

Homework 1

Due Tuesday 12 September in class

(1) Which of the following expressions are SC sentences?

- (a) $ABC \vee \neg \rightarrow \leftrightarrow \wedge$)
- (b) $((A \vee B) \vee (A \vee B) \vee (A \vee B))$
- (c) $((A \rightarrow C) \vee (D \leftrightarrow B))$
- (d) A
- (e) $(A \wedge A)$
- (f) $((B \rightarrow B \vee E$
- (g) $((B \& C) \rightarrow E)$

(2) Classify the following expressions as an atomic sentence¹, a negation, a conjunction, a disjunction, a conditional, a biconditional, or not an SC sentence.

- (a) $((A \vee B) \rightarrow ((A \vee B) \vee (A \vee B))$
- (b) $\neg(((A \vee B) \vee (A \vee B)) \vee (A \vee B))$
- (c) $(\varphi \wedge \psi)$
- (d) A
- (e) $(\neg B)$

(3) Give an example of an SC sentence which is

- (a) a disjunction both of whose disjuncts are conditionals
- (b) a negated biconditional
- (c) a conditional with an antecedent which is a conjunction and a consequent which is a disjunction
- (d) a conjunction with at most one conjunct which is an atomic sentence¹

(4) Consider the following definition of an XC sentence:

Every atomic sentence¹ is an XC sentence.

The result of writing “ \neg ” in front of an XC sentence is always an XC sentence.

The result of writing “(”, followed by an XC sentence, followed by one of the symbols “ \wedge ,” “ \vee ,” “ \rightarrow ,” and “ \leftrightarrow ”, followed by an XC sentence is always an XC sentence.

Nothing is an XC sentence unless it's required to be by the three clauses above.

(a) Which of the expressions from question (1) are XC sentences?

(b) Do the XC sentences have unique readability? Why or why not?

(5) Suppose that the definition of an SC sentence is changed so that only one symbol, “*” is used instead of the two symbols “(” and “)”. In that case, for example, “ $(A \vee B)$ ” would not be an SC sentence, but “ $*A \vee B*$ ” would be an SC sentence.

Would there still be unique readability? Why or why not?

¹Assume the atomic sentences are the capital Roman letters “A”, “B”, “C” ... “Z”.