Teaching comments week 1

Moshe Rosenfeld

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moishe@u.washington.edu

1 Lecture-1

Discuss the syllabus, class mechanisms, tutorials etc.
Most classes will have a simple, preparation problem. All classes will start with students discussions of their solutions that should lead to the topics of the class. Class presentations will be a mixture of blackboard and Power Point slides. Slides used in class, preparation problems and assignments will be posted on the class web site:

http://www. faculty.washington.edu/moishe/hanoi-2011/DiscreteOptimization

Each week's files will be in a separate sub-folder named week-k. (Show in class). The slides used in each class will be posted after class. This will enable us to modify the slides to match the class discussion.

Comments for slides:
Cylinders, do they have to be circular base? (ease to manufacture) is the circular disk "better than" the ellipsoidal disk?

Check whether students can solve the problems.

Demonstrate an approach: If you can somehow identify a bound (lower or upper) and find a feasible solution that is equal to the bound, you solved the optimization problem.
In this example: $2(ab + ac + bc) \geq 6 \times \sqrt[3]{(abc)^2} = 600$. (Means inequality).

So $a = b = c = 10$ is the optimal solution.

Show and briefly explain prep-1.

2 Lecture-2

In the “Simple solution” slide ask students whether the proposed solution is feasible. This will help ascertain they understand what are the feasible solutions in this example.

In Calculating the cost slide ask the students whether they can identify a better assignment.
(Yes! interchange J9 and J4).

Suggestion: Generate and test all pairs of assignments. If none can improve, is the assignment optimal? How much work will it require?

The traveling salesman slide: note that the matrix is not necessarily symmetric.

Calculate the time needed to do 10^{160} additions. Assume one billion additions per second. So we shall need 10^{130} seconds. There are only 525600 seconds per year or if two computers cooperate about $1,000,000$ seconds per year. So this calculation will take “only” 10^{124} years.

Discuss prep-3, in particular reductions.
Time permitting show programming solutions.

3 Lecture-3

Start by a short discussion of reductions based on the cubic equation.

Next run both programs: Run first David Chinn’s program ASSIGN on a size 50 assignment problem. Show the output on the file hung50. Notice the speed of execution. Proving that there is another algorithm that does not enumerate permutations. Written in Pascal on a PC-AT.

Then run Brian’s Java program. Show the final result only. Ask: how can we be sure that this is the optimal solution?

In parallel with the Hungarian Method slide run Brian’s program step by step.

At the end of class discuss assignment 1 and prep-3.