Here are the definitions that we’ve covered since the material for the last midterm exam. I’m not going to re-print all of the definitions for the whole semester – if you lost a previous exam’s definition handout, you can print another from the class web page.

**Topic 13: Counting**

- An ordering of $n$ distinct elements is called a **permutation**.
- An ordering of an $r$-element subset of $n$ distinct elements is called an $r$-**Permutation**.
- An $r$-Combination of an $n$-element set $X$ is an $r$-element subset of $X$. The quantity of $r$-element subsets is denoted $C(n, r)$ or $\binom{n}{r}$, and is read “$n$ choose $r$.”
- A **combinatorial proof** is an argument based on the principles of counting.

**Topic 14: Algorithms**

- An **algorithm** is a finite set of instructions for performing a task.
- A **recursive definition** has two (sometimes three) parts:
  1. The **basis clause** determines how trivial cases are to be handled.
  2. The **inductive clause** explains how complex problems are answered in terms of simpler versions of the same problem.
  3. The **extremal clause** says that only cases covered by the basis and inductive clauses are covered by the recursive definition. That is, the extremal clause provides boundaries for the definition.
- A **recursive algorithm** expresses the solution to a task in terms of a simpler case of the same problem.
- The **factorial** of a non-negative integer $n$, denoted $n!$, is the product of all integer values from 1 through $n$, inclusive. By definition, $0! = 1$.
- The $n^{th}$ term of the **Fibonacci sequence** is the sum of terms $n - 1$ and $n - 2$, where $F(0) = 0$ and $F(1) = 1$.

**Topic 15: Recurrence Relations**

- A **recurrence relation** for the sequence $a_0, a_1, \ldots$ is an equation that expresses term $a_k$ in terms of one or more of its preceding sequence members, one of more of which are explicitly stated **initial conditions** of the sequence.
- A **linear homogeneous recurrence relation with constant coefficients of degree (or order) $k$** (abbreviated: LHRRWCC of degree $k$) has the form $R(n) = c_1 R(n - 1) + c_2 R(n - 2) + \ldots + c_k R(n - k)$, where $c_i \in \mathbb{R}$ and $c_k \neq 0$.

**Topic 16: Finite Probability**

- The **probability** that a specific event will occur is the ratio of the number of occurrences of interest to the number of possible occurrences.