## CS 333202: Probability and Statistics HW4 Part II

1. A total of 4 buses carrying 148 students from the same school arrives at a football stadium. The buses carry, respectively, 40, 33, 25 and 50 students. One of the students is randomly selected. Let $X$ denote the number of students that were on the bus carrying this randomly selected student. One of the 4 bus drivers is also randomly selected. Let $Y$ denote the number of students on her bus.
(a) Compute $E[X]$ and $E[Y]$.
(b) Find $\operatorname{Var}(X)$ and $\operatorname{Var}(Y)$.
2. A student is getting ready to take an important oral examination and is concerned about the possibility of having an "on" day or an "off" day. He figures that if he has an on day, then each of his examiners will pass him independently of each other, with probability 0.8 , whereas, if he has an off day, this probability will be reduced to 0.4 . Suppose that the student will pass the examination if a majority of the examiners pass him. If the student feels that he is twice as likely to have an off day as he is to have an on day, should he request an examination with 3 examiners or with 5 examiners?
3. Suppose that a biased coin that lands on heads with probability $p$ is flipped 10 times. Given that a total of 6 heads result, find the conditional probability that the first 3 outcomes are
(a) $h, t, t$ (meaning that the first flip is heads, the second is tails, and the third is tails);
(b) $t, h, t$.
