Quiz 2

* 1. **Assume that D0 = f, determine P(D1 ) and P(D2 ).**

Initial Distribution f = 1.0

D1:

P(D1 = f) = P(D1 = f | D0 = f) P(D1 = f) + P(D1 = f | D0 = s)P(D0=s) = 0.66 \* 1.0 + 0.33 \* 0.0 = 0.66 (2/3)

P(D1 = s) = P(D1 = s | D0 = f) P(D1 = s) + P(D1 = s | D0 = s)P(D0=s) = 0.33 \* 1.0 + 0.75 \* 0.0 = 0.33 (1/3)

D2:

P(D2 = f) = P(D2 = f | D1 = f) P(D1=f) + P(D2 = f | D1 = s)P(D1=s) =

P(D2 = s) = P(D2 = s | D1 = f) P(D1=s) + P(D2 = s | D1 = s)P(D1=f) =

* 1. **Determine P(D∞ ).**

Pinf (f) = P(f|f)Pinf(f) + P(f|s)Pinf(s)

Pinf (s) = P(s|f)Pinf(f) + P(s|s)Pinf(s)

Pinf(f) = 2/3Pinf(f) + 1/3Pinf(s)

Pinf(s) = 1/3Pinf(f) + 3/4Pinf(s)

Pinf(f) + Pinf(s) = 1

**2. Let B0 (+r) = 0.6 and B0 (-r) = 0.4. Determine B1 (R) and B2 (R) given that we observe U1 = +u and U2 = -u.**

HMM:

U1 = +u

U2 = -u

Joint distribution:

B1(-r) = P(R1) \* P(U1|R1) \* P(R2) \* P(U1|R2) = ¨

B1(+r) = P(R1) \* P(U1|R1) \* P(R2) \* P(U1|R2) =

B2(-r) = P(R1) \* P(U2|R1) \* P(R2) \* P(U1|R2) =

B2(+r) = P(B2) \* P(U2|B2) \* P(R2) \* P(U1|R2) =

3.1 **Write down an equation for the joint probability distribution of the Bayes Net above**

P(A) P(B) P(E | A,B) P(C | A,B) P(D | C,E)

3.2 **Consider the following joint distribution P(A)P(B)P(C|A,B)P(D|C)P(E|B,C). Draw the corresponding Bayes Net.**

3.3 **Consider the following Bayes Net.**

Calc: P(+j, -f, -c, -b, +e).

Ends in Product of the probabilities:

P(+e) \* P(-b) \* P(-f | -c) P(+j | -c) (missing J)

0.1 \* 0.2 \* 0.98 \* +j prob =

0.1 \* 0.2 \* 0.98 \* 0.05 =