DM534

Introduction to Computer Science

Joan Boyar and Rolf Fagerberg

September 2, 2014

Format

- Lectures (most in English)

  - Joan Boyar, Rolf Fagerberg + other CS faculty
  - Joan's office hours:
    Mondays 9:15–10:00, Thursdays 10:45–11:30
  - Questions in English or Danish

- Labs and discussion sections

  - Magnus Gausdal Find (D1)
  - Christian Kudahl (D2)
  - Lasse Malm Lidegaard

- Study groups (with and without advisors)

Course Intro
Algorithms

■ Study start project

◆ available from course homepage — with rules

◆ due September 15, 8:15

◆ turn in through Blackboard — 1 PDF file

◆ start early

◆ read questions carefully

◆ write clear, complete answers

◆ explain your answers, but do not write too much

◆ no working together

◆ must be essentially correct for pass

Course requirements

- Pass/Fail

- 80% attendance at lectures, labs, and discussion sections

- All assignments approved

- Note: there is no formal exam

- assignments to be approved
(6 – at most 2 retries total)

  - no working together
  (talk with me, Rolf, or instruktor)

  - no late assignments

  - turn in via Blackboard – 1 PDF file

  - if sick, use a retry

  - must be nearly correct

  - grading – pass/fail (approved/not approved)

Discussion sections and labs

- Read notes/textbook sections

- Think about problems

- Prepare at least one problem to present

Computer Science

Computer Science is Not:

■ Learning applications

■ Programming

The course gives a broad overview.
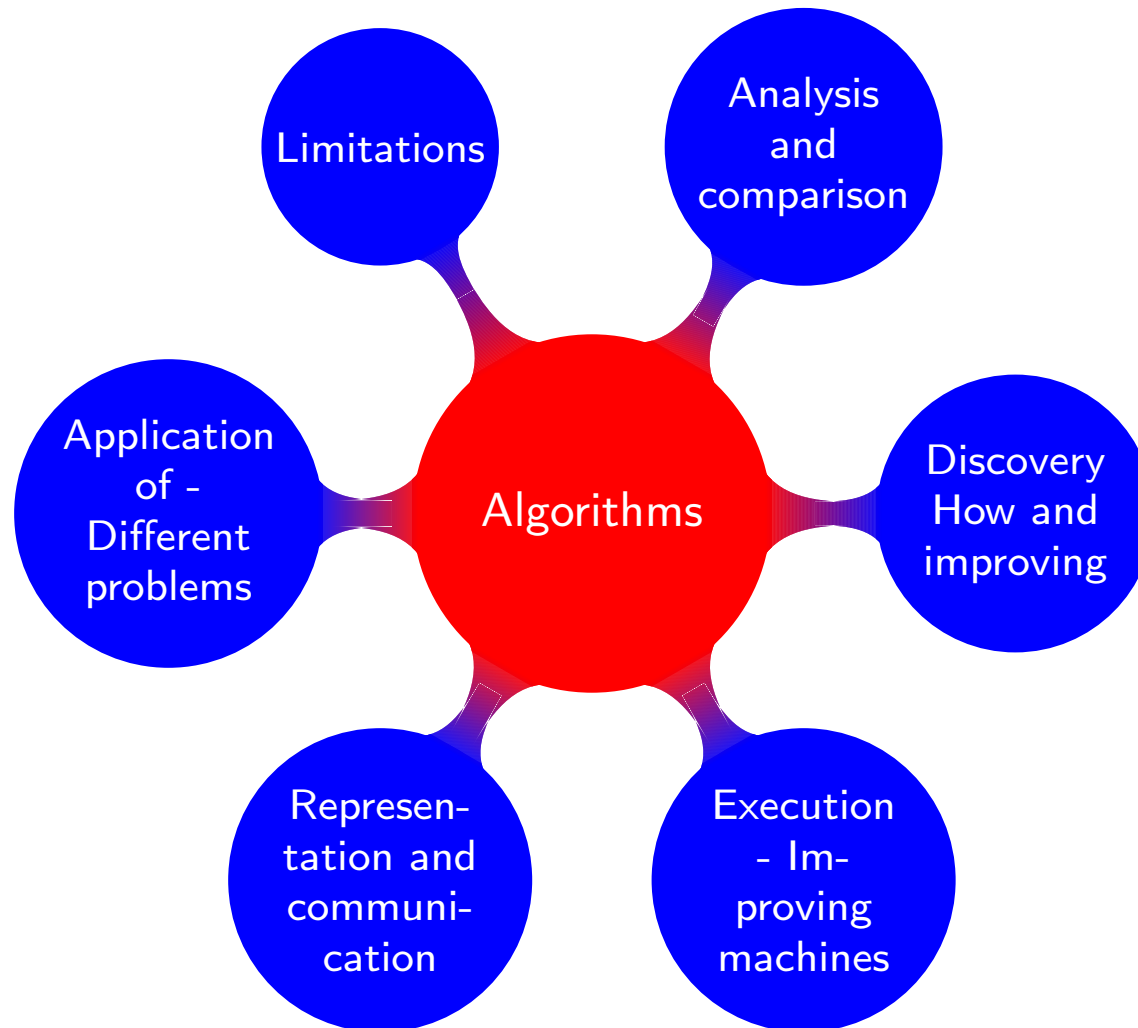
Course Topics:

- Algorithms

- Computer architecture

- Operating systems

- Networks

- Database systems

- Theoretical limits

- Artificial intelligence

- Graphics

- Cryptology

- Software tools — LaTeX, Subversion (version control)

- Computers and society – study group topics

Computer science = Science of algorithms?????

Computer Science

Computer science = Science of algorithms?????

Algorithm: a well-ordered collection of unambiguous and effectively computable operations, that, when executed, produces a result in a finite amount of time.

Course Intro

Algorithms

$$\mathrm{gcd}(a,b) = \max\{g \mid g \text{ divides } a \text{ and } b\}$$

Examples:

$\mathrm{gcd}(15,9) = \mathrm{gcd}(9,15) = 3$

$\mathrm{gcd}(15,8) = \mathrm{gcd}(8,15) = 1$

GCD(M, N):
{ Input: two positive integers M, N }
{ Output: gcd(M, N) }

$A \leftarrow \max(M, N)$
$B \leftarrow \min(M, N)$

$Q \leftarrow A$ div B
$R \leftarrow A - (Q \cdot B)$
while $R \neq 0$ **do**
$A \leftarrow B$
$B \leftarrow R$
$Q \leftarrow A$ div B
$R \leftarrow A - (Q \cdot B)$
return(B)