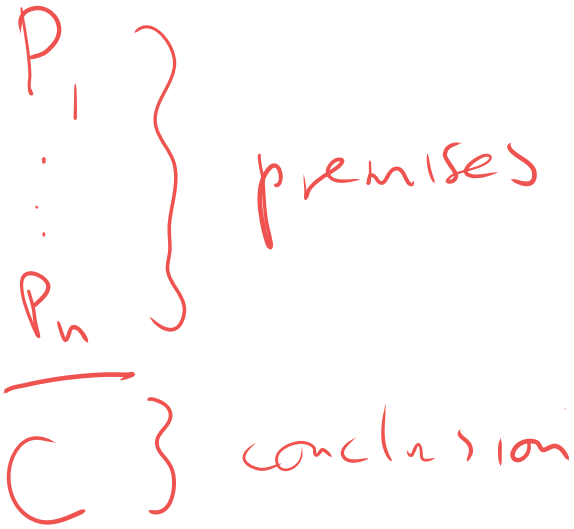
I can write here!

an argument is a list of statements



$$\frac{A \qquad A \to B}{B} \qquad \frac{A \to B \qquad B}{A}$$

An argument is valid if all assignments of values to variables which make all the premises true make the conclusion true

(an argument where premises are inconsistent is valid!)

A

$A \to B$

B

modus ponens

$A \to B$

if A then B

implication

		P_1	P_2	C
A	B	A	$A \to B$	B
T	T	T	T	T
T	F	T	F	F
F	T	F	T	T
F	F	F	T	T

In line 1, where the premises are both true, the conclusion is "true" (and line 1 is the only such line)

$A \to B$

B

affirming the consequent

A

	P_1		P_2	C
A	B	$A \to B$	B	A
① T	T	T	T	T
② T	F	F	F	T
③ F	T	T	T	F
④ F	F	T	F	F

A	B	$A \to B$
T	T	T
T	F	F
F	T	T
F	F	T

This is invalid because of line 3

A

¬A

B

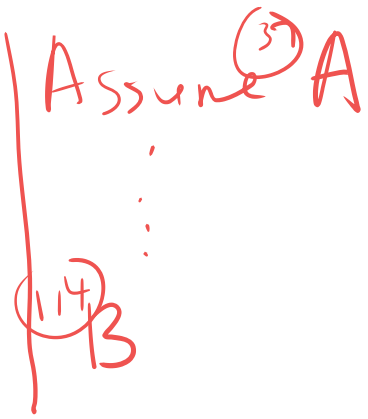
One can also say
an argument is valid iff
there is no assignment of values
which makes all the premises true
and the conclusion false.

modus ponens

m.p.

$$\frac{A \to B \qquad A}{B}$$

To prove $A \to B$



$A \to B$ deduction 37, 114

Prove $((A \to B) \wedge (B \to C)) \to (A \to C)$

① Assume $(A \to B) \wedge (B \to C)$

Goal: $A \to C$

② Assume A

Goal: C

③ $A \to B$ simp 1

④ $B \to C$ simp 1

⑤ B m.p. 2,3

⑥ C m.p. 4,5

⑦ $A \to C$ deduction 2-6

⑧ the theorem deduction 1-7

$(A \to B \wedge B \to C) \to (A \to C)$

$\frac{X \wedge Y}{X}$

$\frac{X \wedge Y}{Y}$

Theorem

$$(A \to (B \to C)) \leftrightarrow ((A \wedge B) \to C)$$

Part 1

Assume ① $A \to (B \to C)$

Goal: $(A \wedge B) \to C$

| Assume ② $A \wedge B$
| Goal: C
| ③ A simp 2
| ④ B simp 2
| ⑤ $B \to C$ m.p. 1, 3
| ⑥ C mp 4, 5

⑦ $(A \wedge B) \to C$ ded 2-6

finished part 1

Part 2 Base ② $(A \wedge B) \to C$

Goal: $A \to (B \to C)$