# Welcome to ECE-250!

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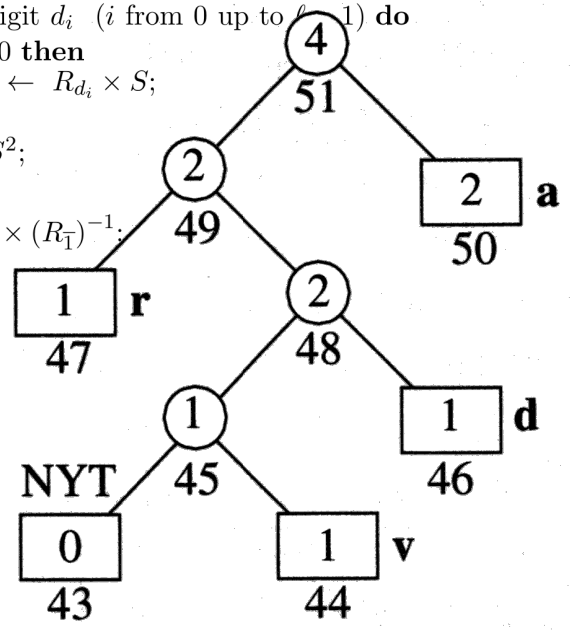
EIT-4103

**Input:** $x$; $e = (d_{\ell-1}d_{\ell-2} \cdots d_1 d_0)_{\text{NAF}}$
**Returns:** $x^e$

```
begin
    S ← x;   R_1 ← 1;   R_1̄ ← 1;
    for each digit d_i  (i from 0 up to ℓ − 1) do
        if d_i ≠ 0 then
            R_{d_i} ← R_{d_i} × S;
        end
        S ← S^2;
    end
    return R_1 × (R_1̄)^{-1};
end
```




**https://ece.uwaterloo.ca/~cmoreno/ece250**

These slides, the course material, and course web site are based on work by Douglas W. Harder

# About the course

- The instructor ...

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# About the course

- The instructor ...
- The T.A.s

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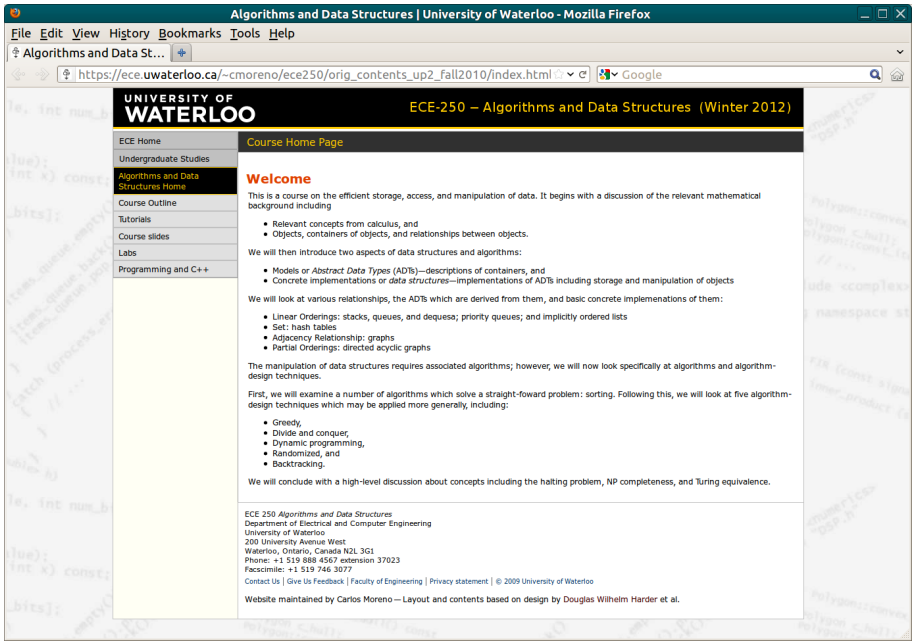
- The instructor ...
- The T.A.s
- The Students:
  - You are expected to have a reasonable background in Math (Algebra, Calculus, Logic), Programming (ECE-150 and ECE-155), Binary numbers and arithmetic and logical operations, and will be learning about how Computer Hardware works (ECE-222)

# About the course

- The logistics:
  - All course material will be posted on the course web site, **http://ece.uwaterloo.ca/~cmoreno/ece250**:
    - Course info
    - Slides
    - Assignments
    - Announcements
    - etc.



