

Administrative

- When: Thursday, September 28, 2017
- Where: In class

Read carefully all of the following items....

- Bring your KUID. *You will not be allowed to take the exam without your KUID.*
- The exam will be closed book and closed notes.
- No calculators, cell phones, head phones, or electronic devices of any sort will be allowed.
- Once you start the exam, you will not be excused from the room for any reason unless you turn in your exam. Once it is turned in, you cannot come back and continue working on it.
- Any unauthorized absence will automatically result in a zero for this exam.

Exam Coverage

You are responsible for all topics covered in our lectures, discussions, reading assignments, practice homework, Connect and Written homework assignments.

Topics Covered**Logic and Propositions**

- (1) Understand the basic structure of proposition and be able to determine the value of a given proposition.
- (2) Understand the properties of the six standard connectives and be able to use them to generate new propositions from existing propositions.
- (3) Understand **operator hierarchy** and be able to evaluate (compound) propositions with connectives.
- (4) Understand the basic structure of truth table and be able to construct the truth table for a given proposition.
- (5) Understand the importance of Disjunctive Normal Form (DNF) and Conjunctive Normal Form (CNF) and be able to construct them from a truth table.
- (6) Understand the basic structure of propositional function and be able to evaluate and manipulate given propositional function(s).
- (7) Understand the basic structure of Universal and Existential quantifications and be able to evaluate and manipulate quantifications with quantifier(s).
- (8) Given two propositions P and Q, understand the significance of logical equivalence of P and Q and be able to prove that $P \equiv Q$ using (i) **truth table**, (ii) **direct method**, and (iii) the **Laws of Logical equivalence**.

Basic Proof Techniques

- (1) **Given a proposition P, understand the difference between valid and invalid argument for proving P.**
- (2) Understand the standard rules of inference and be able to use them to construct valid argument for a given proposition.
- (3) Given an argument, be able to draw conclusion using rules of inference.
- (4) Understand the different structures of propositions (simple proposition, implication, biconditional, quantifications) and be able to prove the validity of a proposition using various proof techniques.
- (5) Understand the difference between direct proof and proof by contradiction techniques and be able to use them to prove the validity of a given proposition.

- (6) For given implication $p \rightarrow q$, understand the structure of contrapositive and be able to prove the validity of $p \rightarrow q$ using proof by contraposition technique.
- (7) Understand the difference between constructive and non-constructive proof techniques and be able to use them to prove, or disprove, the validity of a given proposition.
- (8) Understand the proof by cases technique and be able to use it to prove the validity of a given proposition.

Sets and Set Operations

- (1) Understand basic set operations and be able to generate new set structures from existing sets using different set operations.
- (2) Understand the difference between simple and multi sets and be able to manipulate them.
- (3) Understand the difference between ordered and unordered sets and be able to manipulate them.
- (4) Understand the general properties of power set and be able to generate the power set of a given set.
- (5) Understand the general properties of Cartesian product and be able to compute the Cartesian product of a collection of sets.
- (6) Understand and be able to compute the cardinality of given set structures.
- (7) Given two sets A and B. Be able to prove, or disprove, that $A = B$ using (i) membership table, (ii) direct method, and (iii) the set identities.

9/17/2017