## ENGR 252 LAB #3 - Introduction to CAD
### *"This lab & associated report should be completed individually"*

**Objective**
Introduction to Electrical Circuit Design, Simulation and Test using computer Aided Design and Analysis tools.

**Related Principles**
- *Electrical Circuits* textbook by Nilsson
- *Integrated*


**Equipments**
- Windows-based PC
- Cadence orCAD 16.6 lite
  http://www.engrcs.com/tools_programs/16.6_OrCAD_Lite_Capture&PSpice_Products.zip
- USB hard disk or other removable drives

**Supplies**
- None

**Preparation & Background**
This section should be completed prior to starting on the experiment 1 and 2.

- Installation
  If Cadence OrCAD 16.6 lite is not already installed on your computer, perform the following steps:
    1. Download the file from
       http://www.engrcs.com/tools_programs/16.6_OrCAD_Lite_Capture&PSpice_Products.zip
    2. Unzip the file and run "setup.exe in Disk1"
    3. Select all default options during the installation of Cadence orCAD 16.6 lite.

- Start Application
    1. Run Cadence >> OrCAD 16.6 Lite >> OrCAD Capture CIS Lite from start menu

- Introduction to Schematic Capture and PSpice Simulation
    1. From "Help" menu select "Learning OrCAD Capture"
    2. Review the material in "OrCAD Capture Tutorial" to gain an understanding of schematic capture.
    3. Review material in "OrCAD Flow Tutorial" to learn the steps to enter and simulate circuits using full adder example.

In the remainder of this lab, PSpice is used as short hand for all the functionality of Cadence OrCAD design tool.

**Experiment #1 - Bias Point (DC operating point)**
In the following circuit use PSpice to find:

- a) Voltages va and Vb
- b) Total Power Dissipated
- c) Power supplied by the independent current source
- d) Power supplied by the current-controlled voltage source
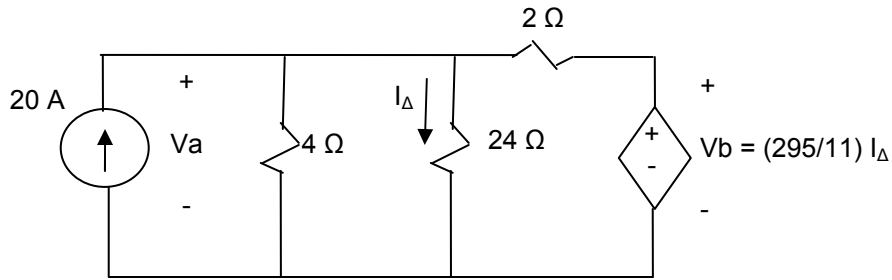
*Hint: The "I", "V" and "W" buttons from the top menu allow the user to turn on and off the current, voltage and power calculations respectively. Gain must be entered as a real number (not a fraction).*

## Experiement 2 - DC Sweep Analysis
The variable dc current source in the following circuit is adjusted so that the power developed by the 4 A current source is zero. Find the value of $I_{dc}$.
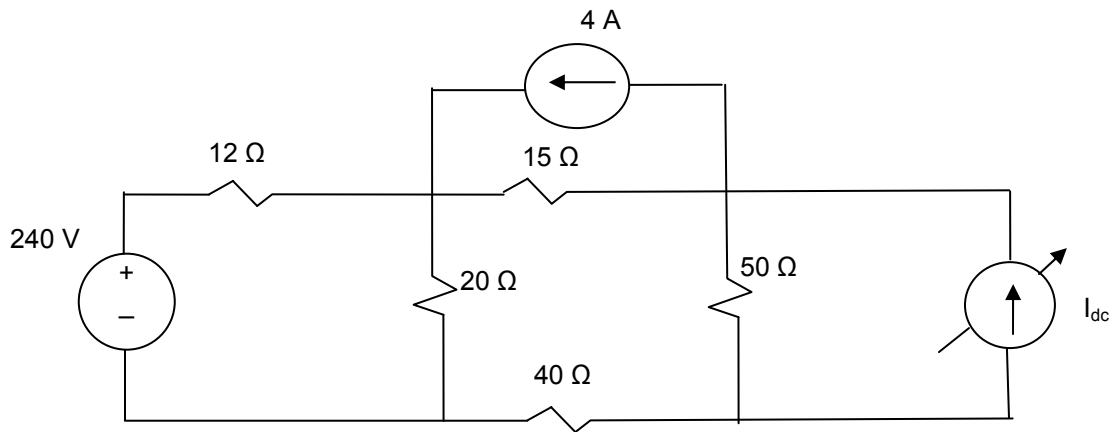


## Report Requirements
This lab and report must be completed individually. All reports must be computer printed (Formulas and Diagrams may be hand drawn) and at minimum include:

**For each Experiment**
   a) Clear problem statement; specify items given and to be found.
   b) Identify the theory or process used.
   c) Documents resulting circuit schematics, Net list, simulation results, and other relevant results.

**For the report as a whole**
   a) Cover sheet with your name, class, lab, completion date and team members' names.
   b) Lessons Learned from the experiments.
   c) A new experiment and expected results which provide additional opportunity to practice the concepts in this lab.