Problem 1

For this problem I used trump's tweets as the data set. I noticed that there was a peak in the number of tweets containing 132-154 characters. This is due to the old twitter character limit of 140 charcters. There is also another peak at 264-286 due to the new character limit. It does not folow the normal dist closly and this is seen with a very high Bhattacharyya Distanc.

Problem 2

The data I used for this problem is the goals of kickstarter projects, the amount of funding they get and the number of backers they have. Since I used a large data set the data is clumped togther after it was normalized to fit in each sub graph. I noticed a large correlation between the number of backers of a kickstarter project and the amount of money the recieve as expected.

Problem 3

Noticed that the graph showing the correlation between number of backers of a project and the amount of money they collect shows a string correlation.

For problems 6 and 7 i couldnt get the background image to work but have everythign else working.

Problem #4

a) Let A = probability that it is raining : $1/3$
Let B = probability that there is heavy traffic

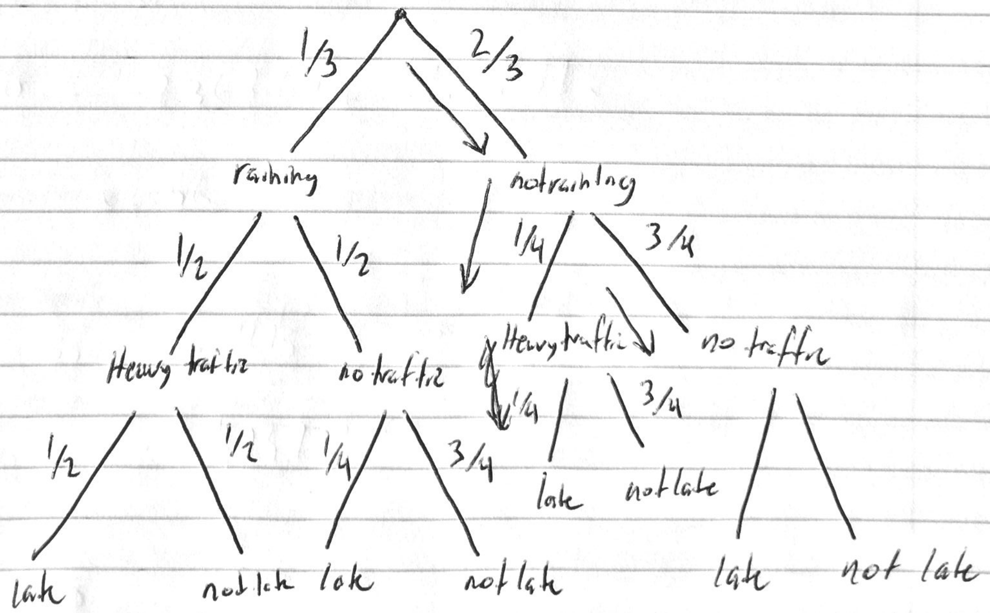
$P(B|A) = 1/2$ $\quad$ $P(B|!A) = 1/4$

Let C = probability that you arrive late to work

$P(C|A,B) = 1/2$ $\therefore$ $P(C|!A,!B) = 1/8$

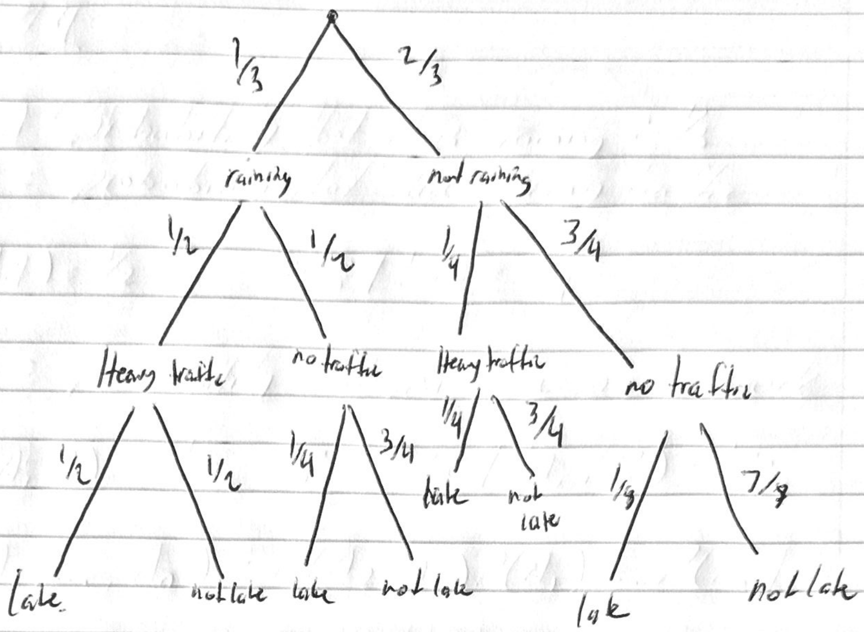
$P(A_1, A_2, \ldots, A_n) = P(A_2|A_1)P(A_1) \ldots P(A_n|A_1 A_2 \ldots A_n)$

$P(!A, B, !C) = P(!A)P(B|!A)P(!C|!A, B)$
$= (2/3)(1/4)(3/4) = 1/8$



$(2/3)(1/4)(3/4) = 1/8$

b)



$$\left(\tfrac{1}{3}\right)\left(\tfrac{1}{2}\right)\left(\tfrac{1}{2}\right) + \left(\tfrac{1}{3}\right)\left(\tfrac{1}{2}\right)\left(\tfrac{1}{4}\right) + \left(\tfrac{2}{3}\right)\left(\tfrac{1}{4}\right)\left(\tfrac{1}{4}\right) + \left(\tfrac{2}{3}\right)\left(\tfrac{3}{4}\right)\left(\tfrac{1}{8}\right)$$

$$= \tfrac{1}{12} + \tfrac{1}{24} + \tfrac{1}{24} + \tfrac{1}{16} = \tfrac{2}{12} + \tfrac{1}{16} = \tfrac{1}{6} + \tfrac{1}{16}$$

$$= \tfrac{11}{48}$$

c) Probability that you arrived late: $\tfrac{11}{48}$

~~Probability~~ need to find $P(A|C)$

$$P(A|C) = \frac{P(A \text{ and } C)}{P(C)}$$

$$P(A \text{ and } C) = \left(\tfrac{1}{3}\right)\left(\tfrac{1}{2}\right)\left(\tfrac{1}{2}\right) + \left(\tfrac{1}{3}\right)\left(\tfrac{1}{2}\right)\left(\tfrac{1}{4}\right)$$

$$= \tfrac{1}{12} + \tfrac{1}{24} = \tfrac{1}{8}$$

$$\therefore P(A|C) = \frac{1/8}{11/48} = 6/11$$

Problem 5

Bayes Theorem : $P(B|A) = \dfrac{P(A,B)}{P(A)}$

Let A = probability that the first child is a girl
Let B = probability that the second child is a girl

$\therefore \quad P(B|A) = \dfrac{(0.5)(0.5)}{0.5} = 1/2$