

# Week 11 Recitation

Robert Woodward

November 3, 2010

- Questions about lecture / homework so far?
- How to use Algorithm2e package for writing algorithms. See `algo_example.tex` for what was done in class, or visit <http://www.ctan.org/tex-archive/macros/latex/contrib/algorithm2e/> to see the package documentation.
- Rosen 3.1.1) List all the steps used by Algorithm 1 to find the maximum of the list  $\{1, 8, 12, 9, 11, 2, 14, 5, 10, 4\}$ .

To show the steps used in an algorithm, you show the changes in assignments incrementally.

So in this problem, we start with line 1 of the MAX method as defined in `algo_example`:

–  $max = 1$

Then, you incrementally show each iteration of  $i$  in the for loop of line 2, and the results if  $max$  changes:

–  $i = 2, max = 8$

–  $i = 3, max = 12$

–  $i = 4$

–  $i = 5$

–  $i = 6$

–  $i = 7, max = 14$

–  $i = 8$

–  $i = 9$

–  $i = 10$

Putting all of this together, the answer would be:

$$max = 1$$

$$i = 2, max = 8,$$

$$i = 3, max = 12,$$

$$i = 4,$$

$$i = 5,$$

$$i = 6,$$

$$i = 7, max = 14,$$

$$i = 8,$$

$$i = 9,$$

$$i = 10$$

- Rosen 3.1.53b) Use the greedy algorithm to make change using quarters, dimes, nickels, and pennies for 69 cents

$$c_1 = 25, c_2 = 10, c_3 = 5, c_4 = 1.$$

$$n = 69$$

$$C = \emptyset,$$

$$i = 1, C = \{25\}, n = 44$$

$$i = 1, C = \{25, 25\}, n = 19$$

$$i = 2, C = \{25, 25, 10\}, n = 9$$

$$i = 3, C = \{25, 25, 10, 5\}, n = 4$$

$$i = 4, C = \{25, 25, 10, 5, 1\}, n = 3$$

$$i = 4, C = \{25, 25, 10, 5, 1, 1\}, n = 2$$

$$i = 4, C = \{25, 25, 10, 5, 1, 1, 1\}, n = 1$$

$$i = 4, C = \{25, 25, 10, 5, 1, 1, 1, 1\}, n = 0$$

- Rosen 3.1.55b) Use the greedy algorithm to make change using quarters, dimes, and pennies for 69 cents

$$c_1 = 25, c_2 = 10, c_3 = 1.$$

$$n = 69$$

$$C = \emptyset,$$

$$i = 1, C = \{25\}, n = 44$$

$$i = 1, C = \{25, 25\}, n = 19$$

$$i = 2, C = \{25, 25, 10\}, n = 9$$

$$i = 3, C = \{25, 25, 10, 1\}, n = 8$$

$$i = 3, C = \{25, 25, 10, 1, 1\}, n = 7$$

$$i = 3, C = \{25, 25, 10, 1, 1, 1\}, n = 6$$

$$i = 3, C = \{25, 25, 10, 1, 1, 1, 1\}, n = 5$$

$$i = 3, C = \{25, 25, 10, 1, 1, 1, 1, 1\}, n = 4$$

$$i = 3, C = \{25, 25, 10, 1, 1, 1, 1, 1, 1\}, n = 3$$

$$i = 3, C = \{25, 25, 10, 1, 1, 1, 1, 1, 1, 1\}, n = 2$$

$$i = 3, C = \{25, 25, 10, 1, 1, 1, 1, 1, 1, 1, 1\}, n = 1$$

$$i = 3, C = \{25, 25, 10, 1, 1, 1, 1, 1, 1, 1, 1, 1\}, n = 0$$

- Rosen 3.1.31 – Solution in algo\_example.tex file
- (Last 10 minutes) Quiz