# About the course

- Contacting me:
  - E-mail is fine (in fact, preferred). But do make sure to include the text *ECE-250* as part of the subject; perhaps at the beginning: ECE-250 – xxxxxxx

# About the course

- As the title suggests, the course focuses on two main areas: techniques/strategies to efficiently store data — "efficiently" refers to both memory usage, and efficiency in the access of that data; and techniques to efficiently process the data (which goes beyond efficiently access it)

# About the course

- General areas include:
  - Sequential storage (lists / arrays / queues / stacks)
  - Hierarchical storage (trees)
  - Adjacency storage (graphs)
  - Algorithms and algorithm analysis and design

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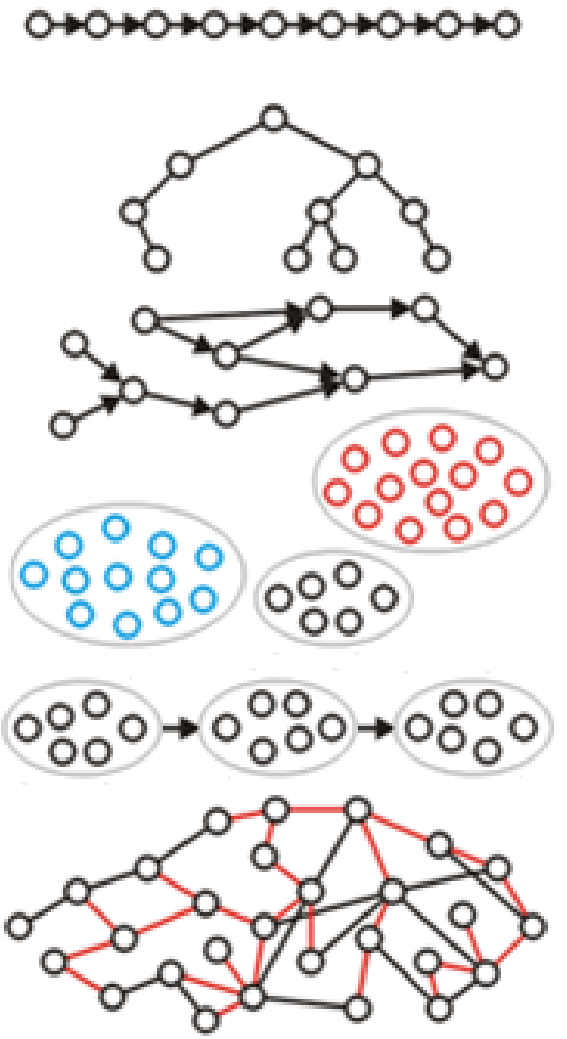

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  - Three main components: Exams, Labs, Homework Assignments.

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    - Midterm: 20%
    - Final exam: 50%
    - Lab projects: 20%
    - Homework assignments: 10%

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  - Additional conditions apply ....

# About the course

- Evaluation:
  - Additional conditions apply:
    - To pass the course, you must obtain a weighted average above 50% for the exams (weighted average being (2×M + 5×F) / 7, where M denotes the grade for the midterm and F denotes the grade for the final), and also a weighted average above 50% for the labs and assignments (weighted average being (2×L + A) / 3, where L denotes the grade obtained for the labs, and A denotes the grade obtained for the assignments)

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    - The grade corresponding to the assignments portion may not exceed 20 marks above the grade in the final

# About the course

- Evaluation:
  - Examples for the additional conditions:
    - A student obtains these grades: M: 75%, F: 65%, L: 90% , A: 100%. This student would be assigned a grade of 85% for the assignments portion (20 marks above the grade in the final), and his/her final grade would then be: 0.2 * 75 + 0.5 * 65 + 0.2 * 90 + 0.1 * 85 = **74**

# About the course

- Evaluation:
  - Examples for the additional conditions:
    - Another student obtains the following grades: M: 70%, F: 70%, L: 40% , A: 20%.

