

Problem Set 7

Due dates: Electronic submission of this homework is due on **Wednesday 3/30/2016 before 3:50am** on ecampus, a signed paper copy of the pdf file is due on **3/30/2016** at the beginning of class.

Name: (put your name here)

Resources. (All people, books, articles, web pages, etc. that have been consulted when producing your answers to this homework)

On my honor, as an Aggie, I have neither given nor received any unauthorized aid on any portion of the academic work included in this assignment. Furthermore, I have disclosed all resources (people, books, web sites, etc.) that have been used to prepare this homework.

Signature: _____

Read Appendix C and the slides.

Problem 1 (10 points). Exercise C.2-2 on page 1195.

Solution.

Problem 2 (10 points). Exercise C.2-3 on page 1195.

Solution.

Problem 3 (10 points). Exercise C.2-4 on page 1195.

Solution.

Problem 4 (10 points). Exercise C.2-5 on page 1195.

Solution.

Problem 5 (15 points). Exercise C.2-6 on page 1195.

[Hint: First, try to understand the hint.]

Solution.

Problem 6 (10 points). Consider the set $S = \{1, 2, \dots, n\}$. We generate a subset X of S as follows: a fair coin is flipped independently for each element in S ; if the coin lands on heads, then the element is added to X , and otherwise it is not added. Show that X is equally likely to be any of the 2^n possible subsets.

Solution.

Problem 7 (15 points). Suppose that two sets X and Y are chosen independently and uniformly at random from all the 2^n subsets of $S = \{1, 2, \dots, n\}$. Determine $\Pr[X \subseteq Y]$.

Solution.

Problem 8 (20 points). There may be several different min-cut sets in a graph with n vertices. Show that there can be at most $n(n-1)/2$ distinct min-cut sets. [Hint: The analysis of the min-cut algorithm can help.]

Solution.

Checklist:

- Did you add your name?
- Did you disclose all resources that you have used?
(This includes all people, books, websites, etc. that you have consulted)
- Did you sign that you followed the Aggie honor code?
- Did you solve all problems?
- Did you submit (a) your latex source file and (b) the resulting pdf file of your homework?
- Did you submit (c) a hardcopy of the pdf file in class?