

# Artificial Intelligence - Lab 4

your name  
your\_email@ru.is

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## Inference rules

$$\{\alpha \Rightarrow \beta, \alpha\} \vdash \beta \quad (1)$$

$$\{\alpha \Rightarrow \beta, \neg\beta\} \vdash \neg\alpha \quad (2)$$

$$\{\alpha \wedge \beta\} \vdash \alpha \quad (3)$$

$$\{\alpha, \beta\} \vdash \alpha \wedge \beta \quad (4)$$

$$\{\alpha\} \vdash \alpha \vee \beta \quad (5)$$

$$\{\alpha \vee \beta, \neg\alpha\} \vdash \beta \quad (6)$$

$$\alpha \Leftrightarrow \beta \equiv \beta \Leftrightarrow \alpha \quad (7)$$

$$\alpha \Leftrightarrow \beta \equiv (\alpha \Rightarrow \beta) \wedge \beta \Rightarrow \alpha \quad (8)$$

$$\alpha \Rightarrow \beta \equiv \neg\alpha \vee \beta \quad (9)$$

$$\alpha \wedge \beta \equiv \beta \wedge \alpha \quad (10)$$

$$\alpha \vee \beta \equiv \beta \vee \alpha \quad (11)$$

$$\neg(\alpha \wedge \beta) \equiv \neg\alpha \vee \neg\beta \quad (12)$$

$$\neg(\alpha \vee \beta) \equiv \neg\alpha \wedge \neg\beta \quad (13)$$

$$\neg\neg\alpha \equiv \alpha \quad (14)$$

## Task 1 - Knowledge base

#	sentence
1	$P \Rightarrow Q$
2	$P$

## Task 2 - Propositional symbols

symbol	meaning
R	it rains today
...	...

### Task 3 - Inference

#	inference rule	sentence
1-2	from KB	see above
3	rule 1 with 1+2	$Q$