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Automata and Logic Engineering 1 (ALE1)
Feb 2019

Lecturer

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Room 2.38

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Today

- Introduction to ALE1
- Course structure
- Demo

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ALE Courses

- ALE1: Logic and set theory (1st year MATH1)
  - Reading logical propositions
  - Building truth table, simplifying it
  - Normalizing, nand-ifing propositions

- ALE2: Automata (1st year MATH2)

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Learning goals

- Besides the specific contents of the assignments, the following general aspects of software engineering:
  - UML modelling
  - refactoring (in particular when your initial UML modelling was not that optimal)
  - testing (module tests and system tests)
  - code analysis (coverage, complexity)
  - user interface design

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Learning goals

- Good software design
  - classes, interfaces, SOLID principles, Design Patterns, etc…
- Clear documentation of design decisions
- Robustness
  - thorough test cases, code analysis, code coverage
- Creativity

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Planning

- 7 weeks
  - 2 hours
  - Thursday 12:45-14:15 theory + practical
- **no exam, one project**
- **mandatory** weekly assignments
  - 5 in total in share point **ALE1 Lab Manual**
  - submit assignments in **Canvas**
  - **deadlines**!

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Assignments

1: parse + tree
Due Feb 21 at 12:45pm

2: truth table + hash code
Due Feb 28 at 12:45pm

3: simplify
Due Mar 14 at 12:45pm

4: normalize
Due Mar 21 at 12:45pm

5: nandify
Due Mar 31 at 11:59pm

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Assignments

- Submit
  - **A ZIP/RAR file containing the working program in the format 'ALE1_PCN_Name.rar',**

    i.e. append your PCN and your name

    ALE1_875856_GeorgianaManolache.rar
  - **Report (pdf):** A report describing the design choices. You can add this in the ZIP/RAR archive

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Assignments

- if assignment is not executable on due date, no worries!
  - detail in the submission comments the issues you have, why you are behind
- only 5th assignment is graded
- **however, all assignments submission is mandatory!**

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Assignments

- if assignment not submitted on time (missed deadline)
  - 5% off your final grade!

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Grading

- submission of **5th assignments** counts as the **final submission** of project

deadline 31st March 23:59h!!!

  - **30% off your grade** if later
  - includes **executable**, **accessible code**, **design report**

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Grading

- grade is awarded according to the **Syllabus** in Canvas
  - https://fhict.instructure.com/courses/7540/assignments/syllabus
- **all assignments** must be **completed!**
- any smart implementations, algorithms or glitches must be written in the **report**
- **report template** in share point **ALE 1 report template**

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Project

- any modern object oriented language
  - **make sure lecturer can run the project!**
  - submit **stand-alone app + code files + report**
- **be present** in class to show your work

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Project

- **NOTE:** you can work in groups, as long as you mention in your report exactly which code lines are shared!

- else, you will be subject to the rules of the Examination Board (plagiarism)

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Communication

- Canvas (assig submission)
  - you will receive an invite today
- Slack (general communication, questions)
  - ask questions, share ideas
  - do not share your code, only help with hints!

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Communication

https://alespring2019.slack.com/signup

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Information gathering summary

Document	Location
Submit assignments\ See deadlines	Canvas\ Assignments
Details about grading\ Submission format	Canvas\ Syllabus
Communication	Canvas Slack
Assignments + Theory	share point\ ALE1
Report template	share point\ ALE1

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True or false

"The meaning of life? sorry, I only answer "true or false" questions."

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Proposition

- sentence which is **true** or **false**:

  5 + 2 < 3

  China is in Europe.

  5 - 2

  x > 5

  Do your ALE assignments.

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Proposition

- In ALE1, a sentence will be denoted as letter, e.g.:

  A, B, p, q, etc.

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Compound propositions

- Multiple **propositions** combined by **one or more logical operators**

Logic notation	Operator
¬ A	Negation
A ⇒ B	Implication
A ⇔ B	Biimplication
A ∧ B	Conjunction
A ∨ B	Disjunction

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Notation

Logic notation	Operator	ASCII (prefix)
¬ A	Negation	~(A)
A ⇒ B	Implication	>(A,B)
A ⇔ B	Biimplication	=(A,B)
A ∧ B	Conjunction	&(A,B)
A ∨ B	Disjunction	|(A,B)

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Examples

Logic notation	ASCII (prefix)
¬ A	~(A)
A ⇒ B	>(A,B)
A ⇔ B	=(A,B)
A ∧ B	&(A,B)
A ∨ B	|(A,B)

- ¬ A ∨ (B ∧ C)

  \|(~(A),&(B,C))

- (A ⇒ B) ∧ (A ⇔ B)

  &(>(A,B),=(A,B))

- (¬ A) ⇔ (¬B)

  =(~(A),~(B))

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Assignment 1

- Read a formula in ASCII format
  - NOTE: spaces are allowed but must be ignored
  - Proposition **A** ≠ **a**
- Return lift of all variables
  - If l(~(**A**),&(**B**,**C**)) return A, B, C
- Build graphical represenation of your proposition

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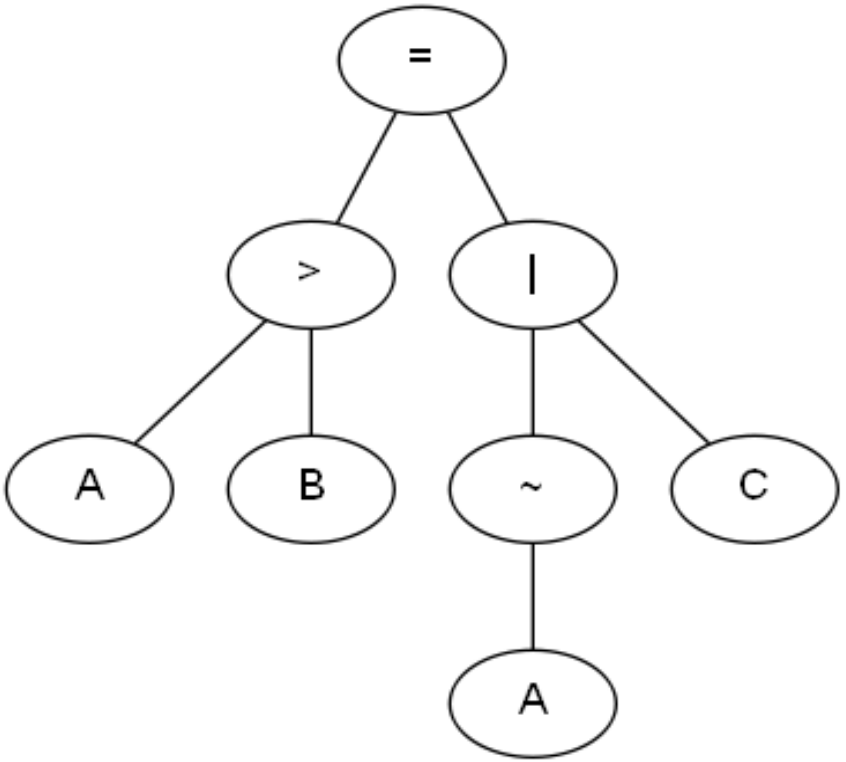
Graphical representation

=(>(A,B),|(~(A),C)



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Assignment 1

- Read course description for more info
- Deadline Assignment 1

21st February 12:45h!

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