CS202M First Exam

Jan 30, 2024
Duration: 75 minutes
Max Marks: 40

Closed Book and Open Lecture Notes and Open Printouts of Course Website Material

Instructions

1. The exam is closed book and open lecture-notes and open printouts of course website material.
2. You are not allowed to have electronic devices such as mobile phones, laptops or tablet PCs with you during the exam.
3. Answers should be clear, and to the point. Also write your answers neatly and strike out any rough work.
4. In your derivation trees, for each inference rule applied please write its name alongside.

Q1(marks-4) Give a (intuitionistic logic) derivation of $A \vee \neg A \vdash_{Ni} \neg\neg A \to A$.

Q2(marks-8) Give a (classical logic) derivation of $A \to B \vdash_{Nc} \neg A \vee B$.

Q3(marks-3+3+12)

(a) Give a (minimal logic) derivation of $A, \neg B \vdash_{Nm} \neg(A \to B)$.

(b) Label your deduction in **(a)** with construction terms.

(c) Give a (minimal logic) derivation of $\neg\neg(A \to B) \vdash_{Nm} \neg\neg A \to \neg\neg B$.

[Hint: you may like to use part **(a)**]

Q4(marks-5+5) Let $\mathbf{B} = (B, \leq, \vee, \wedge, \neg, 0, 1)$ be a Boolean algebra.

(i) For any $a, b \in B$, show that $a \leq b$ iff $\neg b \leq \neg a$.

(ii) For any $a, b \in B$, show that $a \leq b$ iff $a \to b = 1$, (where $a \to b \equiv \neg a \vee b$).

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