CSU22012: Data Structures and Algorithms II

Lecture 0: Intro and Logistics

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Timetables

› Lectures
  – Monday 4-5
  – Thursday 1-2
  – Friday 9-10

› Labs
  – Monday 11-12
  – Thursday 12-1

Lectures – Hilary Term

› Reading week – March 15th -19th no lectures

› Easter holidays – April 2nd Friday and 5th Monday no lectures

› Live but recorded

› Attendance in lectures – not mandatory but
  – In-class exercises can be submitted and count as a potential *bonus mark* of up to 1% each, up to total of 10%
  – There will be exercises in most lectures, so probably up to 20-ish during the term

Labs – Hilary Term

› Labs are optional – no new materials will covered, but can get help with assignments if stuck

› Groups are pre-assigned per course so please attend your scheduled lab session

› Assignment issues/questions
  – POST ON BLACKBOARD – no assignment questions will be answered over email – everyone usually has same questions/issues, so let's make the questions/answers of benefit to everyone
  – Before posting, check if question came up before

› Grades issues/questions
  – Erika Foncesca fonsecae@tcd.ie – TA is the first point of contact for any marks questions - unresolved issues get escalated to me

Course Material

› **Algorithms,** 4th Edition by Robert Sedgewick and Kevin Wayne

› Lecture notes and assignments will be posted on Blackboard https://tcd.blackboard.com/

› Assignments
– Submission both through Web-CAT and Blackboard
– Marking through Web-CAT http://webcat.scss.tcd.ie/cs2012/WebObjects/Web-CAT.woa (only accessible from college network – use VPN to connect from home)

› In-class exercises
– Submission only through Blackboard on the day of the lecture

Assessment

› 100% coursework

› Deadlines
- No extensions - apart from medical cert or note from tutor – please set reminders
- Late submissions: mark docked 20% per day

› Plagiarism – all submissions will be run through Jplag

Assessment Schedule

#	Topic	Issued	Due	Worth
1	Sorting	Week 2	Week 5	20%
2	Graphs	Week 5	Week 8	20%
3	E-test		Week 7	20%
4	*Group* project – sorting, graphs, strings	Week 8	Week 11	40%
--	In-class exercises	Every-ish lecture	On the day of the lecture	Bonus +10%

E-test

› Week 7 (after reading week)

› 1-hour MCQ blackboard test, timed, to be taken within assigned 24-hour window

› Pick a day within week 7

› POLL

Assignments

› Assignments 1 (sorting) and 2 (graphs)

› Same as last term – automated marking through webcat

› Group assignment
  – Groups of 4 – you'll be allowed pick your own group
  – Group mark, but individual contributions will be monitored through git commits
  – More details after reading week

› What day do you want assignments to be due? POLL

In-class exercises

› You will need a pen and paper (or for simpler ones you can use a text document or a drawing program)

› Take a pic and upload to blackboard – same day accepted only

› Only for bonus marks so need to email to ask for exemptions etc

› 5-minute breakout-group exercises – you will need to submit individual answers but can discuss solutions/approaches within your randomly assigned breakout group
  – Trial run?

› Not marked for correctness but for effort – half or full mark

So what are we actually going to learn?

Course content - Review and expand

› Sorting algorithms
  – Insertion sort, heapsort ✓
  – Selection sort, shellsort, mergesort, quicksort
  – Space and time trade offs
  – Select and compare based on input type and size

› Algorithmic approaches
  – Brute force, exhaustive search, decrease and conquer, divide and conquer, greedy, dynamic programming ...

Course content – New Topics

› Graphs – shortest path
  – Dijkstra
  – Depth-first, breadth-first search, Prim, Kruskal, Topological sort
  – Shortest paths - Bellman-Ford, Floyd-Warshall
  – What to use based on graph – directed, undirected, acyclic, negative edge weights etc

› Network flow algorithms
  – Maxflow, Ford-Fulkerson

› Strings
  – String sorts
  – Substring search

Tools

› Blackboard and Blackboard Collaborate Ultra
  – Lectures
  – Labs
  – in-class polls
  – Assignment submission
  – In-class exercise submission

› Web-CAT
  – Assignment submission, testing and marking

› Version control – Git – mandatory for group assignment but highly recommend it for all
  – Github, bitbucket, gitlab
  – gitlab.scss.tcd.ie

Highlights

› Lectures live but recorded

› Labs not mandatory, only if you need help with assignment

› In-class exercises for bonus marks

› Any non-private questions – Blackboard forum only!

Questions?