Midterm 02 Exam Review Sheet

Logistics

Review Tips

In order to have a successful exam, the student should do the following:

- Review lecture slides and class notes [by Prof. Mohan] in google drive folder and the student’s class notes.
- Clear browser cache and get new slides before the exam. There might be some changes that will not show if you do not clear cache and download a new copy of the slides.
- Go through the reading assignments at the end of each slide, and read the textbook chapters. You can skip topics that were not discussed in class.
- Go over the Class activity exercises
- Go over the Lab assignments
- Go over the Quizzes

Exam Format

- Paper based
- Questions will be aimed at basic understanding of concepts and the ability to apply them in concrete examples.
- Question types will include:
  1. Short answer (may require writing programming statements, draw circuit diagrams, analyze circuit design, and/or boolean algebra simplifications and theorem proving, and writing descriptive answers through diagram illustration.)
  2. True/false
  3. Multiple choice
- You will not be asked to write whole programs; however, you have been exposed to a number of concepts through C programming language. There might be questions that would ask you to write part of the program, such as developing new functions.).

Additional Details

- Exam is on: 11/16/2018 2:30 PM - 4:30 PM at Alden 109. The submissions after 4:30pm will be penalized for lateness (unless you have special arrangements). If you plan to be late to the exam starting time, you must let me know in advance.

HANDED OUT ON Nov 13th, 2018
• There would be three booklets given to you during the exam. The first is a question booklet, that contains the list of questions in the exam. The second is an answer booklet, where the students are expected to write their answers to the questions given in the exam. The third is an outline document, that provides an outline to the attributes of right answers. At the end of the exam, it is the responsibility of the student, to combine all the three sections of the student’s exam using a paper clip provided and return back the exam to Prof. Mohan. After grading completion, the graded answer booklets would be returned back to the student.

• The exam will be closed [notes, lecture slides, textbook, other teaching materials, and NO internet].

• However, you may use one 8 1/2 by 11 sheet of paper with any information on it you wish. You need to include your resource sheet with your exam as part of the submission. You may not use a microscope or microform reader to read your one sheet of paper. A basic calculator may be used during the exam.

• I highly recommend you use a black pen (preferably Pilot G-2) for writing your answers during the exam. Please note, it is very difficult for me to read the pencil writing and hence there might be a chance for inaccuracy while grading.

• It is better to give part of an answer than to leave a question blank. No partial credit can be given for wrong answers if there is no accompanying work. If you leave a question blank, then there will be no points awarded to the question.

• Add necessary justification to your answer, if your understanding of the question deviate from the actual question. This rule also applies to multiple choice questions. I may give you partial credit or even full credit, based on how good you have justified your answer.

• I would strongly encourage you to make use of my office hours, to discuss and/or clarify any topic related to the course.

Topics covered

The exam will cover all material up through Sequential Logic. The main topics covered after the first midterm exam, so far are:

• Pointers and Structs in C

  KR: Chapter 05 → 5.1 - 5.2; 5.6 - 5.9; 5.11; 6.1 - 6.4

• Basic Gates

  Principles of Computer Hardware by Alan Clements Chapter 02 → 2.1 to 2.3

• Boolean Algebra

  Principles of Computer Hardware by Alan Clements Chapter 02 → 2.5

• KMaps

  KMaps rules external document provided in the lecture 15 folder. This can be accessed through the course webpage, by clicking on 11/01/2018 google drive folder.

• Combinational Logic

  Principles of Computer Hardware by Alan Clements Chapter 02 → 2.6; PH: Appendix B → B.3

• Sequential Logic

  Principles of Computer Hardware by Alan Clements Chapter 03
Exam Prep Guide

Here are examples of the kinds of questions that might be asked. This is not intended to be a sample exam; the topics covered below are not intended to be an exhaustive review. In particular, knowing the answers to all the questions below will not guarantee a good grade on the exam! The page numbers provided below, refers to the page number shown in the footer of each slides.

1. Explain difference between a Struct and an Array?
2. Explain difference between a variable length array and a dynamic array in C?
3. State some examples of creating a dynamic 2d array in C with the use of malloc keyword?
4. Laws of boolean algebra:

   - State Demorgan’s law with an example?
   - State Associative law with an example?
   - State Distributive law with an example?
   - State Commutative law with an example?

5. Boolean Algebra:

   - What are the different ways that we had discussed, to represent a boolean logic?
   - Given a boolean algebra theorem, prove it by applying the axioms, laws, identity, and negation rules.
   - Given a boolean algebra expression, simplify it by applying the axioms, laws, identity, and negation rules.
   - Given a boolean expression, simplify it using Karnaugh Maps. There will be at least one question on Karnaugh Maps, so I recommend highly to review the lecture notes, KMaps rules reference document, and to look at class examples.

6. State an application of XOR gate, by providing the proper circuit diagram.
   You may be asked to analyze a circuit and say what it is supposed to do!

7. Combination Logic:

   - Show the visual representation of a half adder, by drawing the circuit diagram along with clearly providing the truth table.
   - Show the visual representation of a full adder, by drawing the circuit diagram along with clearly providing the truth table.
   - Show the visual representation of a 4-bit full adder, by drawing the circuit diagram.
   - State the difference between a multiplexer and a demultiplexer. What are some of the applications? you may be asked to draw the circuit diagram for mux (multiplexer) and demux (demultiplexer).

8. Sequential Logic

   - What is a Latch?
   - What is a register?
   - How is a clocked flip flop different from a latch?
   - Show the visual representation of a RS flip flop, by drawing the circuit diagram along with clearly providing the characteristics table.
     You may be asked to analyze the flip flop and identify the outputs for the different input combinations and show the derivation.
   - Show the visual representation of a Clocked RS flip flop, by drawing the circuit diagram along with clearly providing the truth table.
     You may be asked to analyze the flip flop and identify the outputs for the different input combinations and show the derivation.

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The above is not a full review! (For example, I will ask at least one question to write a C program to implement a function that uses pointers and dynamic arrays to implement a dynamic data structure such as a matrix, and find max and min in each row and/or column.) Please come to Thursday’s class prepared to ask questions.

ALL THE BEST IN YOUR EXAMS!!