Artificial Intelligence - Lab 4

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Inference rules

$$\{\alpha \Rightarrow \beta, \alpha\} \quad \vdash \quad \beta \tag{1}$$

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

$$\{\alpha \wedge \beta\} \quad \vdash \quad \alpha \tag{3}$$

$$\{\alpha, \beta\} \quad \vdash \quad \alpha \wedge \beta \tag{4}$$

$$\{\alpha\} \quad \vdash \quad \alpha \vee \beta \tag{5}$$

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

$$\alpha \Leftrightarrow \beta \quad \equiv \quad \beta \Leftrightarrow \alpha \tag{7}$$

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

$$\alpha \Rightarrow \beta \quad \equiv \quad \neg\alpha \vee \beta \tag{9}$$

$$\alpha \wedge \beta \quad \equiv \quad \beta \wedge \alpha \tag{10}$$

$$\alpha \vee \beta \quad \equiv \quad \beta \vee \alpha \tag{11}$$

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

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

$$\neg\neg\alpha \quad \equiv \quad \alpha \tag{14}$$

Task 1 - Propositional symbols

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

Task 2 - Knowledge base

#	sentence
1	$P \Rightarrow Q$
2	P

Task 3 - Inference

#	inference rule	inferred sentence
1-2	from KB	see above
3	rule 1 applied to 1+2	Q