

CS846: Advanced Topics in Software Engineering: Requirements Engineering

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<http://se.uwaterloo.ca/~dberry/ATRE>



Requirements Specification

- **Requirements — desired goals or behaviour**
 - **What are we trying to accomplish?**
 - **What does the customer want?**

Requirements Specification, Cont'd

- **Specification — description of proposed behaviour of software system**
 - **Can a software system help us accomplish our goals?**
 - **What would that software system do?**

The very familiar CS assignment descriptions are no more than informal specifications.

An entire course on requirements?

Why devote an entire course to requirements?

Requirements Problems:

- **80-85% of all software errors are requirements errors.**
- **The cost to fix an error grows exponentially with lifecycle stages.**

So it's important to get requirements right early in the lifecycle of a computer-based system.

Course Requirements

Each student will select a topic, research it, and present it to the class in a half-hour seminar.

I will talk about topics that students don't select but want to hear about until students are ready.

Possible Topics

- **Creativity in requirements elicitation**
- **Ambiguity in requirements specifications**
- **User interface in requirements**
- **Natural language processing in requirements engineering**
- **Abstraction identification in natural language requirements specifications**
- **Traceability in requirements engineering**
- **Requirements management**

Possible Topics, Cont'd

- **Empirical evidence that up-front requirements engineering pays off big**
- **Empirical evaluation of requirements engineering methods**
- **Requirements engineering in agile development**
- **Requirements engineering and formal methods**

Possible Topics, Cont'd

- **Security, safety, survivability, robustness, or privacy requirements**
- **Product line requirements**
- **Laws and regulations as requirements**
- **Requirements for new Internet**
- **Requirements for service-oriented, Web-hosted, distributed systems**

Possible Topics, Cont'd

Requirements specifications for

- **artificial intelligences,**
- **learned machines, the result of machine learning taught by data,**
- **big data applications,**
- **engineered molecules,**
- **cyber-physical systems,**
- **robots, etc.**

that can be used to decide if one of these systems was implemented correctly.

Possible Topics, Cont'd

Or ...

Something you think of, with my approval.

Note that these topics can lead to research for your master's or doctoral thesis.