LECTURE 10: MORE INDUCTION

Date: September 20, 2019.

Induction: To prove $\forall n \in \mathbb{N}$ such that $n \geq b$, $P(n)$

- Prove $P(b)$ [**Base Case**]
- Prove for all $n > b$, if $P(0)$ AND $P(1)$ AND $\cdots$ AND $P(n-1)$ then $P(n)$ [**Induction Step**]

Proposition 1. *For any $n \geq 0$, a $2^n \times 2^n$ checker board with a "middle square" removed can be tiled using L-shaped triominoes.*

Fibonacci Numbers: Numbers obtained by the following recursive process: $F(0) = 0$, $F(1) = 1$, and $F(n) = F(n-1) + F(n-2)$ when $n > 1$.

Proposition 2. *For any* $n \geq 0$, $F(n)$ *is even* IFF $F(n+3)$ *is even.*

Theorem 3. *Every integer greater than* 1 *is a product of primes.*

(Weak) Induction: To prove $\forall n \in \mathbb{N}$ such that $n \geq b$, $P(n)$

- Prove $P(b)$ [**Base Case**]
- Prove for all $n > b$, if $P(n-1)$ then $P(n)$ [**Induction Step**]