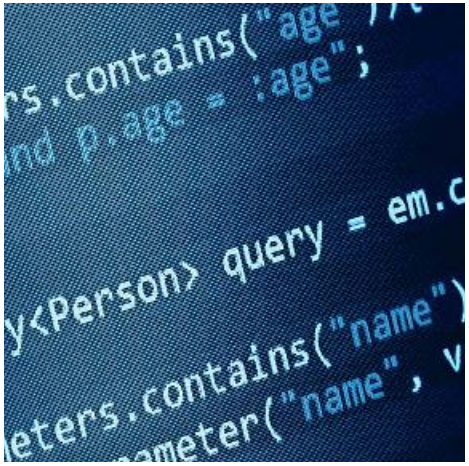
CS3500 Software Engineering

2017/2018



Dept. Computer Science
Dr. Klaas-Jan Stol

UCC
University College Cork, Ireland
Coláiste na hOllscoile Corcaigh

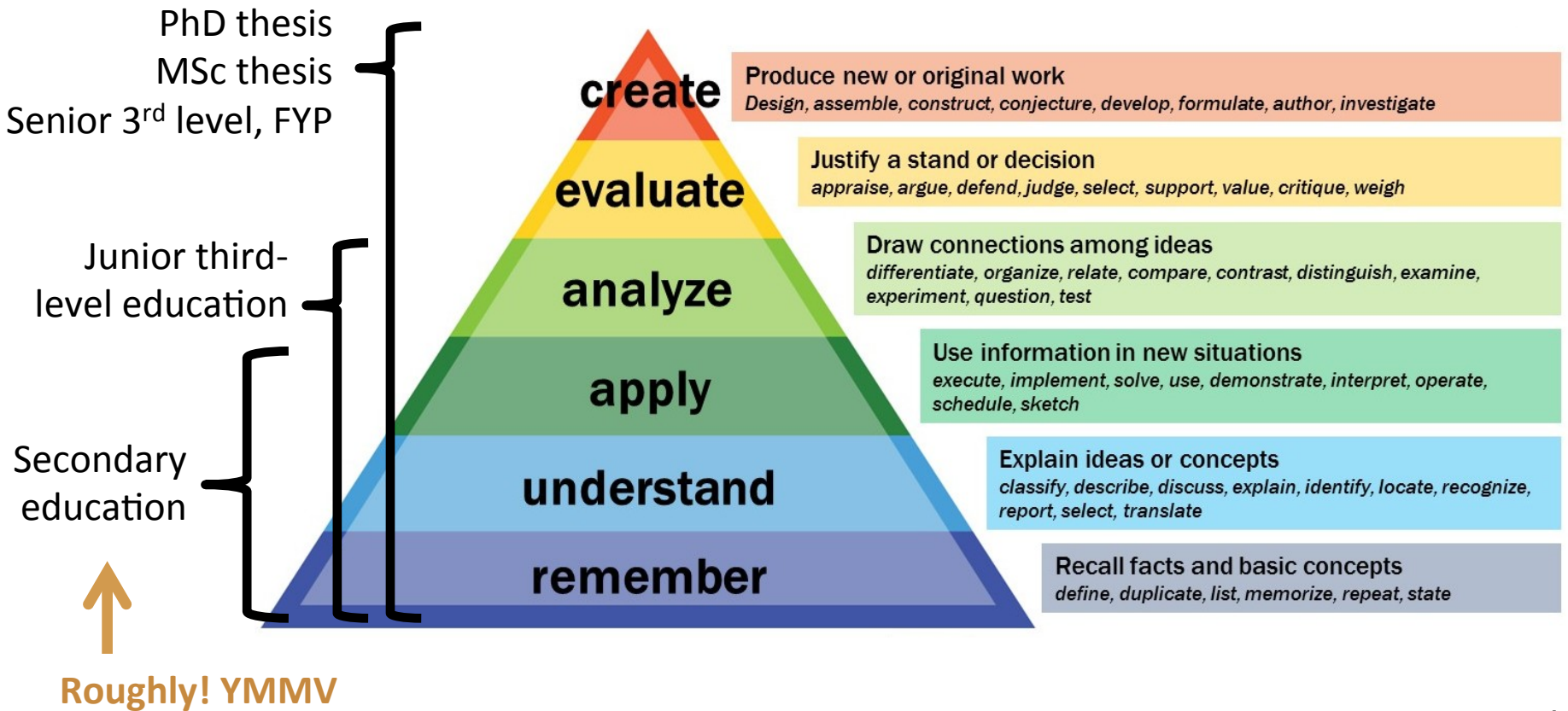
Welcome to CS3500

Lab 2

Task 2

How we Learn: Bloom's Taxonomy

Learning happens in different ways.
Dr. Bloom proposed a taxonomy



Actions for Graded Task 2

Please work in the same teams as for Task 1.

Graded Task 2:

Using the 7 categories of “cues”, identify 5 architecturally significant requirements for each category. (7 x 5 = 35 in total)

Goal:

To learn how to identify Architectural Significant Requirements.

Actions for Graded Task 2

Input:

All (anonymized) requirements from the 22 teams combined into 1 PDF (22 * 20 = 440 requirements).

You may select any combination of requirements from the input document.

