Object Oriented Analysis and Design

Inception Phase and Evolutionary Requirements

COMP 3831

Craig Larman: Chapters 5 and 6

Activities in the Inception Phase

During the this phase we:

- Decide the "go/no-go" of the project
- Determine the Core Architecture of the system
- Create an executable prototype that serves as a proof of concept.

Prerequisite – the Business Case

- The business case includes success criteria, risks assessment, estimates of the resources needed and a phase plan showing a schedule of major millstones.
- The business case is an input for OOAD

Objectives of the Inception Phase

Resolve the System Scope

- Define the scope of the proposed system.
- Draws a line around exactly what is to be within the proposed system and what is outside.
- Defines the external actors, which may be other systems or people which the system is to interact and it specifies at a high level the nature of this interaction.

Resolve the System Scope - Questions

- Is what is to be within the system clear ?
- Are all the actors identified ?
- Is the general nature of the interfaces (user interfaces and communication protocols) to the actors identified ?
- Can what is within the scope stand by itself as a functioning system ?

Objectives of the Inception Phase
Resolve Ambiguities in the Requirements

- The requirements at the beginning of the inception phase may range from a broad vision to many pages of textual description. However, these initial requirements are likely to contain ambiguities. In the inception phase an effort is made to avoid these ambiguities.

Resolve Ambiguities - Questions

- Has the limited number of use-case requirements (functional) needed to reach the objectives of this phase been identified and detailed ?
- Have the supplementary requirements (non functional) been identified, detailed and clarified ?

Objectives of the Inception Phase
Establish a Candidate Architecture

Why should an organization focus on the architecture?

- Lets you gain and retain Intellectual Control over the project.
- Reuse
- Provides a basis for project management.

Establish a Candidate Architecture – Questions?

- Does it meet user's needs?
- Is it likely to work ?

Objectives of the Inception Phase (cont)

- Estimate Risks
  - Many difficult projects have failed because they encountered critical risks.
- Estimate the Cost and Schedule
  - Overall cost and schedule for the entire project.
- Identify the primary scenarios of behavior (use cases) of the system
  - These use cases will drive the systems functionality.

Outcomes of the Inception Phase

- A vision document : general vision of the core project requirements, key features, and main constraints.
- A first version of a business(or domain) model that describes the context of the system
- A first cut of the models representing a first version of the use-case model, the analysis model, the design model. Of the implementation model and test model, there may be something rudimentary. There is also a first version of the supplementary requirements .

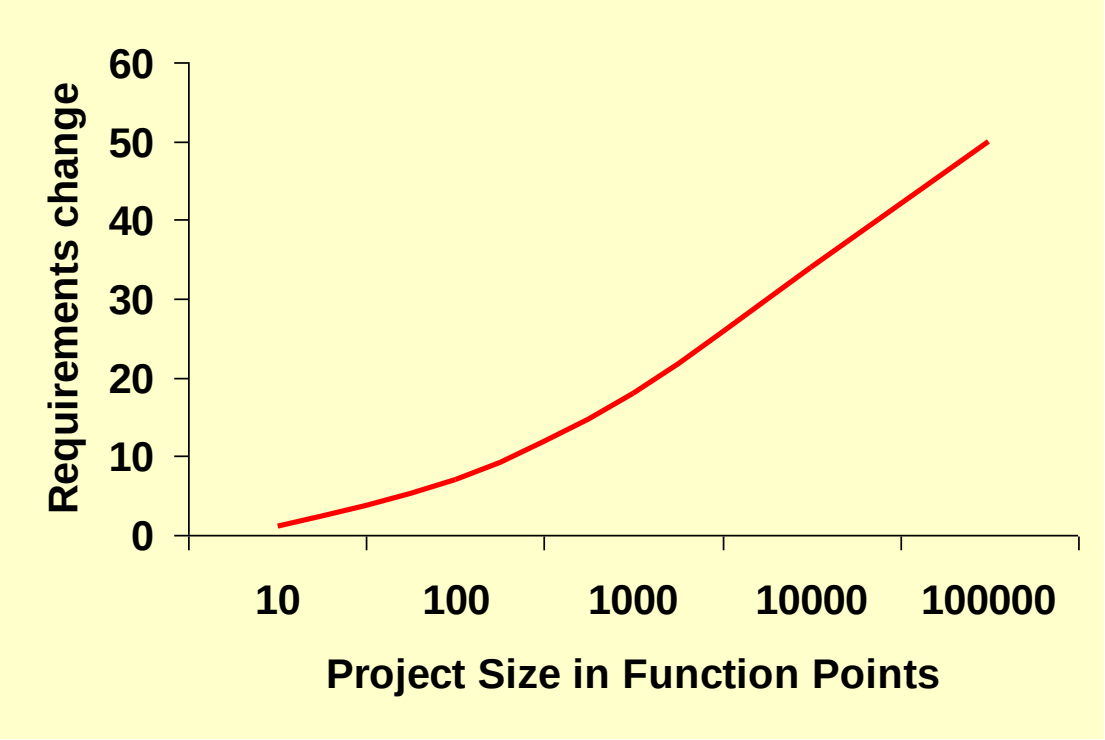
Outcomes of the Inception Phase (cont)

