TCSS 343 - Week 0 - Thursday

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Strong Induction and some Mathematical Review

1. Today we will delve deeper into strong induction. You may not be asked to do this until later in the quarter yourself, but I want to review strong induction more heavily as many of the proofs you will see will rely on this technique!

Weak Induction

Step 1: State Claim: We will show $P(n)$ is true $\forall n$, using induction on n.

Step 2: State Basis: We will show that P(1) is true.

Step 3: Inductive Hypothesis: State P(k)

Step 4: Inductive Step: Suppose $P(k)$ is true, for some integer k. We need to show that $P(k+1)$ is true.

Strong Induction

Step 1: State Claim: We will show $P(n)$ is true $\forall n$, using induction on n.

Step 2: State Basis: We will show that P(1) is true.

Step 3: Inductive Hypothesis: State P(k)

Step 4: Inductive Step: Suppose $P(1)$ through $P(k)$ is true, for some integer k. We need to show that $P(k+1)$ is true.

2. Simplify the following algebraic expressions.

   (a) $9n * (3n^2 + 5n + 8)$