COMP36111: Advanced Algorithms I
Lecture 0: Introduction and Course Organization

Ian Pratt-Hartmann

Room KB2.38: email: ipratt@cs.man.ac.uk

2016–17
Outline

Syllabus

Resources

For next session
Part A (up to reading week): Algorithms

- Graph algorithms
- Flow optimization and matching
- String algorithms
- Linear programming
- Integer programming
• Part B (after reading week): Complexity
  • Turing Machines and computability
  • Computational complexity; propositional satisfiability
  • Hardness and reductions
  • Graph-theoretic algorithms (again)
  • Savitch’ theorem and the Immerman-Szelepcsényi theorem.
  • Revision
• Coursework (25%)
  • Coursework A
    Issue date: Thursday 13th October
    Hand-in date: Friday 21st October @ 12:00 (SSO)
    Review: Thursday 27th November
  • Coursework B
    Issue date: Thursday 24th November
    Hand-in date: Friday, 2nd December @ 12:00 (SSO)
    Review: Thursday 8th December

• Exam (75%)
  • Answer 3 out of 4 questions in 2 hours.
  • Previous years' exams provide a guide to the style of questions.
Outline

Syllabus

Resources

For next session
• Course texts
  
  Title: Algorithm design: foundations, analysis and internet examples
  Author: Goodrich, Michael T. and Roberto Tamassia
  ISBN: 0471383651
  Publisher: Wiley
  Year: 2002

  Title: Introduction to the theory of computation
  Author: Sipser, Michael
  ISBN: 053494728X
  Publisher: PWS Publishing Company
  Year: 1997
- Principal course website
  http://studentnet.cs.manchester.ac.uk/ugt/2016/COMP36111/syllabus/
- Course materials page
  http://studentnet.cs.manchester.ac.uk/ugt/2016/COMP36111/
  - homework exercises
  - lecture overheads
  - fun problems
Fun problem for 6th October (Prisoners with party hats):

A group of prisoners is facing execution. To make the process more interesting, they are told that they will lined up (facing along the line) with coloured hats (red, white or blue) placed on their heads. Each prisoner will be able to see all the hats of the prisoners in the line in front of him, but not his own hat, and not the hats of anyone behind him. (Thus, the first prisoner in the line will be able to see no hats, and the last prisoner, all but his own.) Starting from the back, each prisoner in turn must call out a colour (the other prisoners can hear what he says): if he calls the colour of his own hat, he is spared; otherwise, he is shot. The prisoners are allowed to agree on a strategy for what to say before they are stood in a line and the hats placed on their heads. What strategy will save the maximum number of prisoners?