

**Course**: Electric Circuits I.

**Class**: First year computer engineering.

**Semester**: Fall 2016.

**Assigned** **by**: Dr. Ahmad Gomaa.

**Circuit Simulation Tool**

**Programmed by:**

* **Sayed Kotb Sayed Kotb. Sec: 1 BN: 32**
* **Karem Emad Sayed Ibrahim. Sec: 2 BN: 11**
* **Moamen Hassan Atya. Sec: 2 BN: 14**

**Team number: 1**

**Contact E-mail: sayedalesawy14@gmail.com**

**Program user manual:**

* The user shall start by numbering the nodes of the circuit diagram using a one based indexes, i.e. 1, 2, 3.
* The program will query the user to enter all the electric components connected the current node.
* The user should use the following the input format to enter the circuit description:
* The user lists the symbol of the desired electric component followed by a space and then the value of the component converted into Ohms, Amperes, Volts, and then press the Enter key to start a new line.
* The user continues in the exact same fashion described in the previous point until all the components connected to the current node are listed.
* Once the user has entered all the desired components, the user should type the word “end”, in lower case letters to end entries to the current node.
* The program will query the user if he wants to add another node to the circuit, type “Y” for “Yes”, N for No, Y and N are in upper case letters.
* The user shall repeat the previously described process until all nodes are entered.
* Sample input of the shown circuit diagram numbering nodes in a clockwise direction:

J1 15

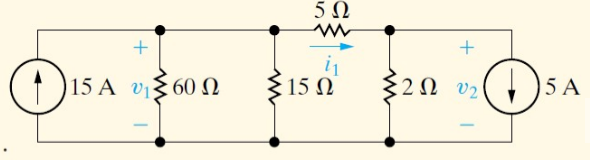
R1 60

R2 15

R3 5

end

Y



R3 5

R4 2

J2 -5

end

Y

J1 -15

R1 60

R2 15

R4 2

J2 5

end

N

* Note: The circuit description could be first typed into a .txt file or any other text editor using the specified format and then copied to the console window as a whole then press the Enter key and the program will start executing.
* Once the circuit description has been successfully loaded, the program will compute all node voltages and run the power balance check, it will print to the console window the amount of power supplied and the amount of power dissipated in Watts and checks if they match and accordingly prints a message to the console window.
* The program will then start interacting with the user to compute any required responses, the program will print a message on the console window asking the user about what type of response he is interested in, the user shall answer using the following format:
* Type “I” if the desired response is current, “V” if it’s voltage difference, “P” if it’s power, and finally “Rmax Pmax” if it’s the maximum power transfer, all in upper case letter.
* On the same line, type “gen” for a response resulting from all sources connected to the circuit, “gen” for general, or type “spe” if the required response is the contribution of a certain source in the circuit, “spe” for specified, “gen” and “spe” are in lower case letters and separated by a space from the previous entry.
* On the same line the user shall enter the element of interest, or the nodes of interest in case the voltage difference is desired in the same way stated in the project description document.
* After each requirement, press the Enter key, the program will compute the desired response and prints it on the console window while simultaneously producing a nicely formatted output .txt file with all the desired responses for further use after terminating the program.
* Sample quires:

I gen R1

I gen E1

V gen 1 2

I spe R1 J1

V spe 2 3 E1

P R1

P V1

P J1

Rmax Pmax R1

* After each response calculating task, the program will ask the user if he wants more responses, answer should be “Y” for Yes or “N” for No.
* Note: All the response calculating tasks could be written in a .txt file using the specified format and then copied as a whole to the console window for ease of use, in this case the user should add the letter ”Y” in a new line between each two tasks and “N” after the very last task for terminating, i.e.

I gen R1

Y

I gen R2

N

* The program will pause and wait until the user reads all the results and presses the Enter key to close the console window.
* The user may check the produced output file that could be found using the following path “Circuits-Project-2017\Circuits Project\output”.