

### Problem Set 5

**Due dates:** Electronic submission of .tex and .pdf files of this homework is due on **10/02/2013 before 10:00am** on csnet.cs.tamu.edu, a signed paper copy of the pdf file is due on **10/02/2013** 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:** \_\_\_\_\_

**Problem 1.**

**P 1.** (15 points) Modify the dynamic programming solution to the coin change problem so that it will output the multiplicities  $m[n], \dots, m[2], m[1]$  of the coins with values  $v[n], \dots, v[1]$  for a given amount  $C$ , that is, the multiplicities need to satisfy

$$C = m[n]v[n] + \dots + m[1]v[1],$$

and the sum of the multiplicities should be the minimum for this amount of change.

**Solution.**

**P 2.** (15 points) Compare the greedy and dynamic programming solutions to the coin change problem (on the slides) and determine the worst case run-time complexity and space complexity of both algorithms.

**Solution.****Problem 2.**

**P 3** (15 points). Solve Exercise 15.4-1 on page 396. Show your work!

**Solution.**

**P 4** (15 points). Solve Exercise 15.4-2 on page 396.

**Solution.**

**P 5** (20 points). Solve Exercise 15.4-5 on page 397.

**Solution.**

**P 6** (20 points). Solve Problem 15-2 on page 405. [Hint: Suppose the sequence is represented by an array  $s$ . Consider the sub-arrays  $s[i..j]$ . Notice that  $s[i..j]$  contains a palindrome of length  $\geq 2$  when  $s[i] = s[j]$ . Let  $l[i, j]$  denote the length of a maximum length palindrom in  $s[i..j]$ . Relate  $l[i, j]$  to subproblems.]

**Solution.**

Discussions on piazza are always encouraged, especially to clarify concepts that were introduced in the lecture. However, discussions of homework problems on piazza should not contain spoilers. It is okay to ask for clarifications concerning homework questions if needed.

**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?