

**LOGIC - From the Greek
“logos” meaning “word”.
The study of the principles of
reasoning.**

Early history:

- **Origins around 4th century BC in**
 - **China** (Mo Zi, the Logicians)
 - **India** (Hindu, Buddhist philosophy)
 - **Greece** - mainly **Aristotle**
 - Name ‘**Logic**’ due to **Zeno the Stoic** (around 300BC)
- **Beginnings of formal Logic -**
 - **René Descartes** (1596 -1650)
 - **Gottfried Leibniz** (1646 -1716)
 - **George Boole** (1815 -1864)
 - **Augustus De Morgan** (1806 -1871)
- **“Father of Modern Logic” - In 1879**
Gottlob Frege’s **“Begriffsschrift”**
brought in variables and quantifiers

The Modern Era:

Albert Einstein, 1950:

“When we say that we understand a group of natural phenomena, we mean that we have found a constructive theory which embraces them.”

● **Hilbert and *formal systems***

- **The Paradoxes** (Russell, etc.)
- **Hilbert’s Programme** - try to capture all of mathematics in consistent logical theories
- The power of the ***axiomatic method***

● **The 1930s - Gödel, Turing, Church**

- The notion of ***algorithm*** clarified
- The discovery of the link between ***proofs*** and ***computer programs*** ...
- **Gödel’s Theorem**, and the ***limits of logical theories*** - and of ***computers***