

Homework 1, week 3 (20 points)

1. A nucleotide symbol is selected at random from a DNA sequence file. If the probability that either a G or C will be selected is 0.2, what is the probability that either an A or a T will be selected? (2)
2. If the probability that student A will fail a certain test is 0.4, the probability that student B will fail is 0.2, and the probability that both will fail is 0.1, what is the probability that at least one of the two will fail? What is the probability that exactly one will fail? (2)
3. Consider the 3rd base position in the high-affinity DNA-binding sites for Protein X. Suppose the numbers of As, Cs, and Gs found in this position are equal, but the number of Ts is twice the number of As (and twice the Cs and twice the number of Gs). If a particular high-affinity binding site for Protein X is selected at random from a list of all such binding sites, what is the probability that it will contain a T in the 3rd position? (2)
4. Suppose a given DNA vector is 50% AT and 50% GC. If a nucleotide is chosen at random from the vector three times, what is the probability that no G or C will be chosen? (2)
5. If two fair dice are rolled, what is the probability that the sum of the two numbers that appear will be even? (3)
6. Suppose a given amino acid site within a family of proteins can contain any one of six different amino acids, while the adjacent sites can contain any one of four amino acids. How many different combinations of amino acids can members of this protein family have? (4)
7. If six six-sided dice are rolled, what is the probability that each of the six numbers will appear exactly once? (5)

Turning in your work

Email your results (all in one file and name it as Yourname_hw1.doc or Yourname_hw1.pdf, please) to ccwei@sjtu.edu.cn by 8:00 AM on Oct. 17th, 2014.

Please cut, sign the following paper, and then return it to the teacher before the class on Oct. 17th, 2014.

-----cut----here-----

独立作业承诺：（请选择一个，并签名）

1. 本人，_____，保证本次作业 hw1 由自己独立完成。

签名

时间 年 月 日

或者

2. 本人，_____，保证本次作业 hw1 和_____同学讨论后，由自己独立完成。
讨论内容包括_____

签名 _____，

时间 年 月 日