I can’t recall the last time I didn’t ask a definition question on a 245 exam. To help you better prepare yourself for such questions, I’ve assembled this list. My pledge to you: If I ask you for a definition on the exam, the term will come from this list. Note that this is not a complete list of the definitions given in class. You should know the others, too, but I won’t specifically ask you for their definitions on the exam.

Once in a while a student will express disappointment that I ask definition questions on exams. My justification is that I think it’s important for you to know what the core terms mean so that you can use them correctly and effectively. At the same time, I don’t require that you memorize the exact wording of the definitions you see here. If you provide a definition in your own words that captures all of the detail found here, that’s fine.

The definitions are grouped by lecture topic, and should be in an order within each topic that is at least close to the order in which the definitions appeared in class.

**Topic 1: Course Background**

- *Discrete Mathematics* is the study of collections of distinct objects.

**Topic 2: Logic**

- *Philosophical Logic* is the classical notion of ‘logic’: The study of thought and reasoning, including arguments and proof techniques.
- *Mathematical Logic* is the use of formal languages and grammars to represent the syntax and semantics of computation.
- A *Well-Formed Formula (wff)* is a correctly structured expression of a language.
- A *proposition* (a.k.a. *statement*) is a claim that is either true or false with respect to an associated context.
- A *simple proposition* is a proposition containing no logical operators.
- A claim that is a logical combination of multiple simple propositions is a *compound proposition*.
- Two propositions $p$ and $q$ are *(Logically) Equivalent* ($p \equiv q$) when both evaluate to the same result when presented with the same input. [Note: An alternate, equally-correct definition is given below.]
- A *Tautology* is a proposition that always evaluates to true.
- A *Contradiction* is a proposition that always evaluates to false.
- A *Contingency* is a proposition that is neither a tautology nor a contradiction.
- The *Inverse* of $p \rightarrow q$ is $\overline{p} \rightarrow \overline{q}$.
- The *Converse* of $p \rightarrow q$ is $q \rightarrow p$.
- The *Contraposition* of $p \rightarrow q$ is $\overline{q} \rightarrow \overline{p}$.
- $p$ and $q$ are *(Logically) Equivalent*, written $p \equiv q$, if $p \leftrightarrow q$ is a tautology. [Note: An alternate, equally-correct definition is given above.]