Model M^0

A = {Richard Nixon, John Mitchell, Noam Chomsky, Muhammad Ali}

F(d) = $[[d]]^{M0}$ = Richard Nixon F(j) = $[[j]]^{M0}$ = John Mitchell

F(n) = $[[n]]^{M0}$ = Noam Chomsky F(m) = $[[m]]^{M0}$ = Muhammad Ali

F(M) = $[[M]]^{M0}$ = set of people with moustaches = {John Mitchell}

F(B) = $[[B]]^{M0}$ = set of people who are bald = {Richard Nixon, John Mitchell}

F(K) = $[[K]]^{M0}$ = set of all pairs of people such that the first knows the second = {<Richard Nixon, Noam Chomsky>, <Noam Chomsky, Richard Nixon>, <John Mitchell, Richard Nixon>, <Noam Chomsky, Muhammad Ali>, <Richard Nixon, Muhammad Ali>, <Muhammad Ali, Richard Nixon>}

F(L) = $[[L]]^{M0}$ = set of all pairs of people such that the first loves the second = {<Richard Nixon, Noam Chomsky>, <Noam Chomsky, Muhammad Ali>, <Muhammad Ali, John Mitchell>, <John Mitchell, Richard Nixon>}

Model M^1

A = {David Crystal, Norah Jones, John Wayne, Mother Teresa}

F(d) = $[[d]]^{M1}$ = David Crystal F(j) = $[[j]]^{M1}$ = John Wayne

F(n) = $[[n]]^{M1}$ = Norah Jones F(m) = $[[m]]^{M1}$ = Mother Teresa

F(M) = $[[M]]^{M1}$ = set of people with moustaches = {David Crystal, John Wayne}

F(B) = $[[B]]^{M1}$ = set of people who are beautiful = {Norah Jones, John Wayne}

F(K) = $[[K]]^{M1}$ = set of all pairs of people such that the first knows the second = {<Norah Jones, John Wayne>, <Norah Jones, Mother Teresa>, <John Wayne, Mother Teresa>, <David Crystal, Mother Teresa>, <David Crystal, John Wayne>}

F(L) = $[[L]]^{M1}$ = set of all pairs of people such that the first hates the second = {<David Crystal, Norah Jones>, <John Wayne, David Crystal>}

NOTE: The meaning of logical connectives remain the same across models.

Questions:

(A) Translate the following L_0 wffs into English and compute the missing truth-values, citing semantic rules:

1. $[[M(d)]]^{M0}$ = ? 2. $[[B(d)]]^{M0}$ = ? 3. $[[M(j)]]^{M0}$ = ? 4. $[[B(j)]]^{M0}$ = ?
5. $[[K(m, n)]]^{M0}$ = ? 6. $[[K(n, m)]]^{M0}$ = ? 7. $[[L(n, d)]]^{M0}$ = ? 8. $[[L(j, d)]]^{M0}$ = ?

For example:

(1) Richard Nixon has a moustache. $[[M(d)]]^{M0} = 1$ iff $[[d]]^{M0} \in [[M]]^{M0}$ (by B1). $[[M]]^{M0}$ = F(M) = {John Mitchell}, $[[d]]^{M0}$ = F(d) = Richard Nixon (by A). Richard Nixon $\notin$ {John Miitchell}. Therefore, $[[M(d)]]^{M0} = 0$.

(B) Write down all the sentences or wffs of L_0 and their semantic values *with respect to model* M^1.

(C) Assuming that unary predicates denote functions in $\{0,1\}^A$ (rather than sets of individuals) and binary predicates denote functions in $(\{0,1\}^A)^A$ (rather than sets of pairs of individuals), write down the semantic values (denotations) of the predicates *M, B, K* and *L* in models M^0 and M^1.

(D) Compute the missing truth-values in (A) assuming – as in (C) – that predicates denote functions rather than sets.