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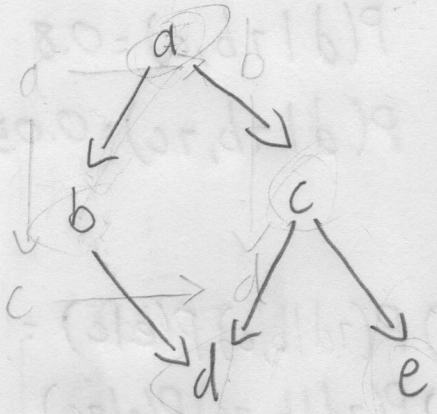
1a)



$P(a)$, $P(b|a)$, $P(c|a)$

$P(d|b,c)$, $P(e|c)$

b) $P(a,b,c,d,e) = P(a)\,P(c|a)\,P(b|a)\,P(d|b,c)\,P(e|c)$

b) $a \to c \to e$

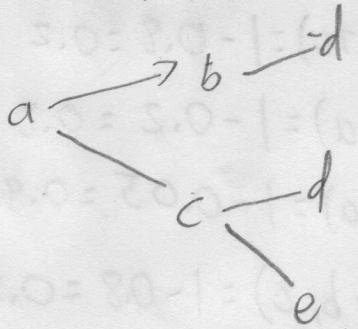
$P(a,c,e) = P(a)\,P(c|a)\,P(e|c)$ $\quad P(a,c) = P(a)\,P(c|a)$

$$P(e|a,c) = \frac{P(a,c,e)}{P(a,c)} = \frac{P(a)\,P(c|a)\,P(e|c)}{P(c|a)\,P(a)}$$

$$= P(e|c)$$

$\therefore$ e and a is independent when given c

$P(e|a) = P(e|c,a)$



c) $P(a) = 0.2$
$P(b|a) = 0.8$
$P(c|a) = 0.2$
$P(e|c) = 0.8$

$P(d|b,c) = 0.8$
$P(d|b,\neg c) = 0.8$
$P(b|\neg a) = 0.2$
$P(c|\neg a) = 0.05$

$P(e|\neg c) = 0.6$
$P(d|\neg b,c) = 0.8$
$P(d|\neg b,\neg c) = 0.05$

i) $P(a, b, c, \neg d, e) = P(a)\,P(b|a)\,P(c|a)\,P(\neg d|b,c)\,P(e|c) =$

ii) $P(a, b, \neg c, \neg d, e) = P(a)\,P(b|a)\,P(\neg c|a)\,P(\neg d|b,\neg c)\,P(e|\neg c)$

iii) $P(a, \neg b, c, \neg d, e) = P(a)\,P(\neg b|a)\,P(c|a)\,P(\neg d|\neg b\ c)\,P(e|c)$

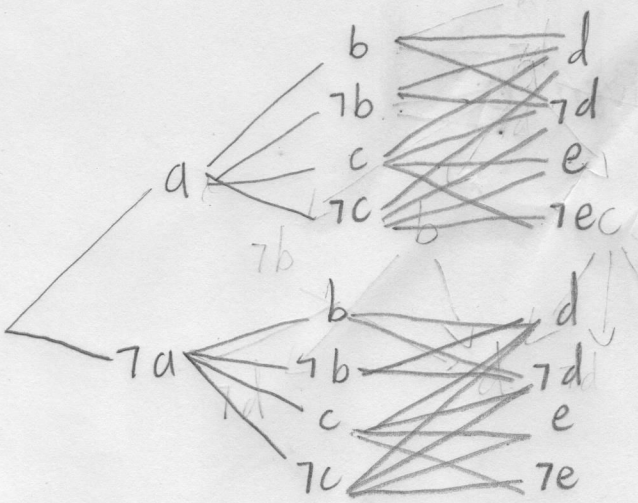
iv) $P(\neg a, b, c, \neg d, e) = P(\neg a)\,P(b|\neg a)\,P(c|\neg a)\,P(\neg d|b,c)\,P(e|c)$

v) $P(a, \neg b, \neg c, \neg d, e) = P(a)\,P(\neg b|a)\,P(\neg c|a)\,P(\neg d|\neg b,\neg c)\,P(e|\neg c)$

vi) $P(\neg a, \neg b, \neg c, \neg d, e) = P(\neg a)\,P(\neg b|\neg a)\,P(\neg c|\neg a)\,P(\neg d|\neg b,\neg c)\,P(e|\neg c)$

vii) $P(\neg a, \neg b, \neg c, \neg d, e) = P(\neg a)\,P(\neg b|\neg a)\,P(c|\neg a)\,P(\neg d|\neg b,c)\,P(e|\neg c)$

viii) $P(\neg a, \neg b, \neg c, \neg d, e) = P(\neg a)\,P(b|\neg a)\,P(\neg c|\neg a)\,P(\neg d|b,\neg c)\,P(e|\neg c)$



$P(\neg a) = 1 - 0.2 = 0.8$
$P(\neg b|a) = 1 - 0.8 = 0.2$
$P(\neg c|a) = 1 - 0.2 = 0.8$
$P(\neg d|b,c) = 1 - 0.8 = 0.2$
$P(\neg d|b,\neg c) = 1 - 0.8 = 0.2$
$P(\neg b|\neg a) = 1 - 0.2 = 0.8$
$P(\neg c|\neg a) = 1 - 0.05 = 0.95$
$P(\neg d|\neg b,c) = 1 - 0.8 = 0.2$
$P(\neg d|\neg b,\neg c) = 1 - 0.05 = 0.95$

i) $0.2 \cdot 0.8 \cdot 0.2 \cdot 0.2 \cdot 0.8 = 0.512\%$

ii) $0.2 \cdot 0.8 \cdot 0.8 \cdot 0.2 \cdot 0.6 = 1.536\%$

iii) $0.2 \cdot 0.2 \cdot 0.2 \cdot 0.2 \cdot 0.8 = 0.128\%$

iv) $0.8 \cdot 0.2 \cdot 0.05 \cdot 0.2 \cdot 0.8 = 0.128\%$

v) $0.2 \cdot 0.2 \cdot 0.8 \cdot 0.95 \cdot 0.6 = 1.824\%$

vi) $0.8 \cdot 0.8 \cdot 0.95 \cdot 0.95 \cdot 0.6 = 34.656\%$

vii) $0.8 \cdot 0.8 \cdot 0.05 \cdot 0.2 \cdot 0.8 = 0.512\%$

viii) $0.8 \cdot 0.2 \cdot 0.95 \cdot 0.2 \cdot 0.6 = 1.824\%$

d) $P_{priori} = 0.2$

Less since $0.2 > P(a,b,c,\neg d,e)$, $P(a,b,\neg c,\neg d,e)$, $P(a,\neg b,c,\neg d,e)$, $P(a,\neg b,\neg c,\neg d,e)$