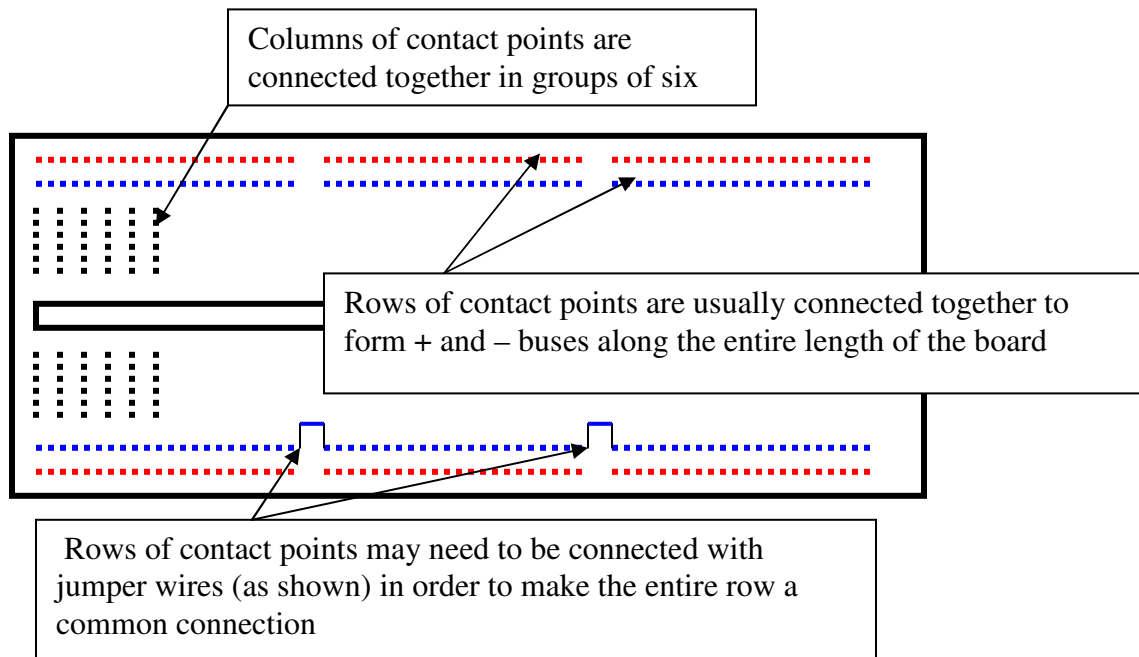


## 1. Building Circuits with the Breadboard

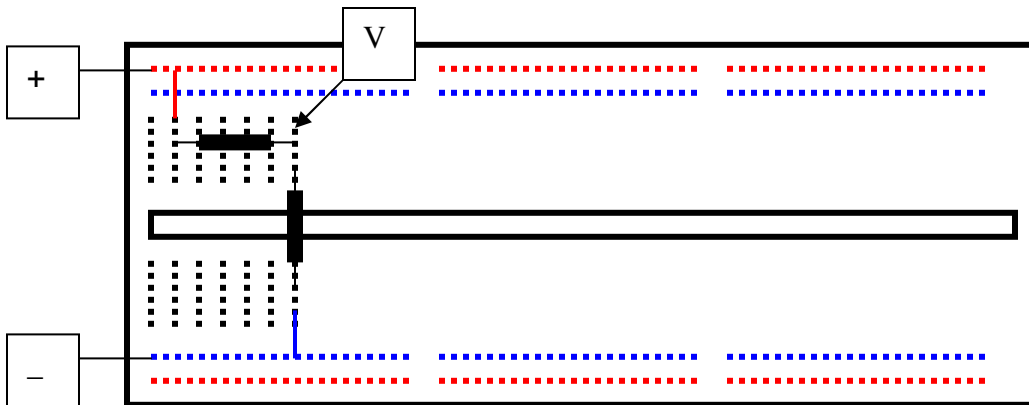
All of your EECE 206 projects will be built on breadboards. Here are a few things to know about building circuits on a breadboard:

- ❑ Breadboards contain a matrix of contact points, which look like holes in the board. The wire 'legs' of the components are inserted into the desired contact points on the board
- ❑ Circuits are constructed by referring to a schematic diagram, then creating an electrically equivalent circuit on the breadboard
- ❑ All breadboards have columns of contact points which are connected together, usually in groups of five or six (Refer to the figure below)
- ❑ Adjacent columns of contact points are not connected together
- ❑ All breadboards have two or more rows of contact points running the length of the board, and often have blue or red stripes next to the rows. These rows are usually used for power supply connections, and are called "buses"



