Techniques and Troubleshooting

If proper laboratory technique is used, the student should be able to finish each of the following labs in the allotted time. In order to make the lab go smoothly, several suggestions are offered below:

1. Instead of wiring the complete circuit and then testing it, break it up into testable blocks. Wire up each section and test it before continuing.
2. Use the long strips of connecting holes on the proto board as buses. For example, ground one end of the bus and then use the shortest jumper possible to connect the grounded point to the bus.
3. Use short, neat jumpers on the proto board. This will make it easier to trace wires if something is wrong. Also, the jumpers should be color coded. For example, if the circuit uses a single voltage, the hot bus should use red jumpers and the ground bus should use black jumpers.
4. Double check all the components to verify that they are correct. Make sure you record all actual component values when writing up a lab report.
5. Check all calibration knobs on equipment before you start. Measurements made with un-calibrated equipment are useless.
6. Be careful of ground loops. For example, the two channels of the oscilloscope use a common ground. If both channels are used, their grounds are to be tied to one point.
7. Make intelligent measurements. If a measurement does not correspond to the expected value, then a problem is usually indicated. The problem should be solved before measurements are made.
8. Check all pin-outs of chips and components carefully before wiring up the circuit.
9. Turn off the power to any circuit before making any changes to it and be sure to turn on when you are ready to test the circuit.

If the circuit does not work, remember that nine times out of ten the problem will be very simple. The following are several simple checks that should be made in the listed order.

1. Make sure that the power is on to the circuit.
2. Be sure that all the sources are working.
3. Check for the ground loops in the measurement system.
4. Check the wiring of the circuit for errors.
5. Check components for errors. Also check voltages and signals at key points for expected values.

If the circuit still is not functioning properly, ask for assistance.