

Assigned: Wednesday, September 8
Due: Wednesday, September 15

Reading Assignment: This problem set covers the material in Chapter 4, Sections 4.1–4.6 (pp. 122–149) of Ross, which deals with the topic of “random variables”. You are encouraged to attempt the self-test problems #1, 2, 3, 5, 6 and 7 on p. 184 of Ross; their solutions can be found in Appendix B.

The problems you will turn in, and which will be graded are the following:

8. Problem 11, p. 171, Ross
9. Problem 22, p. 173, Ross
10. Problem 30, p. 175, Ross
11. Problem 38, p. 176, Ross
12. Theoretical Exercise 28, p. 183, Ross
13. Theoretical Exercise 30, p. 183, Ross
14. (a) An urn contains $n - 1$ blue balls and 1 red ball. Suppose that one successively draws a ball from the urn, notes the color and replaces the ball before drawing another one. The game stops when the red ball is drawn. What is the expected number of draws before the game ends?
(b) An urn contains n balls numbered from 1 to n . Suppose that one successively draws a ball from the urn, notes the number and replaces the ball before drawing another one. Let T denote the number of balls one needs to draw before each ball is drawn at least once. Find $E[T]$.
Hint: You can leave the solution in the form of a sum.
15. A mouse is placed in a maze where it can take any one of the three directions. The first direction leads to the exit in 9 steps. The second and third directions, however, lead to the starting point in 3 and 6 steps, respectively. Assume that the mouse has no memory at all, i.e. once it gets back to the starting point, it will pick one of the three possible routes with equal probability independent of its previous choices. What is the expected number of steps to freedom?