

You may work in pairs or purely individually for this assignment. Prepare your answers to the following questions in a plain ASCII text file or MS Word document. Submit your file to the Curator system by the posted deadline for this assignment. No late submissions will be accepted. If you work in pairs, list the names and email PIDs of both members at the beginning of the file, and submit your solution under only one PID. No other formats will be graded.

For this assignment, you may (and are encouraged to) work in pairs; if you do so, you must also write your solutions in such a way that it is clear how each member contributed to deriving the solution.

You will submit your answers to the Curator System (www.cs.vt.edu/curator) under the heading OOC06.

For the questions on probability, express your answer first in terms of appropriate notation (factorials, combinations, permutations), and then simplify your answer to a single decimal value, rounded to two digits after the decimal point.

1. [15 points each] An urn contains 5 balls of each of 6 colors (red, blue, green, yellow, orange and purple).
 - a) If two balls are drawn randomly from the urn, what is the probability that they will be of the same color?
 - b) If six balls are drawn randomly from the urn, what is the probability that they will be of six different colors?
 - c) If six balls are drawn randomly from the urn, what is the probability there will be two balls of one color and four balls of another color?
 - d) If six balls are drawn randomly from the urn, what is the probability there will be three balls of one color and three balls of another color?
 - e) If three balls are drawn from the urn, and all of them are yellow, what is the probability that the next ball drawn will also be yellow?
 - f) If three balls are drawn from the urn, and all of them are yellow, what is the probability that the next ball drawn will be blue?

2. [10 points] In a country where every couple wants to have a son, each couple continues to have babies until they have a son, at which point they stop having babies. What is the proportion of girls to boys in this country? Assume that the probability of having a boy is $1/2$, and so is the probability of having a girl.

For credit, you must explain carefully the logic you used to derive your answer.