Software Architecture
Decision Making Techniques

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Overview

- Context
- Philosophies
- Actions
- Psychologies
- Summary
Course Objectives

- Goal of course: Familiarize yourself with philosophies, actions, and psychologies of decision making techniques.

- After taking the course participants will be able to
  - Identify several philosophies of decision making
  - Identify several actions to make better decisions
  - Identify several psychologies you need to manage to make better decisions
Definition

**Decision-making**

*Verb*

Decision-making is the study of identifying and choosing alternatives based on the values and preferences of the decision maker.

synonyms: Execution, cognitive process
According to studies, the average human makes about 612 decisions a day. This equals to 4,900 decisions in a week and 254,800 in a year.
Why you need to take this course

- Why should I bother with this?
  - “Building software falls into an interesting case of problems known as wicked problems”.
  - This means basically that there are many possible solutions and that no solution is really "right" or "wrong" only "better" or "worse" given your current understanding of the problem.
  - Further each problem is essentially unique, there isn't an explicit stopping rule, and as the designer you will be held liable for consequences of your solution.“
- Michael Keeling – Architect at IBM
Context

- What context are we dealing with today?

Enterprise Architecture Decisions

System Level Architecture Decisions

Interface level Decisions between systems
Design Knowledge

- **More Knowledge**
  - Boundary of what you can know about all possible designs in the solution space
  - Toward Rational Decision Making

- **Knowledge About the Solution Space**
  - Your current knowledge about the design is somewhere on this curve.
  - Decisions must be made with information available within boundaries.

- **Less Knowledge**
  - Boundary of what you can know about the problem domain (formed by constraints such as time or limitations in the human brain)

- **Less Knowledge**

We desire to be as high up this curve as possible allowing us to make more rational design decisions.
Philosophies
Philosophy

- Extreme programming: Design your system for the requirements we have NOW.
Philosophy

- Systems evolve and each version builds on the previous
Philosophy

- Agile/Lean: make big hard decisions as late as possible

“Abolish the idea that it is a good idea to start development with a complete specification.”
- Mary P
Philosophy

- Conclusion: make decisions that reduce the cost of making change later
Actions
Actions: Reduce the Unknown

- Find out what is important:
- Run a quality attributes workshop with all stakeholders including users, System SMEs, product owners, QA, and architects.
Actions: Reduce the Unknown

- Uncover hidden requirements by using contextual design.
  
  - Contextual Design engages the people doing the work and studies their intents and problems to ensure the software system developed is more in tune with the user's actual needs.
  
  - It provides a powerful tool for software engineers to use as input into their requirements and architecture.
Actions: Get the Evidence

- Don’t rely on hearsay, go to the source
- If the right people are not on in the meeting, end the meeting
Actions: Find a Solution

- Write out the pros and cons for the customer for each solution and review with stakeholders.
Actions: Find a Solution

- Do a Pre-Mortem on your possible solutions
  - Imagine the project is over and talk about what went wrong using each solution
Actions: Find a Solution

- Talk your solutions over with experts from other areas
Actions: Reduce the Unknown Prototype and show it to the users!
Actions: Reduce the Unknown

- Conclusion from Actions: identify issues early and change direction quickly
Psychologies
Realize that most blocks to decisions aren’t technical: They are political

Political means Psychology
Character

- Trustworthy
- Helpful
- Reciprocal
Know thy Audience
Know your Objective
Connect the two
Presentation

- Explain the problem completely
- Answer any questions to ensure they understand the real problem
- Only then once they understand the problem, give them the solution.
Conversation Models

- So What’s Your Point?

![Book cover: So, What’s Your Point?](image)
Summary / Review

Decision Making Toolkit

Philosophy

Psychology

Actions
Resources

- **General Decision Making Resource:**
  - [http://hbr.org/web/management-tip/tips-on-decision-making](http://hbr.org/web/management-tip/tips-on-decision-making)

- **Agile Resources:**
  - *Lean Startup* – Eric Ries

- **Quality Attributes Workshop resource:**
  - SATURN 2014 Presentation
    - [http://resources.sei.cmu.edu/asset_files/Presentation/2014_017_101_89563.pdf](http://resources.sei.cmu.edu/asset_files/Presentation/2014_017_101_89563.pdf)

- **Politics resource:**
  - *So What’s your Point?* by James C. Wetherbe and Bond Wetherbe
  - *Speed of Trust* by Stephen M.R. Covey
  - *Secrets of Closing the Sale* by Zig Zigler
  - *Just in Time Architecture* by George Fairbanks
Questions?

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