Lecture 2- Induction

Base Case P(0) —if True→ P(0) → P(1) —if True→ P(n) → P(n+1)

$$\forall x \in \mathbb{N} : all\, P(n)\, is\, true$$

> ✏️ Note
>
> - Important propositions are called **theorems**.
> - A **lemma** is a preliminary proposition useful for proving later propositions.
> - A **corollary** is a proposition that follows in just a few logical steps from a lemma or a theorem

> 📖 Tip
>
> Because a conditionals contrapositive equals to itself proving contrapositive proves also the theorem.

Sets

$S \subseteq T$ indicates that set S is a subset of set T and S may be equal to T.
$S \subset T$ indicates that set S is a subset of set.

$\overline{A}$ is consists from every element not in set A.Henceforth that is called **complement**

Cardinality

|{1,2,3}| = 3

Power set

Every subset of a set A.

Cross product

A product of sets, S1 S2 , is a new set consisting of all sequences where the first component is drawn from S1, the second from S2, and so forth.

$$\mathbb{N} \times \{a, b\} = \{0, a\}, \{0, b\}, \{1, a\}, \{1, b\} \ldots$$