Engin 103 March 25, 2008 back to e-syllabus	Topics: CW6 Circuit Analysis with LabVIEW III Logbook questions

Engineering 103 –UMass Boston
CW 6
(In-Class-Work 6)

Circuit Analysis with LabVIEW III: Follow Instructions in today's class notes, produce a VI that solves a circuit with one battery and six resistors, producing four outputs: total current I, and voltages V2, V4, and V6.

By alphabetical order of the last names, the first two students in each team will submit LabVIEW LLB file cw6_XX_a.llb, the next two students will submit LabVIEW LLB file cw6_XX_b.llb, to the *files* folder in the server. Each LLB file should contain one VI's corresponding to this CW. Please insert names and dates within the Front Panels. These files need to be uploaded to the server today to receive credit.

*Remember that this is an individual work (turn it in, as instructed, with your name and date). Home-works and class-works count 20% toward the course grade. Class-works are done in class.

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Circuit Analysis with LabVIEW III (See also the link with the same name in the e-syllabus)

Example: a VI that solves a simple electrical circuit with one battery and six resistors

Developing a Virtual Instrument consists of the following steps:
1) Define the problem you want to solve, specify what will be the inputs and the outputs.
Inputs are battery voltage V; resistors R1 to R6; outputs are voltages across R2 (V2); R4 (V4); R6 (V6); and current through R1 (I)
Draw the circuit for the front panel
Enter six Numeric Controls for the six inputs; and four Numeric Indicators for the four outputs

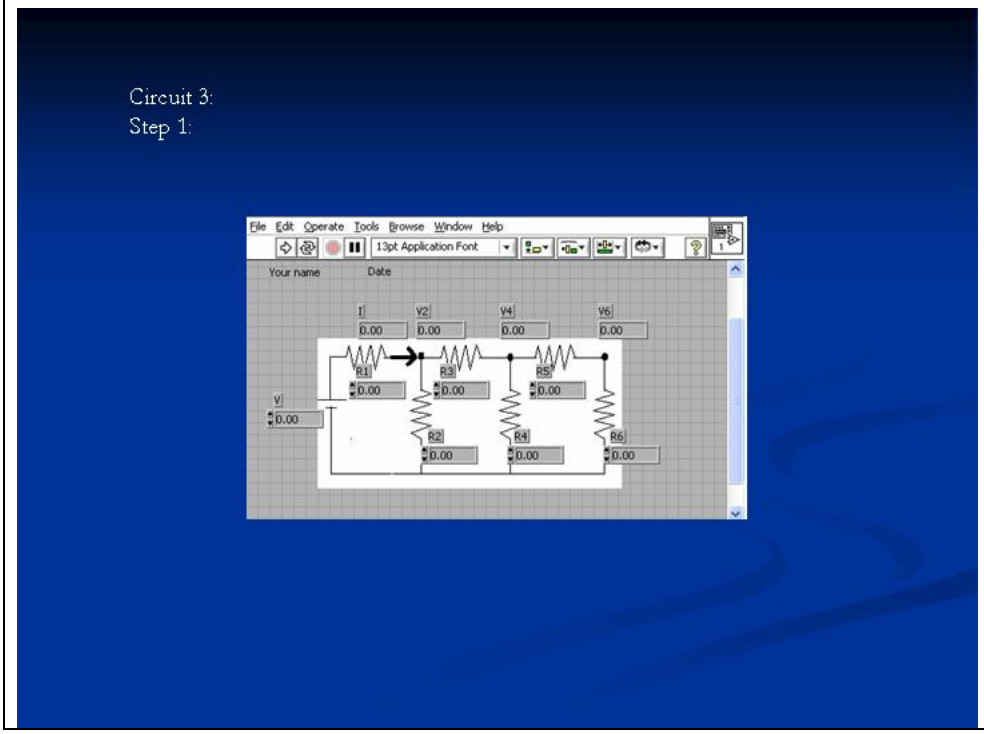
2) Determine the equations or operations needed to produce the outputs from the inputs
Equations are given in the link on e-syllabus "Circuit Analysis with LabVIEW III"

3) Implement the controls and indicators and graphs in the Control Panel and the operations in the Block Diagram

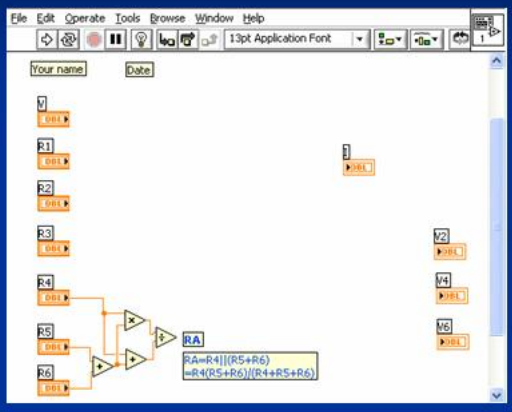
Observe the terminals for connecting “Divide” (what is connected to the upper terminal of “Divide” is divided by what is connected to the lower terminal) or “Subtract” operations

