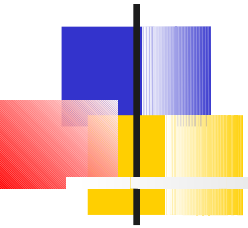
Information Systems Concepts

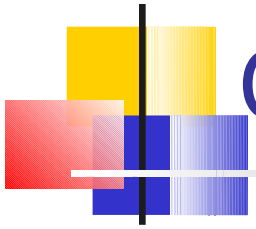
Requirements Capture



Roman Kontchakov

Birkbeck, University of London

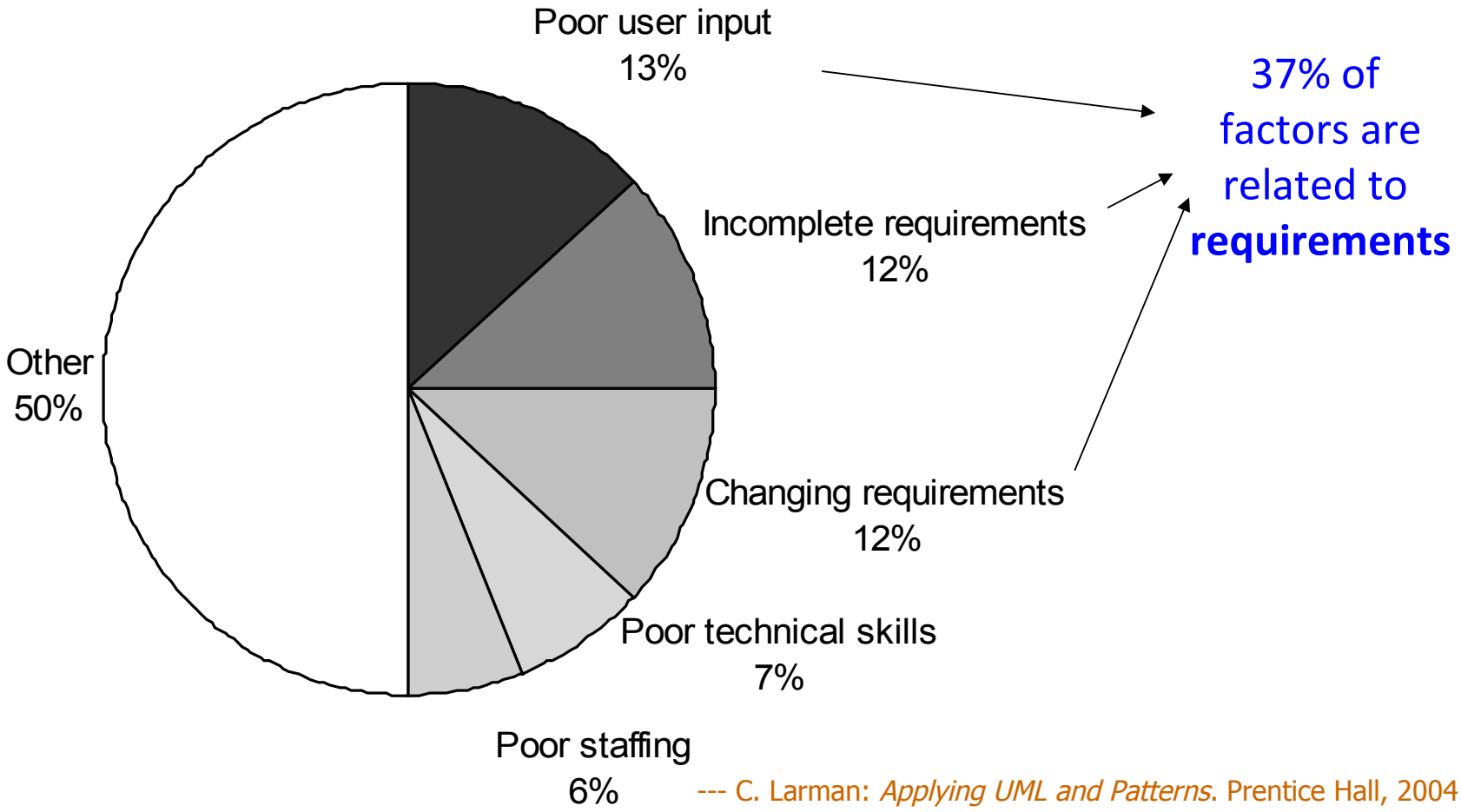
Based on Chapter 6, 12 and 21 of Bennett, McRobb and Farmer:
Object Oriented Systems Analysis and Design Using UML, (4th Edition), McGraw Hill, 2010



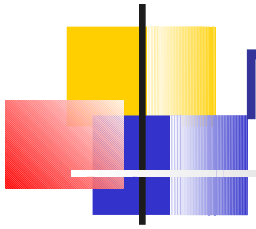
Outline

- User Requirements
  - Section 6.2 (pp. 138 – 142)
  - Section 12.5.3 (pp. 360)
  - Section 21.4.2 (p. 622 – 623)
- Fact Finding Techniques
  - Section 6.3 (pp. 142 – 150)

Factors on Challenged Software Projects

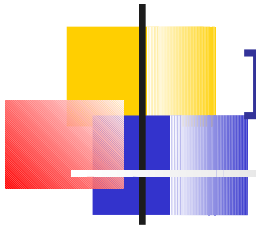


--- C. Larman: *Applying UML and Patterns*. Prentice Hall, 2004



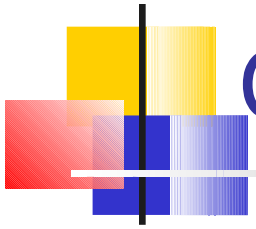
Need for New Systems

- Organizations operate in a rapidly changing *business* environment
- Organizations operate in a rapidly changing *technical* environment
- Governments and supra-governmental organizations (e.g., EU) may introduce *legislation*
- Information Systems become outdated
- Organizations may merge, take over and get taken over (or even simply grow and change the ways they operate)



