Engin 103
Logbook Questions
Fall '08

These questions may refer to information contained in the corresponding class note for that class meeting. Questions #1 and #2 can be found in the class note for meeting #2, there are two questions in each note thereafter.

Logbook	Due
Questions 1-14	**Oct. 7, 2008**
Questions 15-30	**Oct. 30, 2008**
Questions 31-48	**Dec. 4, 2008**
Questions 1-52	**Final Exam**

Each student will keep an individual logbook, number the pages and date the entries. **In addition to answering the questions posted, student should also keep notes on work related to the course: things learned in class, work done in projects, etc.** See example of a logbook page here **example of a logbook page.**

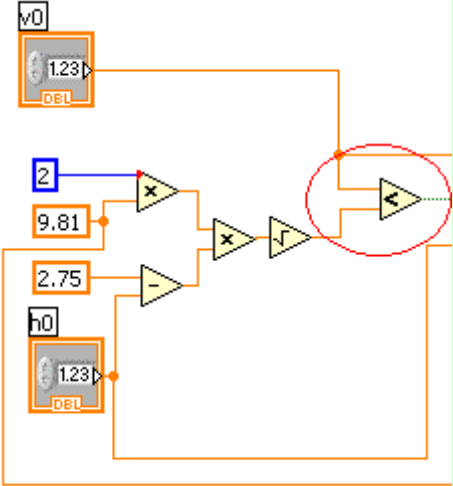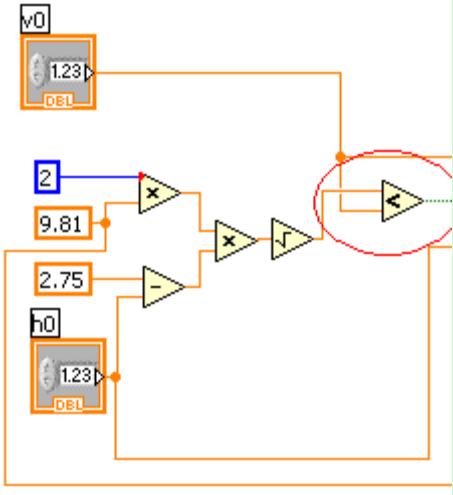| Class	Date **Class notes**	**Logbook questions**
1	Sept 2	
2	Sept 4	**1) What engineering field has your team been assigned for project 0? How did you search for information to include in the oral presentation (Part I)? How did you and your team search for information on a specific project to present (Part II)?** **2) Explain in your own words what is a brainstorming process? Did you and your team perform a brainstorming session to generate ideas for Project 0, part I and/or part II? If yes, describe the session in one paragraph.**
3	Sept 9	**3) Which of the five categories of leadership skills summarized in Phase #4 of the brainstorming process we did in the previous class is the most important (look at the class notes for the previous class)? Explain your position in your own words** **4) Explain what leadership skill would have helped team 12 in the Case Study above, support your claim by referring to specific circumstances in the Case Study.**
4	Sept 11	**5) For each of these three teamwork elements: communication, organization, and participation, discuss if they could be observed during a team presentation you saw today. Include specific examples to support your position**

		6) Evaluate how these three teamwork elements: communication, organization, and participation are being performed in your team in Project 0. Is there anything you could do to help the team with respect to these teamwork elements?
5	Sept 16	**5) For each of these three teamwork elements: communication, organization, and participation, discuss if they could be observed during a team presentation you saw today. Include specific examples to support your position.** **6) Evaluate how these three teamwork elements: communication, organization, and participation are being performed in your team in Project 0. Is there anything you could do to help the team with respect to these teamwork elements?** *** You can add on to your answers to these same questions if there is additional relevant information observed in today's class meeting**
6	Sept 18	**7) Describe a least three specific engineering projects that were presented today that stood out for you, write a critique on their relevancy to the intended engineering field, referring to specific details presented by that team.** **8) Suppose your team is being asked a question after a presentation, consider this dilemma: a) it is important to provide 'an answer' to show the team's confidence and b) the desire to provide correct and accurate information. Explain what option, a) or b) you are more inclined to and why.**
7	Sept 23	**7) Describe a least three specific engineering projects that were presented today that stood out for you, write a critique on their relevancy to the intended engineering field, referring to specific details presented by that team.** **8) Suppose your team is being asked a question after a presentation, consider this dilemma: a) it is important to provide 'an answer' to show the team's confidence and b) the desire to provide correct and accurate information. Explain what option, a) or b) you are more inclined to and why.** *** You can add on to your answers to these same questions if there is additional relevant information observed in today's class meeting**
8	Sept 25	**9) Explain in your own words at least two main differences between science and engineering, for the field you worked with in Project 0.** **10) Make a flow chart for the supply chain of a cell phone from raw materials to the end customer. It should include at least 6 steps. Map**

