CS206 Tutorial No. #9

Date: Mar 31, 2006

1. Show using Compactness Theorem that it is not possible to write a predicate logic sentence ϕ with no free variables and using only the equality predicate and a binary predicate E (null-ary function symbols or constants are allowed), such that
   (i) all models of ϕ are connected directed graphs, and
   (ii) any connected directed graph gives rise to a model of ϕ.

2. Show using Compactness Theorem that it is not possible to write a predicate logic sentence ϕ with no free variables and using only the equality predicate, such that
   (i) all models of ϕ have finite domains, and
   (ii) any finite domain model gives rise to a model of ϕ.

3. Show using Compactness Theorem that it is not possible to write a predicate logic sentence ϕ with no free variables and using only the equality predicate, such that
   (i) all models of ϕ are have an even cardinality domain, and
   (ii) any even cardinality domain model gives rise to a model of ϕ.