CMSC5724: Exercise List 2

Answer the following questions based on the training set below

A	B	C	class
0	2	1	$+$
1	2	2	$+$
1	1	0	$+$
2	0	2	$+$
1	1	1	$+$
2	2	2	$-$
0	1	0	$-$
0	0	1	$-$
2	1	0	$-$
1	0	0	$-$

Problem 1. Estimate $\mathbf{Pr}[class = +]$ and $\mathbf{Pr}[C = 2 \mid class = +]$.

Problem 2. Let us make the following *conditional independence assumption*: conditioned on a specific class, attributes A, B, C are independent. Estimate $\mathbf{Pr}[A = 1, B = 2 \mid class = +]$.

Problem 3. Under the conditional independence assumption, decide the larger probability between $\mathbf{Pr}[class = + \mid A = 1, B = 2, C = 0]$ and $\mathbf{Pr}[class = - \mid A = 1, B = 2, C = 0]$.

Problem 4. Suppose that we make an alternative conditional independence assumptions: A and C are independent, conditioned on a class label and a value of B. Decide the larger probability between $\mathbf{Pr}[class = + \mid A = 1, B = 2, C = 0]$ and $\mathbf{Pr}[class = - \mid A = 1, B = 2, C = 0]$.

Problem 5. Based on the following Bayesian network, decide the larger probability between $\mathbf{Pr}[class = + \mid A = 1, B = 1, C = 0]$ and $\mathbf{Pr}[class = - \mid A = 1, B = 1, C = 0]$.