Maha Alkhairy NLP HW3

Formal Semantic

1. [12 points] Translate the following sentences into quantified formulas of first-order logic:
    a. Angus likes someone and someone likes Julia.

        ∃x likes(Angus, x) ∧ likes(x, Julia)

    b. Nobody smiles at Pat.

        ¬ (∃x smiles-at(x, Pat))

    c. Nobody coughed or sneezed

        ¬ (∃x coughed(x) ∨ sneezed(x)

2. [12 points] Translate the following *verb phrases* using λλ-abstracts and quantified formulas of first-order logic:
    a. feed Cyril and give a compliment to Angus

        λx act(x, feed), feeder(x), fed(Cyril) ∧ λy act(y, compliment), complimentor(y), complimented(Angus)

    b. be loved by everyone

        λx ∀y act(x, be-loved), being-loved(x), lover(y)

    c. be loved by everyone and detested by no-one

        λx ∀y act(x, be-loved), being-loved(x), lover(y) ∧ ¬(∃y act(x, be-detested), being-detested(x), detester(y))

3. [6 points] Let g=chase and h=λx.∀y.(dog(y)⇒chase(x,y))h=λx.∀y.(dog(y)⇒chase(x,y)). If h=f(g)h=f(g), write down a λ-abstract for f.

$f = \lambda x.\lambda w.\forall y.\ (dog(y) \Rightarrow w(x, y)$

4. [7 points] Let
   g=give and h=λz.λx.∃y.(present(y)∧give(x,y,z))h=λz.λx.∃y.(present(y)∧give(x,y,z)).
   If h=f(g)h=f(g), write down a λ-abstract for f

   $f = \lambda z.\lambda x.\lambda w.\ \exists y.\ (Present(y) \wedge w(x, y, z))$