

## *Stat 134: Section 10*

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### ***Conceptual Review***

Please discuss these short questions with those around you in section. These problems are intended to highlight concepts from lecture that will be relevant for today's problems.

- a. If  $X \sim \text{Geom}(p)$  on  $\{1, 2, \dots\}$ , what is  $P(X = x)$ ?
- b. What is the way to specify a distribution?

### *Problem 1*

Bill, Mary, and Tom have coins with respective probabilities  $p_1, p_2, p_3$  of turning up heads. They toss their coins independently at the same times.

- a. What is the probability that the first person to get a head has to toss more than  $n$  times? (What distribution does this follow?)
- b. What is the probability that neither Bill nor Tom gets a head before Mary?

*Ex 3.4.5 in Pitman's Probability*

*Problem 2*

In Bernoulli ( $p$ ) trials let  $V_n$  be the number of trials required to produce either  $n$  successes or  $n$  failures, whichever comes first.

- a. Write down the range of possible values of  $V_n$ .
- b. Find the distribution of  $V_n$ .

*Ex 3.4.14 in Pitman's Probability*

*Problem 3*

In a world series, Teams A and B play until one team wins 2 more games than the other. Suppose all games are independent, and that on each game, the probability that Team A beats Team B is  $p$ . Let  $X$  = number of games played. Find  $P(X = x)$ .