      Despite having an overall average of 0.2 * 70 + 0.5 * 70 + 0.2 * 40 + 0.1 * 30 = **60**, since this student has an average of 36.67 for the assignments + labs, he/she obtains a final grade of **49** for this course.

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  - Late submissions are NOT allowed — neither for assignments nor for lab projects.

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  - Late submissions are NOT allowed — neither for assignments nor for lab projects.
  - This is a general policy for the course — if for some assignment(s) an exception is made, then it would be specified explicitly in the assignment, along with the details about penalties for late submission.

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- Assignments and Lab projects:
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  - There will be 5 assignments (roughly speaking, every two weeks), and they will be due in class (see course outline for details and due dates)
  - There will be 4 Lab projects (with a piece of good news: you will not be working on a Lab project the week of midterms!). See course outline for details (additional details will be posted through the course web site)

# Academic Integrity

- Every student must be familiar with the rules of academic integrity (in addition to some "common sense" guidelines to avoid incidents of academic offences)
- In this course, you will be allowed to study in groups, co-operate, help your classmates through the assignments or lab projects. However .....

# Academic Integrity

- Each student must submit work strictly authored by him/herself — *strictly in your own words!* Dictation or sharing materials is strictly prohibited and would constitute an academic offence.
- This includes copy-n-pasting or in any way transcribing material from Wikipedia or in general from any source — Internet or otherwise.

# Academic Integrity

- The standard minimum penalty for incidents of academic dishonesty is: each student involved receives a grade of 0 (zero) for the given evaluation item, PLUS a deduction of 5 marks off his/her final grade in the course.

  (The rationale is quite obvious: a student who cheats must receive a lower grade than a student who did not submit that particular work)

# Academic Integrity

- When the incident involves submitting copied work, every student involved receives the same penalization — regardless of who is the legitimate author and who copied the work.

  This is UNCONDITIONAL — no student is allowed to “take full responsibility”, regardless of the causes and actions that led to the incident.

# Academic offences – examples

- Alice, Bob, Chelsea, and David worked together in a group
- They each did their own work; however, they shared code to comment on each others programming
- Bob gave Alice's code to Eve who copied it for her project and submitted it
- Alice, Bob and Eve receive a 0 for this assignment, and -5 marks off their final grades

# Academic offences – examples

- Alice and Bob were lab partners in ECE-222
- Bob left himself logged on Unix to allow Alice to complete the lab
- Alice copied Bob's ECE 250 project and submitted it.
- Both Alice and Bob are equally liable — they both receive 0 in this project, plus -5 marks off their final grade.

# Academic offences – examples

- Leslie asked if Morgan could send her his code so that she could look at it (promising, of course, not to copy it)
- Morgan sent the code
- Leslie copied it and handed it in
- Both Leslie and Morgan are equally liable; they both receive 0 for this project and -5 marks off their final grade.

# Academic offences – examples

- David did not chance his default password
- Eve logged onto David's account and took his code
- Both David and Eve are equally liable — they both receive 0 for this project and -5 marks off their final grade.

# Academic offences – examples

- You could come up with multiple additional examples — the pattern is quite simple:

# Academic offences – examples

- You could come up with multiple additional examples — the pattern is quite simple:
- If the submitted work is found to be copied, then unconditionally, every student involved is penalized, regardless of any attempt or any amount of arguments to try to justify or exempt from responsibility some of the participants in the incident.

# Classroom Etiquette

I expect several “etiquette rules” to be followed by each of you:

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- Most importantly: we want complete silence while the instructor is delivering the lecture (obvious exceptions when the lecture is interactive, or when I ask questions to the audience, etc.)

  Notice that this is mainly out of consideration to your classmates — they want to be able to *hear* and follow the material being covered / discussed, and without any distractions.

# Classroom Etiquette

Somewhat in the category of “asking you a favour”, since I am allergic to most perfumes, colognes, and in general most cosmetics with fragrances, I would ask you to avoid as much as possible the use of any fragrances.


(image courtesy of www.poweredtemplates.com)

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But this also goes with consideration to your classmates — for some of them, fragrances may be unpleasant.