		the ten engineering fields in the table for CW1 into each step, with a few words on what would those engineers be doing.
9	Sept 30	**11) Sketch the Engineering Design Cycle in your logbook, explain specific actions to be taken by you and your team for Project 1 as related to the different steps in the cycle. Be as specific and as detailed as possible.** **12) Explain in your own words, steps 1-4 on how to prepare an Excel spreadsheet to obtain the model/equation describing a system. In another words, explain what to do in columns A to E in the spreadsheet. Be as detailed as possible.**
10	Oct 2	**13) Explain in your own words what did you do in each of the seven steps to do data modeling with Excel in CW3. Write Y'=f(X), being f the quadratic polynomial obtained after using Solver with values for the coefficients a,b,c substituted in. Also write down the final s parameter achieved with these coefficients. Attach a copy of your spreadsheet for CW3.** **14) You have the spreadsheet to make a quadratic model for certain data set, such as the one used in CW3.** **(a) Explain what changes you would do on the spreadsheet to make a linear model for the same data set. Use the most economical way that would not require changing the equations in cells D3 and B9 and copying them into the cells below.** **(b) Explain what changes you would do on the spreadsheet to make a cubic model for the same data set.**
11	Oct 7	**15) Insert copies of the Tables 1, 2, 3 into your logbook.** **(a) Did you expect to get the same coefficients A, B, C, D and the s parameter for these two sets of data? Notice that the initial four pairs of data are contained in the longer data set. Explain why Tables 1 and 2 contain different results.** **(b) After looking at Tables 2 and 3 can you conclude that for any set of data, the higher the order of the polynomial model (e.g. in this case, the cubic model), the better the model (as reflected in the final s parameter achieved)? Explain why.** **16) Write a quadric (fourth order) polynomial in a similar format as we wrote the cubic polynomial in the previous class note. Explain in your own words what are the changes you will need to do to in the Excel spreadsheet you made for a cubic model to produce a quadric model.**
12	Oct 9	**17) Sketch the system built by your team, describe the input and output variables on the sketch. What units will you measure these**

		variables, and with what instruments.
		18) Explain with a sketch the different design elements your team used to increase predictability. Explain what mathematical model will be the best to describe the system using the X and Y variables mentioned in the previous question.
13	Oct 14	**19) Insert the spreadsheet made by your team for the system presented. Make a table of the coefficients and parameter s for the different models considered by the team, similar to that submitted in CW4. Explain which model was chosen to be the best and why.** **20) For each of the other teams, list their predictability results (in percentage error between prediction and average measurement done in class) and try to critically relate these results with their system designs.**
14	Oct 16	Please add content to the answers to questions 19 and 20 after more presentations have been made today **19) Insert the spreadsheet made by your team for the system presented. Make a table of the coefficients and parameter s for the different models considered by the team, similar to that submitted in CW4. Explain which model was chosen to be the best and why.** **20) For each of the other teams, list their predictability results (in percentage error between prediction and average measurement done in class) and try to critically relate these results with their system designs.** **21) After completing Project 1, explain the general steps needed to perform a data modeling for this project. Also explain what role it played in the testing of a system predictability.** **22) Can we apply data modeling to predict future behavior of natural or socio-economical systems? Describe an example for each kind of system (natural and socio-economical), including what data you would need to collect, what mathematical model would probably be a best fit, and what limitations our data modeling method will face.**
15	Oct 21	**23) Attach snapshots of your Sheet#1-3 and the three tables shown in CW4 with values of the polynomial coefficients and s parameters in the logbook. Explain what is different in the graphs of the three tables in CW4.** **24) Calculate the constant acceleration of gravity g (in m/s^2) using the coefficient A from your table #3 of CW4 using the formula provided above (see class notes for today); show the calculations and the final result in your logbook** **25) What is the difference between a Numeric Control and a Numeric**