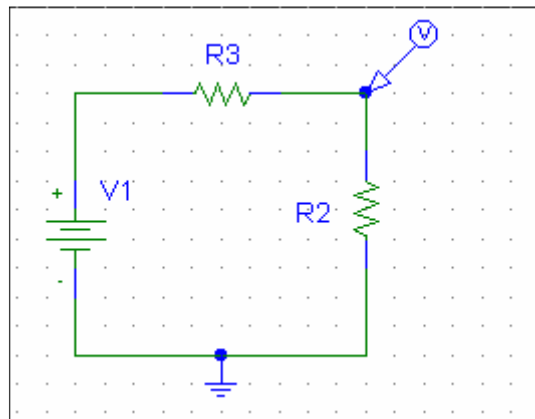
## 2. Placing Resistors (or similar components) on the Breadboard

The following example shows two resistors connected as a DC voltage divider circuit. The red bus is used for the positive power connection (+), and the blue bus is used as the ground connection (-). Jumper wires are shown connecting the resistors to (+) or (-) respectively:



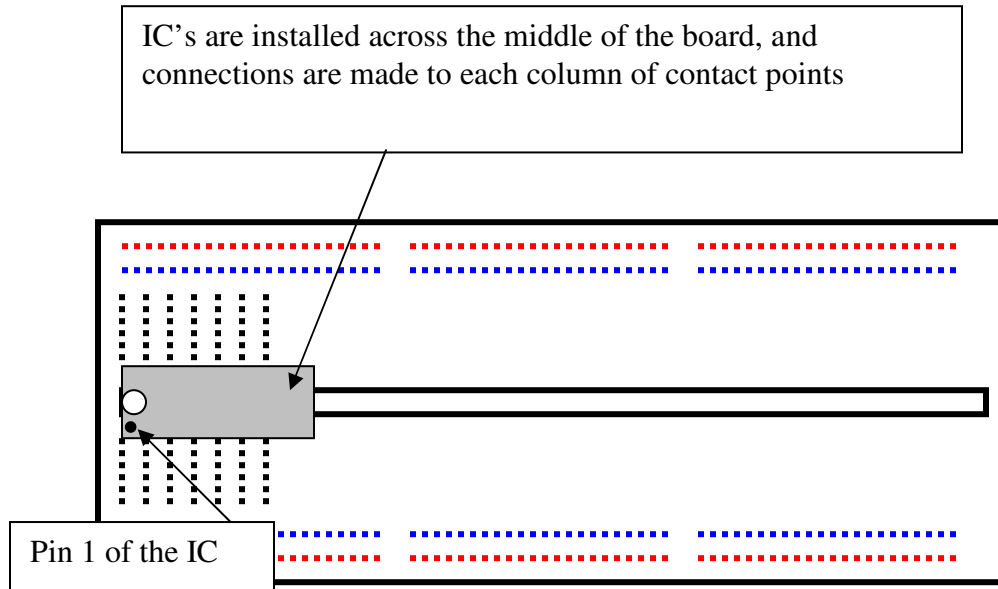
Notice any of the six contact points in each column could have been used to connect the circuit components together. Notice too that capacitors, inductors, or other discrete components can be placed on the board in the same way.

Here is a schematic of the above circuit:



### 3. Installing Integrated Circuits on the Breadboard

The easiest way to insert an integrated circuit (IC) into a breadboard is to use an insertion tool. If you do not have this tool, gently set the IC on the board, and make sure the legs are aligned with the contact points. Push firmly and evenly down on the IC until its legs are seated into the contact points. Make sure that none of the legs are bent or broken during installation. The figure below shows the proper placement of the IC on the board:



### 4. Breadboarding Tips

Using the following guidelines greatly simplifies circuit construction and troubleshooting:

- ❑ Always use the **red (+)** and **blue (-)** buses for positive and negative power supply connections respectively. The blue bus is also generally circuit ground
- ❑ Create continuous bus lines on the board by placing jumper wires as shown on page one
- ❑ Always use the same color jumper wires (preferably red for (+); blue for (-)) for connections to or from the power supply buses
- ❑ Always use the same color jumper wires for similar signal types (e.g., AC sine wave input = yellow; AC sine wave output = yellow)
- ❑ Avoid crossing wires over IC's: You may need to replace a bad IC
- ❑ Spread out the circuit across the board so it is easier to build and troubleshoot
- ❑ **Make the wiring neat! This is the best habit to establish NOW!**