4.1 The following sentence is scopally ambiguous:

(1) *Every student at a university reads a paper*.

Using Nested Cooper Storage, we can derive five distinct readings for the sentence:

(a) $\forall x((S(x) \wedge \exists y(U(y) \wedge A(y)(x))) \rightarrow \exists z(B(z) \wedge R(z)(x))$

(b) $\exists y(U(y) \wedge \forall x((S(x) \wedge A(y)(x))) \rightarrow \exists z(B(z) \wedge R(z)(x))$

(c) $\exists z(B(z) \wedge \forall x((S(x) \wedge \exists y(U(y) \wedge A(y)(x))) \rightarrow R(z)(x))$

(d) $\exists z(B(z) \wedge \exists y(U(y) \wedge \forall x((S(x) \wedge A(y)(x))) \rightarrow R(z)(x))$

(e) $\exists y(U(y) \wedge \exists z(B(z) \wedge \forall x((S(x) \wedge A(y)(x))) \rightarrow R(z)(x))$

where S stands for “student,” U for “university,” B for “book,” R for “reads,” and A for “at.”

Show how these readings can be derived. You don‘t need to compute the corresponding semantic representations explicitly – it is sufficient to indicate for each reading of the sentence which operation (storage, retrieval, or application) needs to be performed at which node in the syntax tree to derive the reading.

4.2 Classify the following noun phrases / quantifiers w.r.t. their monotonicity properties:

(f) exactly n N

(g) at least n N

(h) at most n N

(i) less than half of the N

(j) Mary

(k) some but not all N

4.3 Try to show that the disjunction of two upward monotonic quantifiers is an upward monotonic quantifier.

4.4 Try to show that the external negation of an upward monotonic quantifier is a downward monotonic quantifier.

To be turned in Tuesday, 2011-05-17.