		Indicator? List examples of each category using the two examples shown above, that is, Circuit Analysis with LabVIEW I and II. What happens if you wire into a Numeric Control? 26) To implement V/R: should I wire V to the upper left terminal of the Divide operation or to its lower left terminal? Why? How do you save existing numeric values within the Front Panel? (if no extra action is taken next time you open the VI, the Front Panel boxes only show default values of zeros)
16	Oct 23	27) Write in your logbook the equations to obtain I, V2, V4, and V6 from the Circuit Analysis with LaBVIEW III. 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. Answer this question when your VI for Circuit Analysis with LabVIEW III is completed.
17	Oct 28	29) How many sub-VI's did you create in this exercise? What is the difference between creating a VI and creating a sub-VI? 30) How do you call in a sub-VI? How do you wire it? What would happen if you did not properly assign connectors when creating the sub-VI?
18	Oct 30	31) LabVIEW: in this Classwork what formula we tried to implement using the For Loop?, What are the 'N' and 'i' for? Once we have the time series (horizontal axis in the Waveform graph), how did we calculate values of the function f for each element of the time series to get f(ti) (vertical axis in the Waveform graph)? 32) Why do we need a 'Bundle' for the Waveform graph? How many inputs should the 'Bundle' have and what should be connected to those inputs?
19	Nov 4	33) Specify the inputs and outputs, with clear details, for your team Virtual Instrument to be presented as Part I of Project 2. Write the equations that allow the calculation of the outputs from the inputs, explain each variable in your equations. 34) Insert a snapshot of the Front Panel and Block Diagram of your team VI for Part I of Project 2, explain did you need to use those specific elements. 35) Describe at least two LabVIEW elements not included in your team's VI but used in other teams' VI's. 36) Specify the inputs and outputs, with clear details including

		equations to obtain the outputs from the inputs, for your team Virtual Instrument to be presented as Part II of Project 2. List what LabVIEW elements will be used in the Block Diagram, how many times a subVI will be called in, and what elements will be included in the sub-VI, use LabVIEW terminology.
20	Nov 6	**37) Explain any similarity between a sub-VI and a "super-operator". What are the advantages and disadvantages of using a "super-operator" a)in computer programming b) in mathematics** **38) Insert a snapshot of the Front Panel and Block Diagram of your team VI for Part II of Project 2, explain why the different elements were used. Also do the same for any sub-VI created and used in Part II.**
21	Nov 13	**39) In the LabVIEW exercise we completed today (CW9), the result of what operation decides which window (True or False) of the Case Structure will be used? How do you call a variable that can take only two possible values (for example: 1 or 0; or True or False)?** **40) Include a print-out of your Block Diagram for CW9. Answer questions a) and b) for two possible connections at the less-than operator shown in the table below:**

If v_0 and its limit are connected to the less-than comparison as shown below	a) Within the True window of the Case Structure, what do you write inside the String Constant?	b) Within the False window of the Case Structure, what do you write inside the String Constant?

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| 22 | Nov 18 | **41) What are the information required by an XY Graph? What did we use the 'Build Array' for? Specify the LabVIEW version you are using and describe how to insert an "Array" of 'Numeric Controls" in the Front Panel. Also where to find the 'Linear Fit.vi' and what inputs and outputs we are using in this exercise.**

42) a) Binary numbers: write 0.625 and 0.875 using 8 bit binary numbers with a "binary dot" between the two groups of four bits. b) Can you write 0.626 using 8 bits with four bits after the dot? Explain if we could achieve exact calculations using a digital computer. Can you offer a solution? |
| 23 | Nov 20 | **43) Explain the steps to modify CW8 so the frequency or period of a sinusoid can be controlled by the user.** |

		44) Define the spectrum of a signal and explain how to show it in LabVIEW.
24	Nov 25	**45) Use your own words to describe the important steps in developing a Virtual Instrument or any computer code that can performs some assigned tasks** **46) Is your team using a Case Structure in Project 3? If yes, describe what it does in the true and false cases, and what operation determines the case.**
25	Dec 2	**No questions for this meeting**
26	Dec 4	**No questions for this meeting**
27	Dec 9	**47) Insert a snapshot of the Front Panel of your team's VI for Project 3, describe each element shown and explain why they are there** **48) Insert a snapshot of the Block Diagram of your team's VI for Project 3, describe each operation shown and explain why they are there** **49) Describe the modifications required for your team Virtual Instrument.** **50) Describe one project you saw from the other teams that stood out the most, include a brief summary of the LabVIEW elements they used**
28	Dec 11	**51) Explain how did you implement the required modifications for Part II. Insert a revised snapshots of the Front Panel and Block Diagram to satisfy the modifications, explain what has been changed and why.** **52) Explain one advanced LabVIEW element you have used or seen in the presentations: where to find it, where does it do, what are its inputs and outputs, and what can it be used for.**
	Final Exam 12/18 8-11am in S-3-126	**Logbook is required to take the final** Final exam schedule

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