4) Fix any error and implement modifications as needed

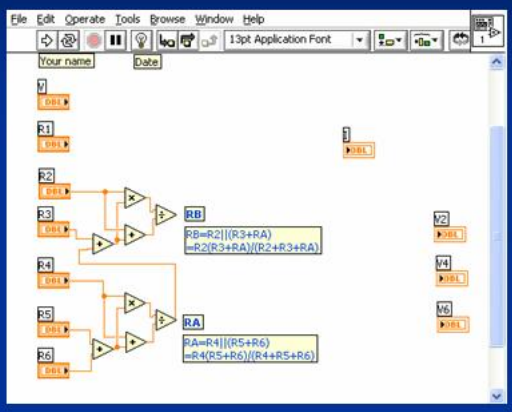
5) Test the final results against expected theoretical values.



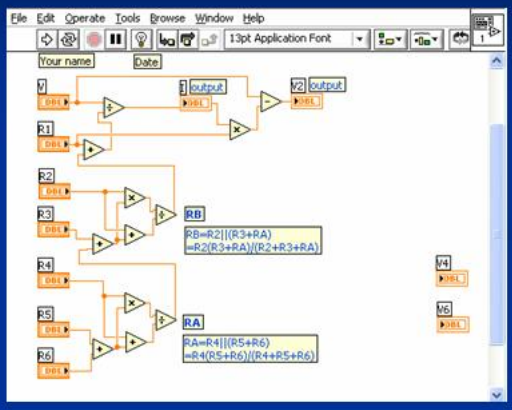
Step 2:


File Edit Operate Tools Browse Window Help
13pt Application Font
Your name
Date
V
R1
R2
R3
R4
R5
R6
I
V2
V4
V6
RA
RA=R4||(R5+R6)
=R4(R5+R6)/(R4+R5+R6)

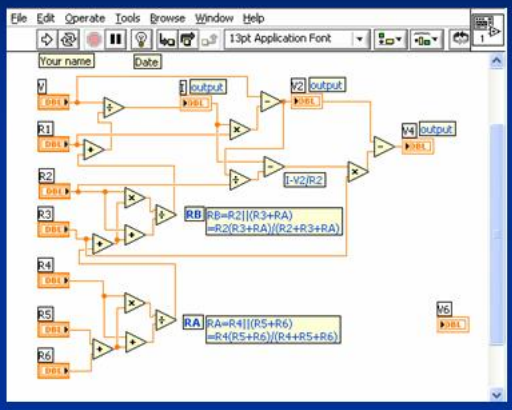
Step3:


File Edit Operate Tools Browse Window Help
13pt Application Font
Your name
Date
V
R1
R2
R3
R4
R5
R6
I
V2
V4
V6
RB
RB=R2||(R3+RA)
=R2(R3+RA)/(R2+R3+RA)
RA
RA=R4||(R5+R6)
=R4(R5+R6)/(R4+R5+R6)

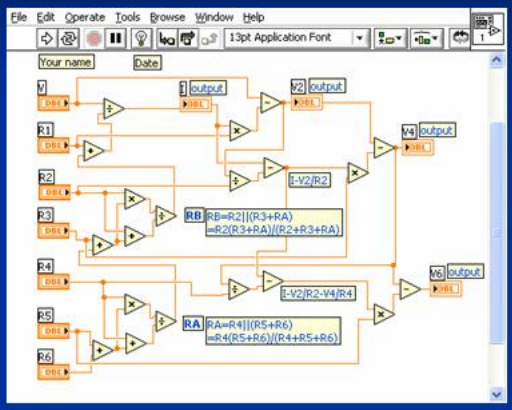
Step 4:


File Edit Operate Tools Browse Window Help
13pt Application Font
Your name
Date
V
I
output
V2
output
R1
R2
R3
RB
RB=R2||(R3+RA)
=R2(R3+RA)/(R2+R3+RA)
R4
R5
R6
RA
RA=R4||(R5+R6)
=R4(R5+R6)/(R4+R5+R6)
V4
V6

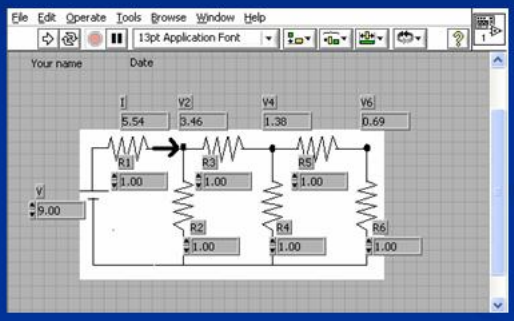
Step 5:

