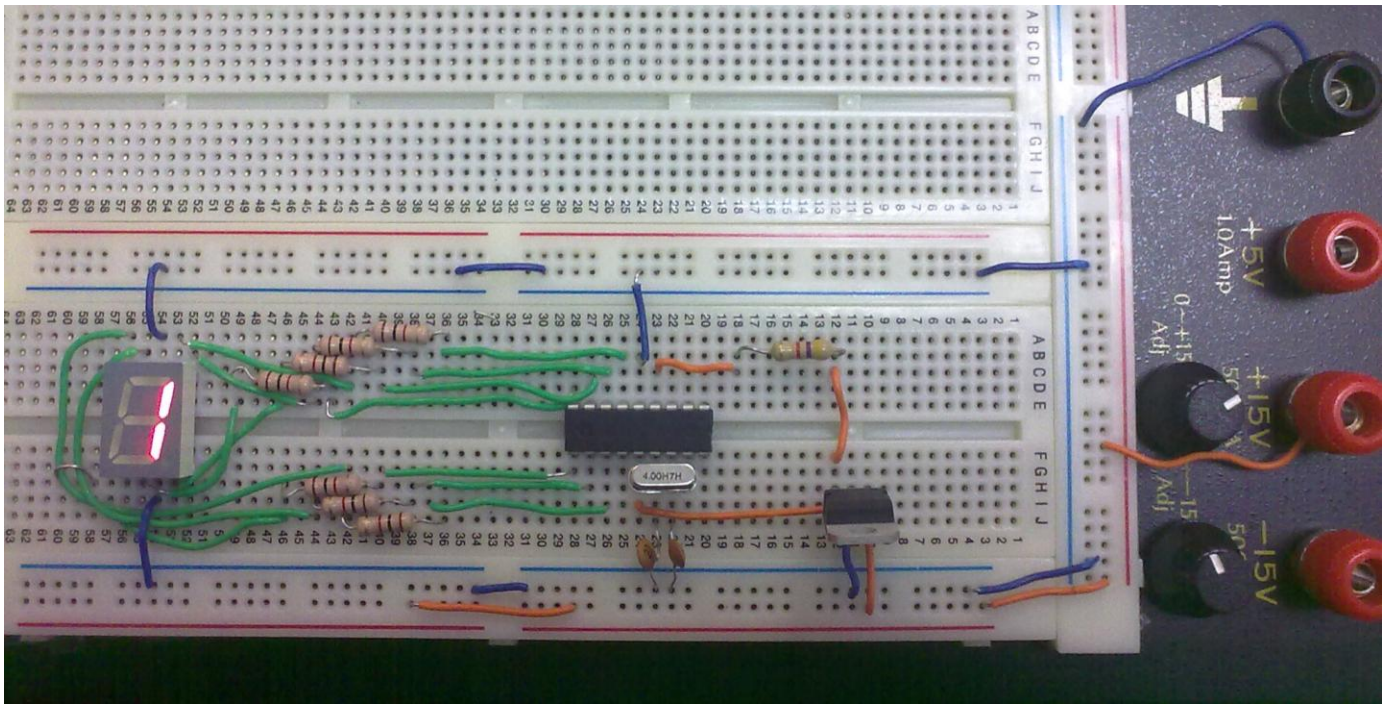


Step 3: Interfacing RB0 – RB3 to segments A to D! Note that the resistors are needed to limit the current to the LEDs making up the 7-segment such that it will not burn out (Note: some 7-segments have high internal resistors values and do not necessarily require external resistors!)



Step 4: Interfacing RB4 – RB6 to segments E to G!





Circuit on breadboard

Your circuit on breadboard should be similar to this picture

Ask your engineer to check the circuit.