Institut for Matematik og Datalogi
Syddansk Universitet

December 6, 2011
JFB

Introduction to Computer Science
E11 – Lecture 19

Lecture, December 6, 8:15–10, U26

We began on chapter 7 and covered up through use cases in the subsection of section 7.5 having to do with the Unified Modeling Language in the textbook.

Lecture, December 8, 12:15–14, U26

We will finish sections 7.5 and 7.6 in the textbook. Then we will cover up through section 11.2 in chapter 11.

Lecture, December 13, 8:15–10, U26

We will continue with chapter 11 in the textbook.

Discussion section and study groups: December 16

Study group 1 should prepare to present the first problem and problems 27, 32, and 42 on pages 555–556.

Study group 2 should prepare to present problem 2 on page 549, problems 20, 33, and 44 on pages 555–556, and the fourth problem.

Study group 3 should prepare to present problem 3 on page 549, and problems 25, and 37 on pages 555–556.

Study group 4 should prepare to present problem 5 on page 549, and problems 29 and 31 on pages 555–556.

1. In Daniel Merkle's lecture, he considered the pancake sorting problem, where you are given n pancakes with n different sizes, and you want to sort them with the largest on the bottom and decreasing size. The

operation allowed is to stick a spatula in somewhere and flip all the pancakes above that. He proved that the following algorithm will require at most $2n - 2$ flips to sort any stack of n pancakes.

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Bring To Top Method for $n$ pancakes:

if $n=1$, no work required - we are done!
Otherwise, flip pancake $n$ to top and
   then flip it to position $n$
Now use Bring To Top Method for $n-1$ pancakes
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Prove that it actually requires at most $2n - 3$ flips by considering the last moves of the algorithm in more detail.

2. Questions 2, 3, and 5 from page 549.

3. Problems 20, 25, 27, 29, 31, 32, 33, 37, 42, 44 on pages 555–556.

4. Discuss how the Shortest Path Problem (defined in lecture – given two cities, find the shortest path between them) and the Traveling Salesman Problem differ.