

Algorithms

INFORMATION

Algorithms

Instructor — Amotz Bar-Noy

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Class Hours: Thursday 11:00am–1:00pm.

Extra Hours: Thursday 10:00am–11:00am.

Textbooks

- ★ “Introduction to Algorithms (second edition),” by Cormen, Leiserson, Rivest, and Stein, MIT press.
- ★ “Algorithm Design,” by Kleinberg and Tardos, Addison Wesley.
- ★ “Algorithm Design,” by Goodrich and Tamassia, Wiley.
- ★ “Computer Algorithms: Introduction to Design and Analysis (3rd Edition),” by Baase and Van Gelder, Addison Wesley.
- ★ “Algorithms,” by Dasgupta, Papadimitriou, and Vazirani, McGraw Hill.
- ★ “Introduction to Algorithms a Creative Approach,” by Manber, Addison-Wesley.

Online Resources

- ★ Lecture notes from MIT:

<http://ocw.mit.edu/OcwWeb/Electrical-Engineering-and-Computer-Science/6-046JFall-2005/VideoLectures/index.htm>

- ★ Problems on Algorithms:

<http://www.eng.unt.edu/ian/books/free/poa.pdf>

Tentative Syllabus

- ★ Introduction; Mathematical Background; Examples.
- ★ Searching; Order Statistics; Sorting; Sorting Networks.
- ★ Divide&Conquer; Greedy Algorithms; Dynamic Programming.
- ★ Graphs; Graph Traversals; Minimum Spanning Trees; Shortest Paths(?).
- ★ NP-Completeness.

Tentative Schedule

01. 09/03/2009 Introduction and Mathematical Background
02. 09/10/2009 Examples
03. 09/17/2009 Order Statistics
04. 09/24/2009 Sorting
05. 10/01/2009 Sorting Networks
06. 10/08/2009 **Midterm Exam**
07. 10/15/2009 Divide and Conquer
08. 10/22/2009 Greedy Algorithms
09. 10/29/2009 Dynamic Programming
10. 11/05/2009 Graphs
11. 11/12/2009 Graph Traversals
12. 11/19/2009 Minimum Spanning Trees
13. 12/03/2009 ???
14. 12/10/2009 NP-Completeness
15. 12/17/2009 **Final Exam**

Tentative Schedule – Remarks

1. There is no class on 11/26/2009.
2. Some of the classes will start at 10:00am instead of 11:00am
This extra hour is reserved for solving the assignments and answering some questions.
3. Dates with '???' are reserved either for completing the previous subjects or for additional subjects.

Grading

Note: This is only a **guide**, percentages and rules may change during the semester as needed.

Percentages: The final grade will be composed of the following 5 components:

- ★ $\approx 40\% - 60\%$ final exam.
- ★ $\approx 20\% - 30\%$ mid-term exam.
- ★ $\approx 0\% - 20\%$ quizzes.
- ★ $\approx 10\% - 10\%$ assignments.
- ★ $\approx 0\% - 20\%$ project.

Quizzes

- ★ There **could** be 2 types of quizzes:
 - At the **beginning** of the class to check what you learned in the previous week.
 - At the **end** of the class to check what you learned during the class.
- ★ There will be no **announcements** regarding quizzes.
- ★ The number of quizzes has not yet been **determined**.

Answering a question

Answer a question in an **exam**, in a **quiz**, or in an **assignment**:

- ★ **Only** within the given space for the answer.
- ★ Using a **readable** text with **normal size** font.
- ★ You get **20%** of the value if you leave the answer **blank**.
- ★ You get **no** points for a **wrong** answer.

Preparing Assignments

- ★ No hand writing. You **must** type the answers.
- ★ Do the assignments **alone** if you can.
- ★ Get **help** if necessary.
- ★ You **must** understand everything you write.

Projects

- ★ Must be coordinated with and approved by the instructor.
- ★ Percentage of final grade depends on size and difficulty.
- ★ Possible projects:
 - * Doing **something** with the software package LEDA.
 - * <http://www.algorithmic-solutions.com/leda/index.htm>

Reading and Practicing

Refresh your algorithmic knowledge and mathematical foundations. Practice by solving some or all of the problems in the books and online resources.

- ★ Read Chapters 1–4 (without 4.4), and Appendices A–C (without C.5) of the book: “Introduction to Algorithms”, second edition, by Cormen, Leiserson, Rivest, and Stein.
- ★ In the first edition read Chapters 1–5 (without 4.4).
- ★ Solve problems in Chapters 1–5 of the online book “Problems on Algorithms,” by Ian Parberry:
<http://www.eng.unt.edu/ian/books/free/poa.pdf>