- A first draft of a candidate architecture description with outlines of views of the use case, analysis, design and implementation models
- Possibly a proof of concept exploratory prototype, demonstrating the use of the new system
- An initial risk list and use case ranking list
- The beginning of a plan for the entire project, including a general plan for the phases

Evolutionary Requirements

Faulty Assumption 1: Requirements can be Fairly Accurate

Jones, 1997. Based on 6,700 systems.



Faulty Assumption 2: Requirements are Stable

- The market changes—constantly.
- The technology changes.
- The goals of the stakeholders change.

Faulty Assumption 3: The Design can be Done, before Programming

- Ask a programmer.
- Requirements are incomplete and changing.
- Too many variables, unknowns, and novelties.
- A complete specification must be as detailed as code itself.
- Software is very “hard”.
  - Discover Magazine, 1999: Software characterized as the most complex “machine” humankind builds.

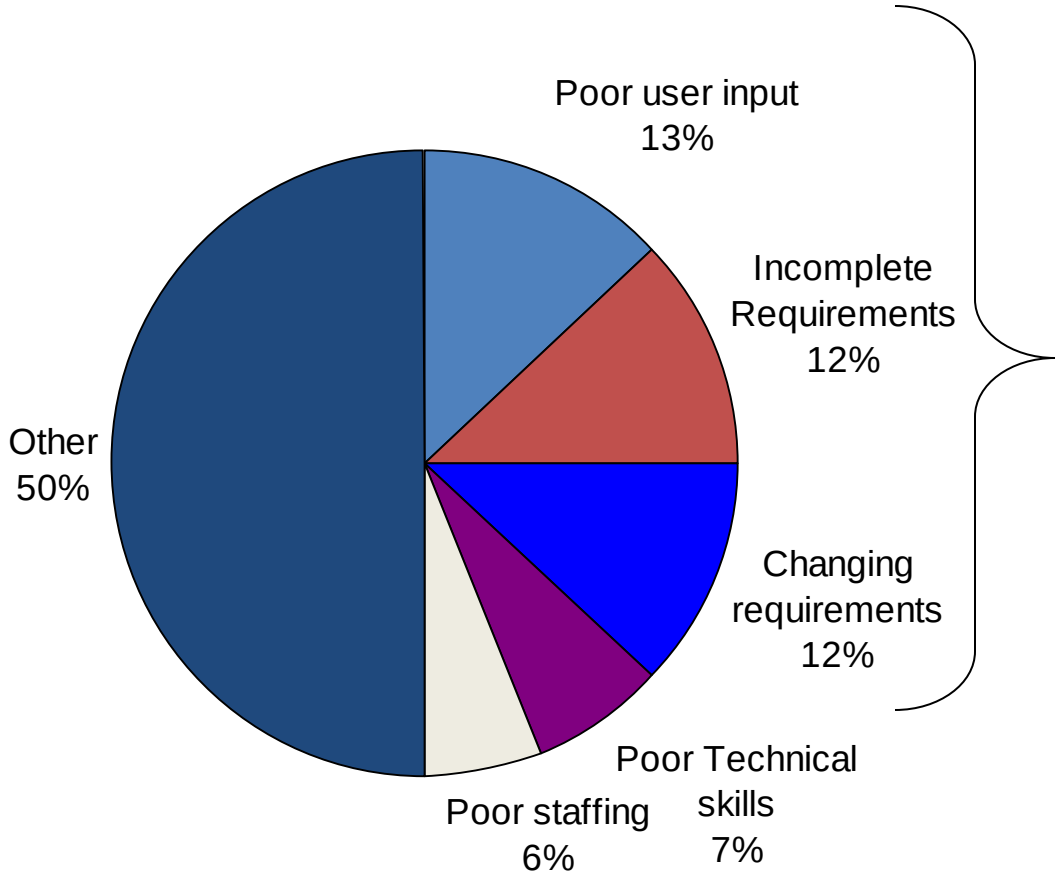
The Importance of Requirements

- Requirements are often taken for granted.
- Users know what they want, right? Well not exactly!
- Figuring out exactly what a system should be doing is a major undertaking

