

# COMP6262 Logic Assignment - 3

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## Introduction

Unlike the implication used in = natural language that can indicate causation, formal logic on the other hand is un-intuitive. Consider an example the phrase *philosophers are superhuman* can have two different meanings. If one is a philosopher, one is superhuman or all superhuman are philosophers. To circumvent these ambiguities, formal logic defines a truth table as below :

$p$	$q$	$p \rightarrow q$
1	1	1
1	0	0
0	1	1
0	0	1

However, such strict interpretations are often at odds with the way implication is perceived in natural language. and thus are paradoxical  
This discussion shall be centered around the following implications:

1.  $A \vdash (A \rightarrow B)$
2.  $\neg B \vdash (A \rightarrow B)$

Following which a new paradigm for solving implication shall be introduced that circumvent the demerits of the first definition

## Solution to the paradox

The objective of introducing a new paradigm to precisely and coherently formalize the implication used in natural language would be :

$p$	$q$	$p \rightarrow q$
1	1	1
1	0	0
0	1	0
0	0	1

The merits and demerits along with the proofs of sequents [1] and [2] from the introduction should be discussed by proving them using both the old and new natural deduction rules that need to be introduced.

Modified Implication Elimination ... (1)	
$X \vdash A \rightarrow B$	$Y \vdash \neg B$
$X, Y \vdash \neg B$	
Modified Implication Elimination ... (2)	
$X \vdash A \rightarrow B$	$Y \vdash A$
$X, Y \vdash B$	
Modified Implication Introduction ... (3)	
$X, A \vdash B$	
$X \vdash A \rightarrow B$	
Modified Implication Introduction ... (4)	
$X, \neg A \vdash \neg B$	
$X \vdash \neg A \rightarrow \neg B$	