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  - The use of smartphones (or any cell phones) is strictly prohibited — you are allowed to keep yours ON but in silence/vibrate mode, to receive any emergency calls or texts.

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    Needless to say that this follows the exact same rationale about consideration to your classmates, avoiding disrupting the class, etc.

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    Plus, you will have course notes (these slides) posted on the course web site anyway, along with additional references — usually relevant Wikipedia pages, but possibly other references as well. Case in point, here's one:
    http://www.marilynvossavant.com/articles/multitasking.html

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- And speaking of multitasking ....
  The use of laptops for multitasking with non-class activities will be detrimental to your own performance in the course!

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  By “multitasking”, your brain is just switching from one task to the next; this consumes more time and energy than completing the various tasks one after the other, without multitasking....

# Classroom Etiquette

- And speaking of multitasking ....

  But wait! It gets worse .... Hopefully you see what the big problem is when applying the notion of multitasking in the context of a class!

# Classroom Etiquette

- With that said .... if you want to use a laptop for taking notes but you know you're simply unable to resist the temptation to open your e-mail or browser, etc., I ask that you sit at the back of the classroom, preferably the last row, so that no-one is behind your screen to get distracted by it.

# Classroom Etiquette

- Connecting all these pieces ....

# Classroom Etiquette

- Connecting all these pieces .... The following reference is so important that I'm making it required reading:

  Dennis Adams, *Wireless Laptops in the Classroom (and the Sesame Street Syndrome)*. Communications of the ACM, Sep. 2006.

  (a Google search will certainly lead you to it)

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  Foods and beverages in the classroom are strongly discouraged. And again, this follows the same rationale — it can be (and most likely is) very distracting to others and disruptive for the class.

  Like with laptops — if you really need to make an exception, I ask that you sit at the back.

# Motivation

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# Motivation

- Reasons for students being motivated typically tend to fall in the following two categories:
  - The material is enjoyable and fun!
  - The material is relevant / useful
- Often enough, a given course gets high marks on one of the above categories, but a poor mark on the other one.
- In my opinion, ECE-250 is unusual in that it gets highest marks *on both* categories!

# Motivation

- Another side of this is the categorization of students (or in general, of our learners) based on their approach to learning and motivation about learning.

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  - Performance-oriented learners
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- Interestingly, these are not mutually exclusive, and in fact, according to psychologists, most of us exhibit a little bit of both.
- There's a lot that can be said about this, but I really want to focus on one aspect of it ...

# Motivation

- One of the characteristics in this classification is that:
  - Performance-oriented learners tend to avoid mistakes at all cost («*mistakes are cause for embarrassment, shows poor performance, and therefore must be avoided at all cost*»)
  - Mastery-oriented learners see mistakes as an opportunity to learn and to gain deeper and more complete understanding — they are willing to take more risks and go outside their comfort zone, thus opening more opportunities to learn!

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  By taking the risk to make mistakes while you're learning, you're more likely to learn to avoid those mistakes when it is critical that you do!

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  (I mean, we *will* get to the correct answers; we just want to also understand why the incorrect ones are incorrect — that will give us a better, deeper understanding of the topic!)

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  «*An expert is a person who has made all the mistakes that can be made in a narrow field*»
  – Niels Bohr

# Motivation

- And speaking of making mistakes... This other reference is so important, and such a spectacular read, that I'm making it even more required reading than the other one :-)

  Roediger and Finn, *Getting it Wrong: Surprising Tips on How to Learn*. Sci. Am., Oct. 2009

  Available online:
  http://www.scientificamerican.com/article.cfm?id=getting-it-wrong

  (make sure that you read the second page as well!)

# Tomorrow

- During tomorrow's tutorial (5:30PM, in this same classroom), we'll go over some C++ concepts, possibly some Unix/Linux concepts.
- In preparation, I would recommend that, if not already using it, consider installing Ubuntu (or some other Linux flavour) on your computers; this will (could) help you with the Labs.

  http://www.ubuntu.com for details (then, you can download from our CS club mirror)

# Tomorrow

- As for C++, I wrote (like, looooong ago) some introductory tutorials, available at:

  http://www.mochima.com/tutorials/#cpptutorials

  and one for the STL:

  http://www.mochima.com/tutorials/STL.html