Types of requirements (FURPS+)

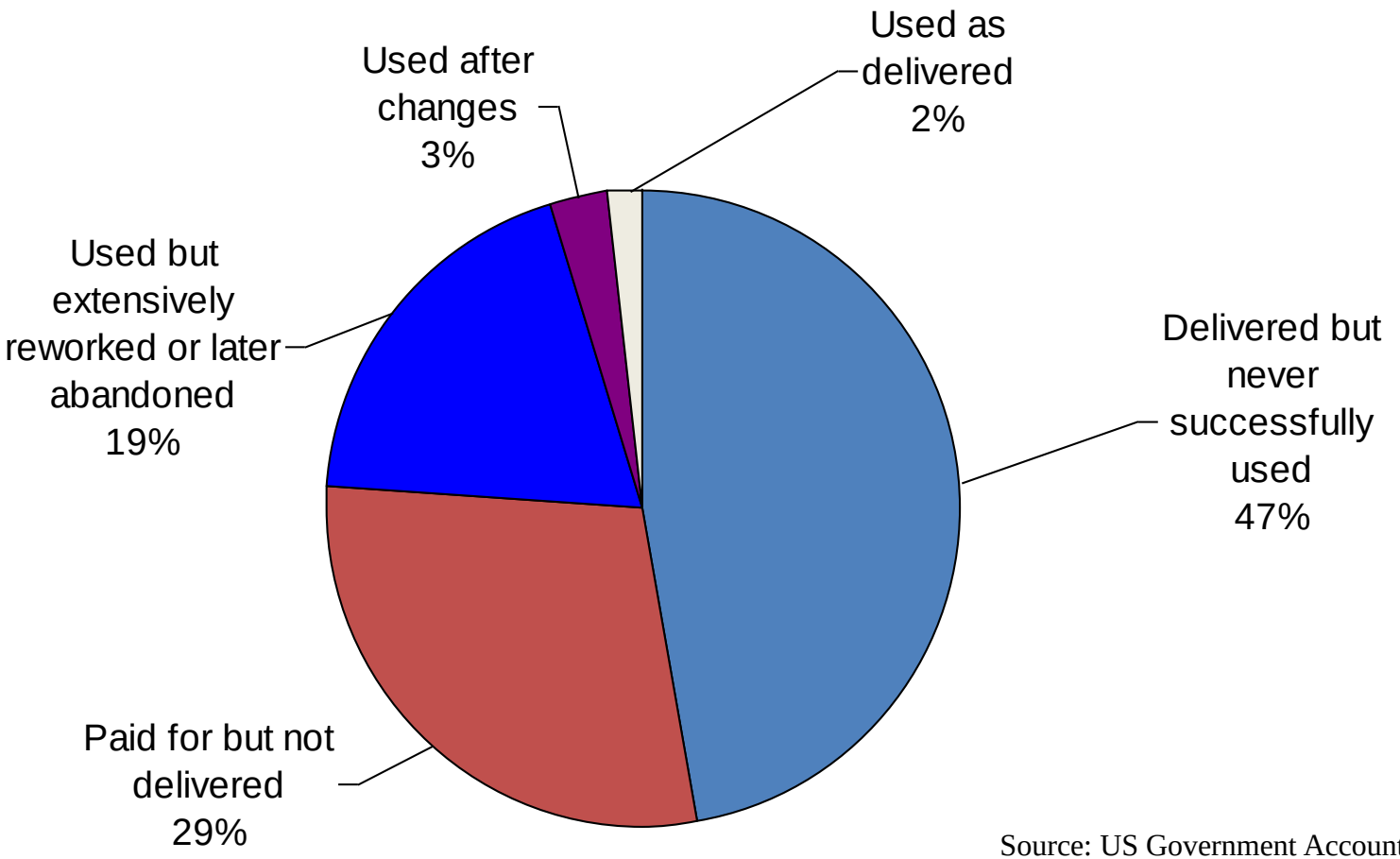
- FURPS
  - (**F**)unctional - features, capabilities, security
  - (**U**)sability - human factors, help, documentation
  - (**R**)eliability - frequency of failure, recoverability, predictability
  - (**P**)erformance - response times, throughput, accuracy, availability, resource usage
  - (**S**)upportability - adaptability, maintainability, internationalization, configurability

