

# Computation in Operations Research

## IE 495

Dr. Ted Ralphs

First Meeting  
August 29, 2000

# Administrivia

- Class Meeting Time
- Introductions
- Surveys
- Office Hours

# What is the motivation for this class?

"Here is your book, the one your thousands of letter have asked us to publish. It has taken us years to do, checking and rechecking countless recipes to bring you only the best, only the interesting, only the perfect. Now we can say, without a shadow of a doubt, that every single one of them, if you follow the directions to the letter, will work for you exactly as it did for us, even if you have never cooked before."

- McCall's Cookbook (1963)

# What will this class be about?

- Some computer science theory
  - data structures
  - design and analysis of algorithms, complexity
- Some mathematical theory
  - matrix computations, linear algebra
  - recursion, induction
- Some programming/development
- The **ultimate focus** will be on bringing all these tools together to solve problems.

# Topic Coverage

- Fundamentals of Computer Systems
- Models of Computation/Complexity theory
- Induction and Recursion
- Parallel Programming/Parallel Algorithms
- Basic Data Structures
- Basic Algorithms
- Numerical Analysis
- Advanced Algorithms

# Unified Approach

- Emphasize common themes
- Treat all subjects as a unified whole
- Treat serial and parallel algorithms equally
- Programming projects will build on each other
- There is flexibility in the syllabus

# What will I get out of this class?

- What you put into it . . . .
- There will be no "recipes" or "cookbooks".
- In this course, we will raise a myriad of interesting computational issues.
- We won't have time to resolve them all.
- To get the maximum out of this course, you will have to take some initiative.

# My approach to lectures

- Lectures should serve a definite purpose.
- There should be an active dialog between teacher and students.
- In this course, lectures will not be very detailed.
- They will be customized to the background of the students.
- Lectures will be an introduction to more in-depth reading.
- This class is a **partnership**.



# More on lectures

- There will be a Web site for the class at

<http://www.lehigh.edu/~tkr2/courses/ie495/>

- I will do my best to post the lecture slides there before the class so that you can prepare if you want.
- All handouts for the class will be available at the site.
- Preferred format?
- Let me know what you think of the lecture slides.

# Assignments and Exams

(Subject to change)

- There will be two types of assignments.
  - Programming
  - Written
- Assignments will be given approximately once a week.
  - They should enhance your understanding of the material.
  - They should enhance your ability to apply knowledge.
  - They should enhance your ability to retain knowledge.
- There will be no formal written exams.
- There will be no written final.
- There will be a final project.

# Submitting Assignments

- Written assignments can be submitted at my office (if handwritten) or by e-mail (preferably in postscript format).
- For programming assignments, I would like **well-commented, formatted source code** submitted to me as electronic text files by e-mail.
- It would be helpful to have an accompanying write-up explaining the code.

# Textbook

- There will be no single required textbook.
- There are a few books that may be worth purchasing.
- I will have references available in my office.

# Programming Environment

- Operating Systems
  - Unix
  - Windows
- Languages
  - C
  - C++
  - Matlab

Questions?