Coping with Change and Risk

CMPT 276

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Based on slides from Software Engineering 9th ed, Sommerville.

Topics

- How can software projects manage change?
  - What is prototyping?
  - What is incremental development?

Coping with change

- Change is inevitable in all large software projects:
  - Business changes

    lead to new (or changed) system requirements.
  - open up new possibilities.

- Cost of change =

  Cost of reworking completed work

  (re-analyzing requirements, design, re-coding)

  +

  Cost of..

Change avoidance with
(Throwaway) Software Prototyping

Throwaway Software Prototyping

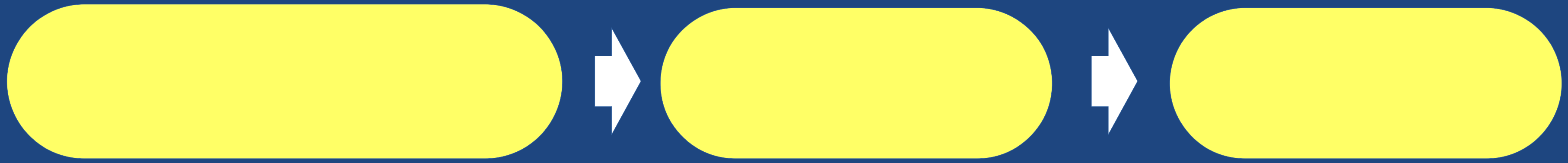
- Prototype:
  -

    used to try out options.
- "Throw-away" code:
  - Prototypes could ignore things like code quality, error-handling, or testability.
  - Built to answer a specific question, not to see if the whole system will work.

Software prototyping

- A prototype can be used in:
  - ..
    to help with requirements elicitation and validation;
  - .. to explore options;
    - For example, a paper prototype of the UI.

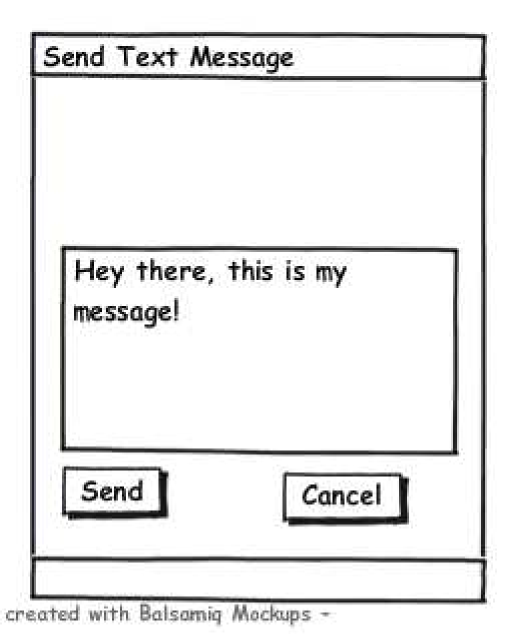
Prototyping Process:



Benefits of prototyping

- Benefits of Prototyping:
  - Improved system usability
  - A closer match to users' real needs
  - Improved design quality
  - Improved maintainability
  - Reduced development effort

Why?


Send Text Message
Hey there, this is my message!
Send
Cancel
created with Balsamiq Mockups -

Prototype development

..

- Focus on poorly understood areas of the product;
- Error checking and recovery may be omitted;
- Focus on rather than requirements.

Ex: Accessing hardware, screen layouts, database access.

Ex: Security, performance, etc.

- Prototypes..
  not a good basis for a production system:
  - Likely below software quality standards.
  - Normally undocumented;
  - Degraded structure from rapid change (no refactoring)
  - Hard to tune it to meet non-functional requirements.

Change tolerance with

Incremental Delivery

Incremental delivery

- Development and delivery are
  ..
  - Each increment delivers some required functionality
- Prioritized user's requirements
  - Highest priority ones included in early increments.
  - Customer evaluates product at end of each increment
- Requirement changes
  - Once the development of an increment is started,
    ..
  - Backlog's user stories continue to evolve;
    team will commit to these in future iterations

Customer value from incremental delivery

- Incremental delivery gives customer early benefits

Draw graph of (customer value) vs (time)

Benefits & Drawbacks

What is a difference between an early increment and a prototype?

- Benefits include:
  - New functionality delivered with each increment so system functionality is available earlier.
  - Early increments act..
    to help elicit requirements for later increments.
  - Lower risk of overall project failure.
  - Highest priority requirements implemented first and..

- Limitation of incremental delivery: Contracts
  - Complete system specification can be needed as part of the..

Summary

- Processes should cope with change.
  - Change avoidance:
    - Throwaway prototyping helps avoid poor decisions on requirements and design.
  - Change tolerance:
    - Iterative development and delivery allows changes without disrupting whole system.