1] $P(T \geq 80/m) = 0.2$

$P(T \geq 80/S) = 0.9$

$P(T < 80/m) = 0.8$

$P(T < 80/m) = 0.1$

$P_0(m) = 0.05 \quad P_0(S) = 0.95$

a) By Bayes th^m

$$P(m|T<80) = \frac{P(T<80|m)\,P_0(m)}{P(T<80|m)\,P_0(m) + P(T<80|S)\,P_0(S)}$$

$$= \frac{0.8 \times 0.05}{0.8\times0.05 + 0.1\times0.95} = 0.296$$

$$P_0(T<80) = 0.8\times0.05 + 0.1\times0.95 = 0.135$$

b) Probability that 2nd email also indicates daily high under 80 degrees, is $P_1(T<80)$

$$P_1(m) = \frac{P(T<80|m)\times P_0(m)}{P_0(T<80)} = \frac{0.8\times0.05}{0.135}$$

$$= 0.296$$

$$P_1(S) = 1 - P_1(m) = 0.704$$

$$P_1(T<80) = P(T<80|m)P_1(m) + P(T<80|S)\cdot P_1(S)$$

$$= 0.8\times0.296 + 0.1\times0.704$$

$$= 0.3071$$

c) Prob. of third email indicating daily high under 80 degrees $= P_2(T<80)$

$$P_2(m) = \frac{P(T<80|m)\times P_1(m)}{P_1(T<80)} = \frac{0.8\times0.296}{0.3071}$$

$$= 0.77$$

$P_2(S) = 1 - P_2(M) = 0.23$

$P_2(T < 80) = P(T < 80 | M) P_2(M) + P(T < 80 | S) . P_2(S)$

$= 0.8 \times 0.77 + 0.1 \times 0.23 = 0.639$

$\therefore$ P(all 3 emails of daily high under 80 degrees) $= P\left(P_0(T<80) P_1(T<80) P_3(T<80)\right)$

$= P_0(T<80) \times P_1(T<80) \times P_2(T<80)$

$= 0.135 \times 0.3071 \times 0.639$

$= 0.0265$

2] There are total 11 variables,

A, B_1, B_2, B_3, B_4, B_5, B_6, B_7, B_8, B_9, B_{10}

A → 5 values.

B → 7 values.

a) In joint distributⁿ we need to store value of every combinatⁿ

$\therefore \quad 5 \times 7 \times 7 \times 7 \times 7 \times 7 \times 7 \times 7 \times 7 \times 7 \times 7 = 5 \times 7^{10}$.

b) Since each B_i is independent of other B_j

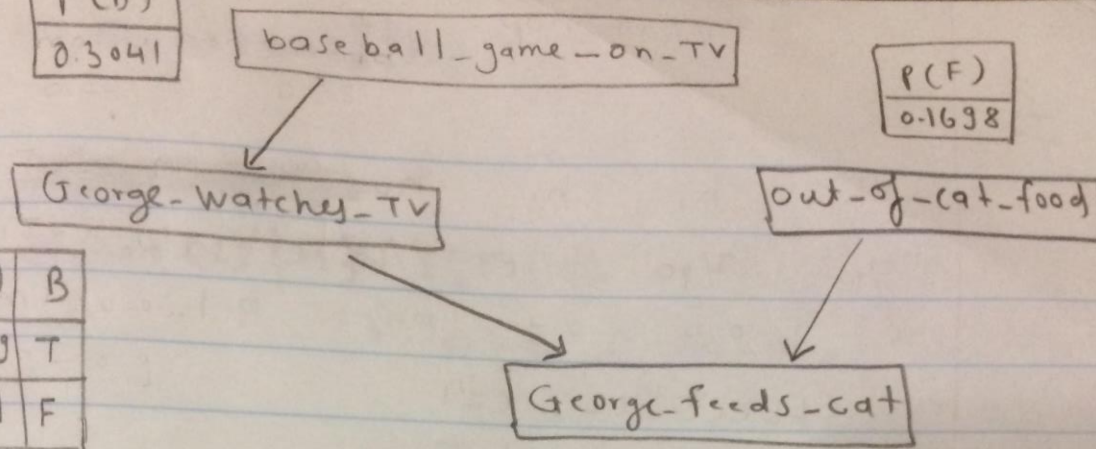
we need 5 values of A & B_1 or B_2 or B_2

$\therefore \quad = 5(7 + 7 + 7 + 7 + 7 + 7 + 7 + 7 + 7 + 7)$

$= 5 \times 10 \times 7$

$= 350$

3] & 4]



P(B)
0.3041

P(F)
0.1698

P(G/B)	B
0.9279	T
0.1181	F

P(GFC/F, G)	F	G
0.0416	T	T
0.7064	T	F
0.3157	F	T
0.9587	F	F

5] a) markov blanket consists of parent, children & ~~par~~ other parents of its children

$\therefore$ markov blanket of L is G, K, P, Q, M

b) $P(A, F) = P(A) . P(F|A)$

$= 0.8 \times 0.8 = 0.64$

explanation :-

P(A)
0.8

P(F)	A
0.8	T
0.3	F

since F depends on A & since A has happened with prob 0.8

$\therefore$ we consider true part of P(F) given A is true

$\therefore 0.8 \times 0.8 = 0.64$.

d) $P(m, \text{not}(c) \mid H) = ?$

$\cancel{P(\text{not}(c) \mid H) =}$

$$
\begin{aligned}
P(M, \text{not}(c) \mid H) &= P(m \mid H) \cdot P(\text{not}(c) \mid H) \\
&= 0.1 \times \frac{P(H \mid \text{not}(c)) \cdot P(\text{not}(c))}{P(H)} \\
&= 0.1 \times \frac{0.1 \times 0.4}{P(H \mid C) \cdot P(C) + P(H \mid \text{not}(c)) \cdot P(\text{not}(c))} \\
&= 0.1 \times \frac{0.04}{0.6 \times 0.6 + 0.1 \times 0.4} \\
&= \frac{0.004}{0.36 + 0.04} \\
&= \frac{0.004}{0.40} = \frac{\cancel{4} \times 10^{-3}}{\cancel{4} \times 10^{-1}} = 0.01
\end{aligned}
$$

In baysian n/w we know that given parent, grandparent & children are independent of each oth