Exam
Logical theory part II, LOG110

2019–01–14

This exam is marked and graded anonymously using code numbers. Please enter your name and personal identity number below. Then enter only the code number on the answer sheets.

Name / Namn: .....

Personal identity number / Personnummer: .....

Code number / Tentamensnummer: .....

FLoV
Göteborgs universitet

EXAM 2019-01-14
Logical theory part II, LOG110

No aids are permitted.

1. Show that the following formulas are not derivable in intuitionistic logic, i.e., $\nvdash_i \varphi$:
   (a) $(p_0 \to p_1) \vee (p_1 \to p_0)$, where p_i are 0-ary predicate symbols. (2p)
   (b) $(p \to \exists x P(x)) \to \exists x(p \to P(x))$, where p is a 0-ary and P a unary predicate symbol. (3p)

2. Define a translation/function $f : \text{FORM} \to \text{FORM}$ such that (4p)

$$\vdash_c \varphi \text{ iff } \vdash_i f(\varphi).$$

3. State the subformula property of classical predicate logic and use it to prove that $\nvdash_c \bot$ (4p)

4. State and prove the Gödel incompleteness theorem given the Fixpoint theorem. (4p)

5. (a) Define what a primitive recursive function is. (2p)
   (b) Give an example of a partial recursive function that is not primitive recursive. (1p)
   (c) Give an example of a recursive function that is not primitive recursive. (2p)

Max points: 22. 11 points are required for Pass (G) and 16 for Pass with distinction (VG).

Fredrik Engström, 031 – 786 6335, fredrik.engstrom@gu.se