Factors on challenged software projects



The Rate of Failure

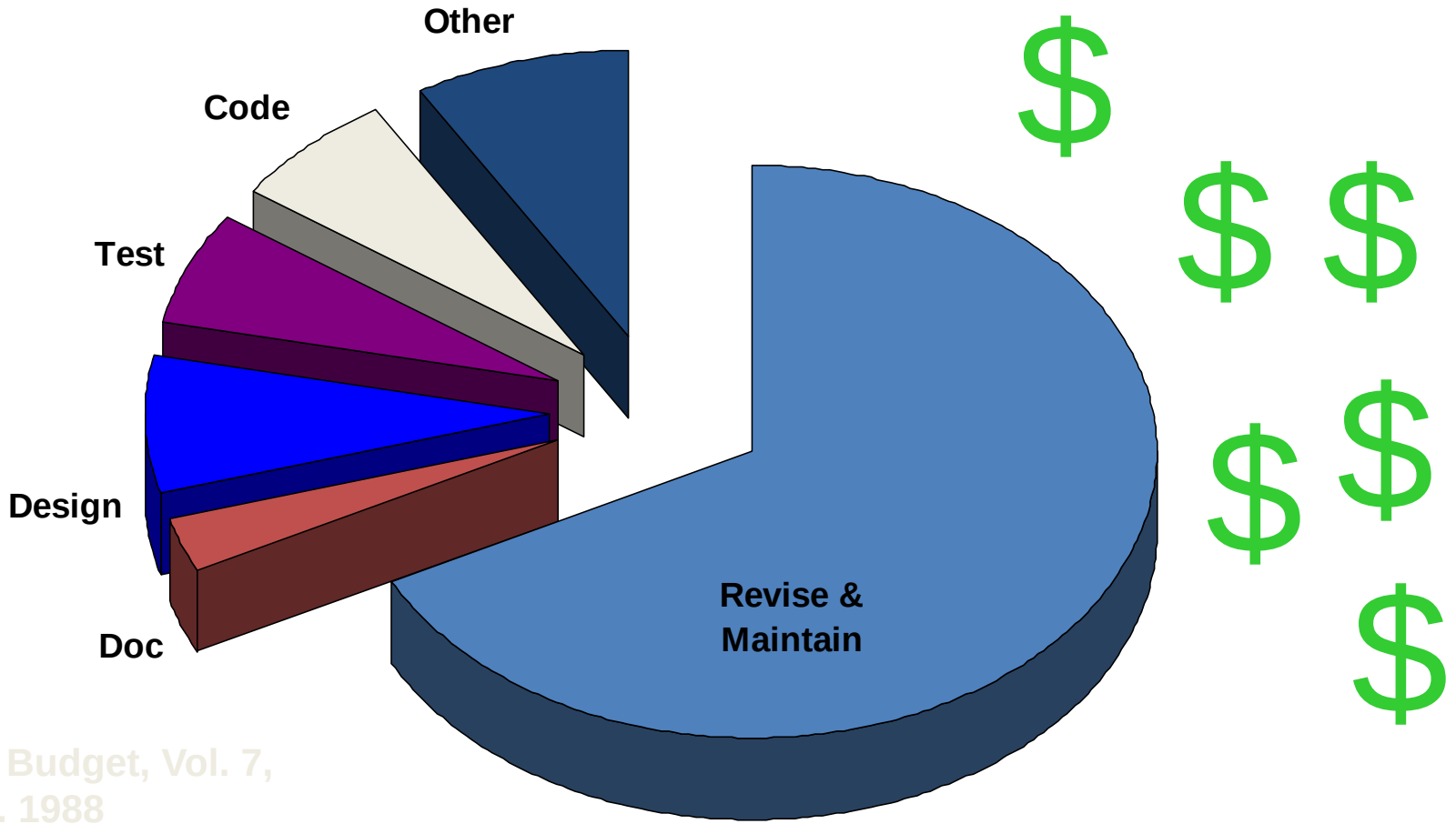
Randomly selected U.S. government software projects:



Source: US Government Accounting Office. Report FGMSD-80-4.

The Cost of Change

Strategic rational system development plans are based on the <u>complete</u> cost of a system, not solely on development costs.



Source: DP Budget, Vol. 7, No. 12, Dec. 1988

The Cost of Change

- An AT&T study indicated that, on average

Business Rules change at the rate of 8% per month. This would be quite a large change over a year.

Questions and Conclusions