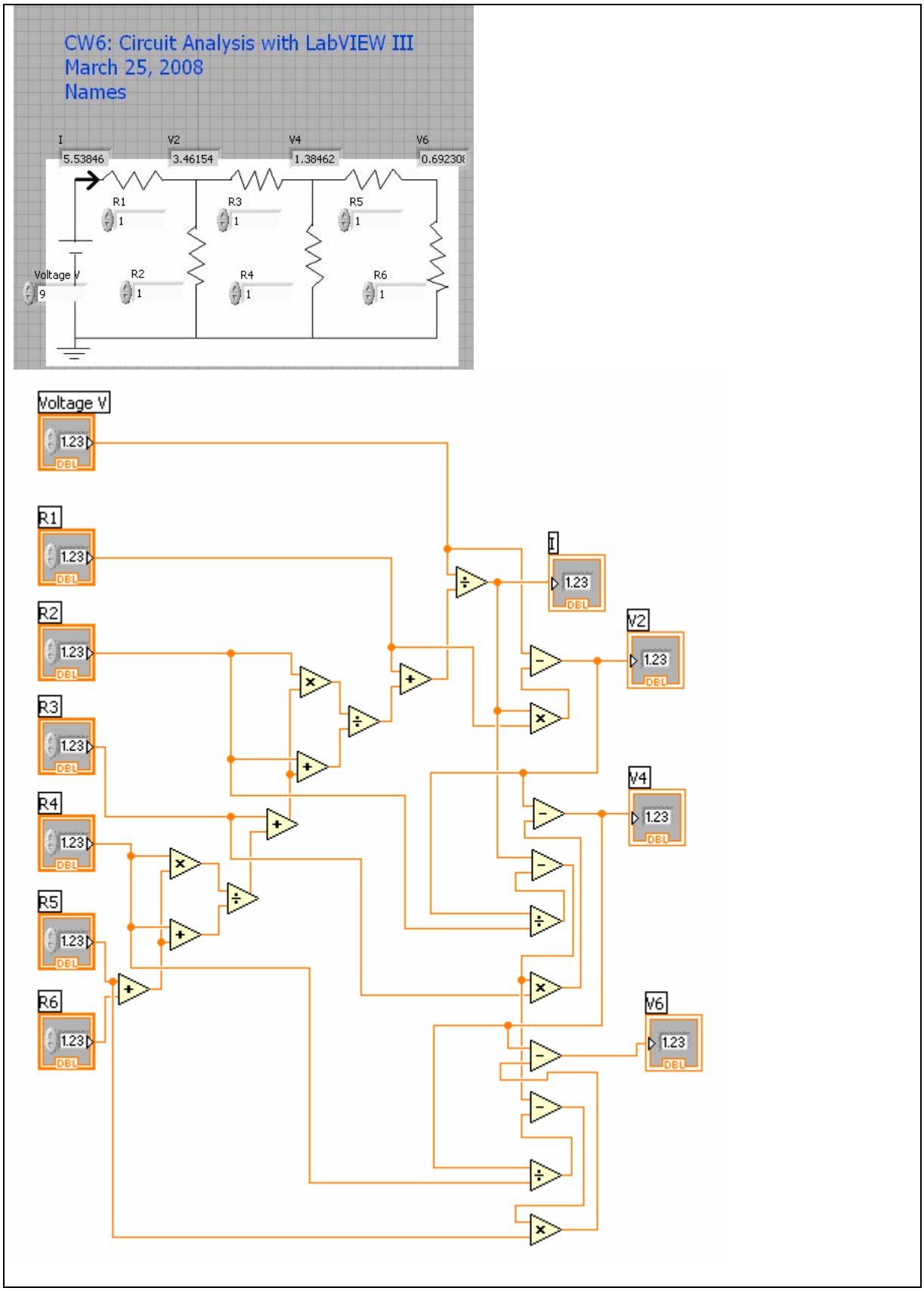

File Edit Operate Tools Browse Window Help
13pt Application Font
Your name
Date
V
I
output
V2
output
R1
V4
output
I-V2/R2
R2
R3
RB
RB=R2||(R3+RA)
=R2(R3+RA)/(R2+R3+RA)
R4
R5
R6
RA
RA=R4||(R5+R6)
=R4(R5+R6)/(R4+R5+R6)
V6

Step 6:



Step 7: Check!




CW6: Circuit Analysis with LabVIEW III
March 25, 2008
Names
I
5.53846
V2
3.46154
V4
1.38462
V6
0.692308
R1
R2
R3
R4
R5
R6
Voltage V
9
Voltage V
R1
R2
R3
R4
R5
R6
I
V2
V4
V6
1.23
DBL

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LOGBOOK: example of a logbook page

-Use a quadrille notebook; number all pages; date all entries
-Write your notes for all activities, thoughts, problems and solutions, and learning conclusions related to Engin 103. You should write down progress, outcomes, and conclusions on projects and teamwork; conclusions from class work (including LabVIEW) and homework.
-In addition you should answer in the logbook all questions listed in these notes in blue, as shown below:

27) Write here the equations to obtain I, V2, V4, and V6. Describe any similar groups of operations that are repeating in these equations.

28) Insert a copy of your Block Diagram for Circuit Analysis with LabVIEW III, circle the similar groups of operations you mentioned in the previous question. These groups of repeating operations will be replaced by a sub-VI in Circuit Analysis with LabVIEW IV

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