TDT 4171 ASSIGNMENT 1

1.1

B = amount of bananas eaten

b	$P(B=b)$
0	0,03
1	0,18
2	0,24
3	0,28
4	0,10
≥ 5	0,17

A) $P(B>2) = 0{,}28 + 0{,}10 + 0{,}17$
$$= \underline{\underline{0{,}55}}$$

B) $P(B \leq 4) = 1{,}0 - P(B \geq 5)$
$$= 1{,}0 - 0{,}17 = \underline{\underline{0{,}83}}$$

C) $P(B \geq 4) = 0{,}10 + 0{,}17$
$$= \underline{\underline{0{,}27}}$$

1.2

R = amount of rotten apples

$P(R=0)=0{,}6$, $P(R=1)=0{,}3$ $P(R=2)=0{,}1$

S = Selected apples are <u>not</u> rotten

A) $P(R=0|S) = \dfrac{P(S|R=0)\cdot P(R=0)}{P(S)}$ (*)

$P(S) = 0{,}6 \cdot 1{,}0 + \underbrace{0{,}3 \cdot \frac{19}{20} \cdot \frac{18}{19}} + 0{,}1 \cdot \frac{18}{20} \cdot \frac{17}{19}$

$\underline{= 0{,}95}$

1 rotten apple, 19 good

$\Rightarrow P(S|R=1) = \frac{19}{20} \cdot \frac{18}{19}$

first drawn

second draw

(*) $\dfrac{P(S|R=0)\cdot P(R=0)}{P(S)} = \dfrac{1{,}0 \cdot 0{,}6}{0{,}95} = \underline{\underline{0{,}63}}$

B) $P(R=1|S) = \dfrac{P(S|R=1)\cdot P(R=1)}{P(S)}$

$= \dfrac{\frac{19}{20} \cdot \frac{18}{19} \cdot 0{,}3}{0{,}95} = \underline{\underline{0{,}28}}$

C) $P(R=2 \mid S) = \dfrac{P(S \mid R=2) \cdot P(R=2)}{P(S)}$

$= \dfrac{\frac{18}{20} \cdot \frac{17}{19} \cdot 0{,}1}{0{,}95} = \underline{\underline{0{,}085}}$

1.3 $P(\text{Cold} \mid \text{man over } 50) = 0{,}07$

$P(\text{False positive}) = 0{,}05$

$P(\text{False negative}) = 0{,}10$

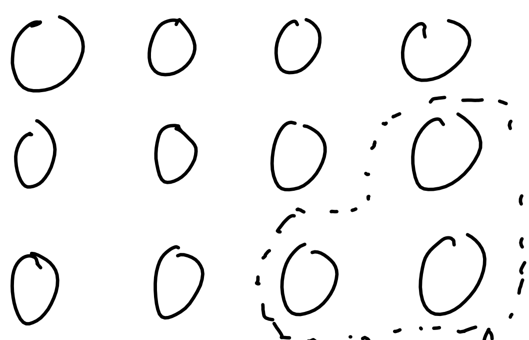
A) $P(\text{cold} \mid \text{negative}) = \dfrac{P(\text{negative} \mid \text{cold}) \cdot P(\text{cold})}{P(\text{negative})}$

$= \dfrac{0{,}10 \cdot 0{,}07}{\underbrace{0{,}93 \cdot 0{,}95}_{P(\text{negative} \mid \overline{\text{cold}}) \cdot P(\overline{\text{cold}})} + \underbrace{0{,}07 \cdot 0{,}10}_{P(\text{negative} \mid \text{cold}) \cdot P(\text{cold})}} = \underline{0{,}0077}$

1,4 12 computer sets, 3 defective

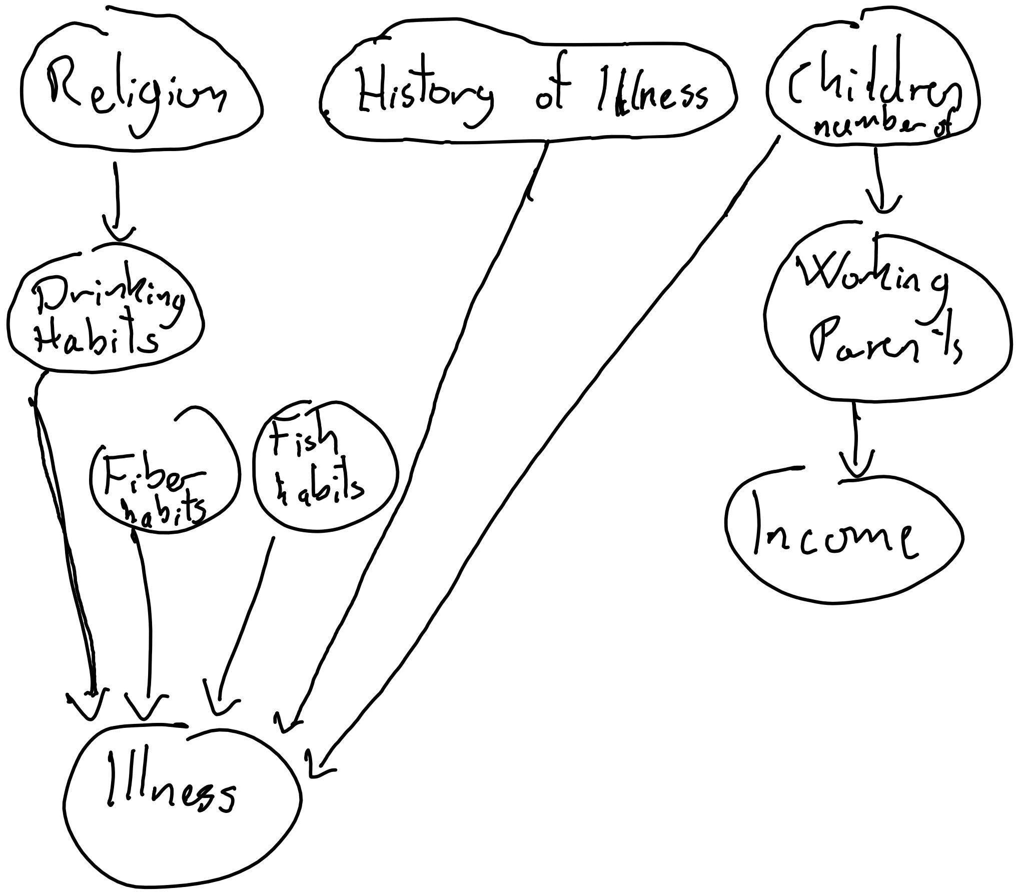
$$\underbrace{\binom{9}{2}\cdot\binom{3}{3}}_{\text{Combinations with 3 defective, 2 functioning}} + \binom{9}{3}\cdot\binom{3}{2} = \underline{\underline{288}}$$

9 functioning



3 Defective

2



Current Illness and household income are cond. indep. of each other given number of children. This may be a bit too simplified.