CS2010: Data Structures and Algorithms II

Lecture 0: Intro and Logistics

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Timetable

Time	Monday	Tuesday	Wednesday	Thursday	Friday
09.00 – 10.00	HT: CS2022: Lect LB04	MT: CS2010: Lab ICT1/2 HT:CS2022: Lect / Lab LB04/LG35/36		MT: CS2010 Lab: ICT 1/2 (1hr only-9am-10am)	HT: CS2010: Lect LB08
10.00 – 11.00	MT: CS2041: Lect LB01 (2 hours) HT: CS2021: Lect LB04		MT:CS2010: Lect LB08	MT: CS2010: Lect Goldhall (10-11) HT: CS2016: Lab LG12 (9 - 11am)	MT: CS2031: Lect: LB01 (2hrs)
11.00 – 12.00	MT: CS2041: Lect LB01 HT: CS2022: Lect LB08/LG35/36	HT: CS2022: Lect/Lab: McNeil/ LG35/36	HT: MA2C03: Lect LB04	MT: CS2041: Lect LB01 HT: CS2021: Lect LB08	MT: CS2031: Lect: LB01 HT: CS2021: Lect LB04
12.00 – 13.00	HT: CS2021: Lab LG35/36 (3 hours)	HT: CS2016: Lect LB01		MT: CS2014: Lab LG12 HT: CS2010: Lab ICT 2	
13.00 – 14.00	MT:MA2C03: Lect LB08 HT: CS2021: Lab LG35/36	HT: CS2013: Lect LB01 /M20	MT: CS2014: Lect LB08	MT: CS2014: Lab LG12 HT: CS2010: Lect LB04	MT: CS2031: Tut: LB01
14.00 – 15.00	HT: CS2021: Lab LG35/36			MT: CS2014: Lab LG12 (2hrs)	MT:MA2C03: Lect LB01
15.00 – 16.00	MT: CS2010: Lect Joly HT: CS2021: LB04	MT: CS2014: Lect LB01		MT: CS2014: Lab LG12 HT: CS2016: Lect LB08	
16.00 – 17.00	MT: CS2031: Lab ICT 1/2 HT: CS2010: Lect Goldhall	MT: CS2031: (1hr 4pm–5pm) Lab ICT Lab 1/2 HT: CS2010: Lab ICT Lab 1/2 (2 hrs)	HT: MA2C03: Lect MacNeil	HT: CS2022: Lect MacNeil	
17.00 – 18.00	HT: CS2016: Lect LB01	MT: MA2C03: Lect LB04 HT: CS2010: Lab ICT Lab 1/2		HT: MA2C03: Lect McNeil	

Labs – Hilary Term

- ICT LABS 1 and 2, Tuesday 4-5 and 5-6
- No labs in week 1
- First lab session on Tuesday January 29th
- Groups will be posted on blackboard
- Any issues? email your TA
  - Nima Afraz- nafraz@tcd.ie
  - TA is the first point of contact for any lab/assignment/marks questions - unresolved issues get escalated to me

Lectures – Hilary Term

- Monday 4-5 Goldhall
- Thursday 1-2 LB04
- Friday 9-10 LB08

- Reading week – march 4th – 8th – no lectures or labs
- Also no lectures on March 18th (bank holiday)
- Last day of lectures: April 12th

- Attendance taken

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)

Assignments

- Coursework: exam = 50-50 % split
- **(CS2010 Mark) = 35% * (50% * (Michaelmas Term Coursework Mark) + 50% * (Hillary Term Coursework Mark)) + 15% * (50% * (Michaelmas Term In-class Test) + 50% * (Hillary Term In-class Test)) + 50% * (Exam Mark)**
- Coursework in Hillary Term
  - 2 assignments
- Deadlines
  - No extensions (apart from medical cert, note from tutor)
  - Late submissions: mark docked 20% per day
- Plagiarism – all submissions will be run through Jplag
- To get additional help:
  - From the demonstrators - come to lab sessions
  - Undergraduate Programming Centre https://www.scss.tcd.ie/misc/ugpc/

In-class test

- **Tuesday March 12th 4-6pm ICTLABs**
- Attend per assigned lab group
  - If don't have groups assigned yet, Nima will assign them by then
- If you miss it – your in-class exam from term 1 counts for full 15% of the overall cs2010 mark
- If you missed term 1 in-class exam, this one counts for full 15% of the overall cs2010 mark
- If you miss both – 0%

Questions, feedback etc

- Lecturer ivana.Dusparic@scss.tcd.ie
- Talk to me before/after class
- Evaluation at the end of the module
- Class reps?
- Anonymous feedback? Notes to share with the class?
  - use a Padlet https://padlet.com/ivana_dusparic/cs2010feedback
  - password: cs2010

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 ...
- Trees- ?
  - 2-3, red-black search trees ✓
  - B-trees, B*

Course content – New Topics

- Strings
  - String sorts
  - Substring search
  - Data compression
- 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


HELP!

Tools

- Blackboard. Web-CAT
- Eclipse, Junit

- TurningPoint?
  - Download Android or iPhone app or use browser to access polls
  - https://play.google.com/store/apps/details?id=com.turningTech.Responseware&hl=en
  - https://responseware.turningtechnologies.eu/responseware/session/index/128764
    - (128764 – unique session id for every session)
    - Ignore user id details, just press JOIN

- Version control - Git?
  - Github, bitbucket, gitlab
  - gitlab.scss.tcd.ie