# Exam Preparation F2008

# Summary of course

Big-O notation, measuring complexity, simplifications, scalability, different functions and their properties. Time and Space

Search and Sort: binary search, merge-sort, interstion-sort etc

Binary seach trees, 2-3-4 trees

Hashing, Cuckoo

Graphs, Graphs search, BFS, DFS, Dijkstra, A*

Tests, black vs white box, unit test, interaction test, types of test, guest lecure, tools

# Skills

- Performance analysis
- Scalability assessment.
- Combining algorithms into bigger programs.
- Choosing algorithms for an application.
- Limited training in design of new algorithms.
- Software test

# Organisation

Oral exam with preparation

30 Minutes preparation + 30 minutes examination including grade

Curriculum: See course homepage (almost all reading material) + project

Qualification: All mandatory exercises, midterm and project handed in and passed

# In detail

- Draw a question from the lottery (topics):
- Prepare 5-7 minutes talk

1. Searching and sorting
2. Search trees
3. Hashing
4. Graphs and Graph search,
5. Shortest paths
6. Types of testing

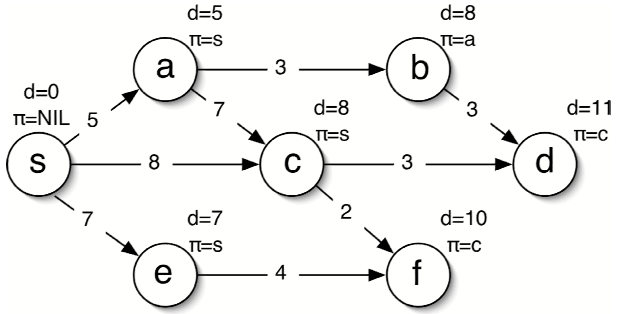
- "Measuring performance" is implicit in all questions
- Additional prepared questions
- In the exam you'll get  one or more secondary questions (unprepared other topic)
- May include project

# Formalities

- No laptops.
- No mobile phones.
- All printed material allowed.
- Have your own book and notes!
  - Impossible to share material with someone who has an exam within a 2 hour interval from you.
- Be at the exam at least 30 minutes earlier than scheduled

Consider the following graph, with edge weights
p-values, d-values describing the outcome of running
Dijkstra's algorithm on it. p in vertex v indicates the
previous vertex on a shortest path from v to source, d denotes the
length of the shortest path from v to source.

Is this a correct result of running Dijkstra's algorithm on the graph?
If no, why not? If yes, is it the only possible result?



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length of the shortest path from v to source.

Is this a correct result of running Dijkstra's algorithm on the graph?
If no, why not? If yes, is it the only possible result?

This is a correct result of running Dijkstra's algorithm on the graph.
There is one more possible result, namely that vertex d has p-value b.
This is because b and c have the same d-value, and hence they were
both in the priority queue, with the same priority when c was returned
by the *Extract-Min* call, and therefore b could as well have been
returned

# Rough grading guideline (only a guideline!)

12: Full understanding of all details, being able to compare to other methods (algorithm, analysis, proof of correctness and performance) and modify known algorithms (extrapolation).

10:Details of algorithms (difficult ones), analysis of performance and correctness, some degree of extrapolation.

7:Describe and 'code' the questions, argue for performance, definition of big-O.

4: Understand question topic and describe rudimentary algorithms and their performance some knowledge of more advanced algorithms and performance.

02: basic understanding of question topic: simplification in big-O, purpose and basic understanding of algorithms (memorization) , scaling in Big-O

00: We don't want anyone here or below

-3:

# Question day

- Monday 9. June 2008 at 10.00 (location to be announced later).
- All questions must be emailed to kss@itu.dk before Sunday 8. June.