Process:

- You can (but don't have to) start with your own set of requirements, but that's not enough because you need to identify 35 in total.
- This forces you to read requirements as proposed by other teams.
- Don't forget to read the papers on Moodle.

Why?

Reading other people's solutions is a form of feedback. Learn from others – feel free to adopt "good practices" you see.

Actions for Graded Task 2

Output:

Copy the requirements into a table with 3 columns:

1. Page of input PDF (as indicated by PDF viewer) that lists it, and requirement identifier if it has one.
2. The copied requirement.
3. Explanation why it is architectural.

(Made up) Example table – adjust as you see fit:

Mapping among architectural elements		
Source	**Requirement**	**Reason**
p.XX, RYY	Each voting machine links to a central server, and submitted votes are synchronized every 180 seconds. Both the voting machine and the central server retains a copy of the data.	Regular synchronization/ communication; storing copies of data on different nodes.
…	…	…

Graded Task 2

Contents of Deliverable D2:

- Minimum of 5 architecturally significant requirements for each of the 7 categories of “cues” + justification for each.

- Only pick architecturally significant reqs.

Graded Task 2: Seven categories of cues that hint at architectural significance

7. Choice of technology

1. Allocation of responsibility

6. Binding time decisions

2. Coordination Model

5. Mapping among architectural elements

3. Data Model

4. Management of Resources

Next: Examples!

Seven categories

Category	Look for requirements addressing …
Allocation of responsibility	User roles, system modes, major processing steps, commercial packages
Coordination model	Properties of coordination incl. timeliness, concurrency, completeness, correctness, consistency. Names of external elements, protocols, sensors/ devices, middleware, network configurations
Data model	Processing steps, information flows, major domain entities, access rights, persistence
Management of resources	Time, concurrency, memory footprint, scheduling, multiple (parallel) users and activities, devices, energy usage, buffers and queues
Mapping among architectural elements	Allocation of processors, network coordination, communication between elements
Binding time decisions	Extension of functionality, run-time adaptation of functionality, regional/ language distinctions, portability, calibrations, configurations
Choice of technology	Named (specific) technology, changes/evolution of technology

Adapted from Bass et al. "Software Architecture in Practice", 3rd Ed.

EXAMPLE

Is it an ASR or a Non-ASR? (1/4)

Allocation of responsibility	**User roles, system modes, major processing steps, commercial packages**

A standard 500 dpi+ scanner will be used as this is the dpi used by law enforcements to scan.

Coordination model	**Properties of coordination incl. timeliness, concurrency, completeness, correctness, consistency. Names of external elements, protocols, sensors/devices, middleware, network configurations**

An SSD will be used and read/write times must be a minimum of 0.5ms per 4kb read and 0.2ms per 4kb write.

EXAMPLE

Is it an ASR or a Non-ASR? (2/4)

Data model	**Processing steps, information flows, major domain entities, access rights, persistence**

A live change can be made only during the process of filling the voting form. Once the vote gets sent, it will not possible to modify it anymore.

Management of resources	**Time, concurrency, memory footprint, scheduling, multiple (parallel) users and activities, devices, energy usage, buffers and queues**

The systems server will have a RAID 5 configuration.

EXAMPLE

Is it an ASR or a Non-ASR? (3/4)

Mapping among architectural elements	**Allocation of processors, network coordination, communication between elements**

A state-wide satellite internet connection will be available in all regions of Ireland for a stable and secure voting for all residents.

Binding time decisions	**Extension of functionality, run-time adaptation of functionality, regional/language distinctions, portability, calibrations, configurations**

The services will be offered in 5 languages as follows, English, Irish, French, German and Polish. [..] The user will be required to select the language they would like to use once they arrive at the voting machine.

EXAMPLE

Is it an ASR or a Non-ASR? (4/4)

Choice of technology	Named (specific) technology, changes/ evolution of technology

HTTPS or a similar protocol must be used to guarantee a secure connection that can protect the voter's data.

Graded Task 2: Contents of Deliverable

(Similar to deliverable D1)

- Cover page with team ID + team member names + student ID numbers.
- 35 ASRs organized by category of cues.
- 1 page describing contributions of team members – format as you see fit.
- Think of formatting
  - make it look OK – don't use Notepad

Graded Task 2

- Submission must be in PDF format.
- Submit through Moodle by October 31.
- Please: Only 1 submission per team.

FAQ

Q: How should I know what an ASR is – I'm not an architect!

A: Exactly, and this is meant as part of your training.

Q: How can I get it right if I don't know what an ASR is?

A: Review the material, and justify how requirements are arguably architecturally significant. There are no black/white answers!

Q: Some requirements fit in several categories. What should I do?

A: That might happen; always ask: of which category is this a representative example, or a characteristic? Is it about "data", "control", etc.

Q: What is this good for?

A: Good question! In the short term, you'll be doing a Team Software Project (CS3305), and work placement; in both cases you may be doing architecture design work. Also, when you're a developer, you need to understand some of the underlying principles of large systems.

Q: Can I start coding yet?

A: Not yet. Next semester (CS3305).

Questions?

Please email: k.stol@ucc.ie

Thank you for your attention

Questions & suggestions can be sent to:
k.stol@ucc.ie