Investigating Current System

- Some of the *functionality* will be required in the new system
- Some of the *data* must be migrated to the new system
- Technical *documentation* provides details of processing algorithms
- *Defects* of existing system must be avoided
- *Parts* of the existing system may have to be kept
- We need to understand the work of the *users*
- *Baseline* information about the existing system helps set performance targets for the new one

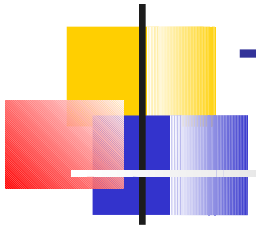


Current System v New System

- SSADM (Structured Systems Analysis and Design Method) makes the case for modelling the current system — much of its functionality will be required in the new system.
- Yourdon (1989) argues against spending a lot of time analysing the existing system — it's being replaced!

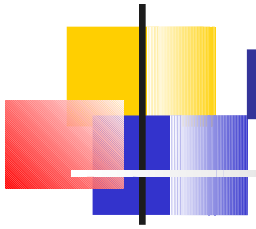
Things will develop in the opposite direction when they become extreme.

*The **Golden Mean** from Confucianism*



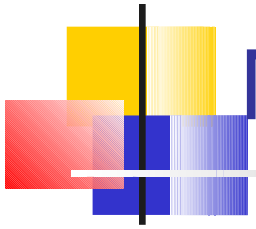
Types of User Requirements

- Functional requirements
- Non-functional requirements
- Usability requirements



Functional Requirements

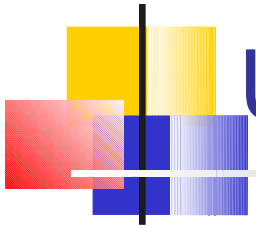
- What the system does or is expected to do (*functionality*)
  - include
    - descriptions of processing to be carried out
    - details of the inputs (forms, documents, etc.)
    - details of the outputs (documents, reports, screens, transfers to other systems)
    - details of data that must be held in the system
  - documented in
    - Use Case models
    - Class Diagrams, Communication or Sequence Diagrams and State Machine Diagrams



Non-functional Requirements

- How well the system provides the functional requirements
  - include
    - performance: response times / volumes of data
    - availability (downtime), concurrent access
    - security considerations
    - …
  - documented in:
    - Requirements List
    - Use Case models (for requirements that can be linked to specific use cases)

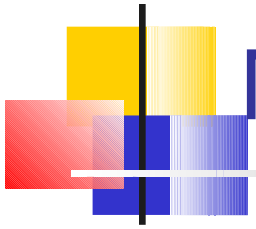
Support for both Microsoft IE and Mozilla Firefox?



Usability Requirements

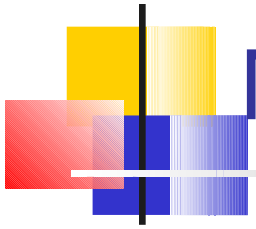
- How good the system is matched to the way that people work
  - include:
    - characteristics of users
    - tasks users undertake
    - situational factors
    - acceptance criteria for the working system
    - …
  - documented in:
    - Requirements List (may be tested by prototypes)

Unbounded undo/redo? Pop-up free?



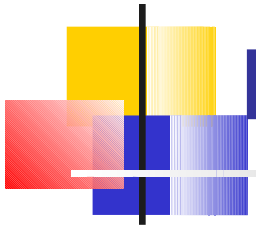
Measurable Objectives in Design

- How can we tell whether the non-functional requirements have been achieved?
- Measurable objectives set clear targets for designers
- Objectives should be quantified so that they can be tested



Measurable Objectives: Examples

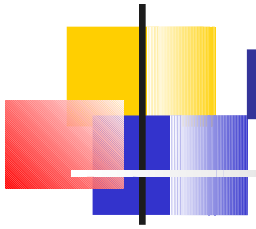
- To reduce invoice errors by one-third within a year
  - How would you design for this?
    - checks on quantities
    - comparing invoices with previous ones for the same customer
    - better feedback to the user about the items ordered
- To process 50% more orders at peak periods
  - How would you design for this?
    - design for as many fields as possible to be filled with defaults
    - design for rapid response from database
    - design system to handle larger number of simultaneous users



Prioritizing Requirements

- MoSCoW
  - **M**ust have requirements are crucial -- the system will not operate without them
  - **S**hould have requirements are important, but if necessary the system can still operate without them
  - **Co**uld have requirements are desirable, but provide less benefit to the user
  - **W**on't have requirements should be left for a later iteration/increment

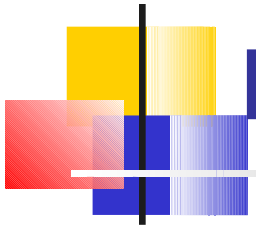
Rocks, Gravel, Sand and Water



Fact-Finding Techniques

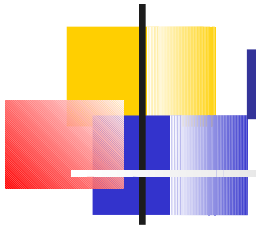
- SQIRO
  - Document **S**ampling
  - **Q**uestionnaires
  - **I**nterviewing
  - Background **R**eading
  - **O**bservation

This is not the order they are mostly likely to be used!



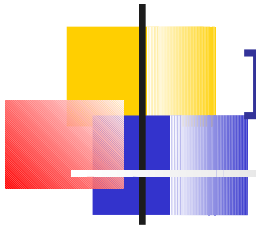
Background Reading

- aim:
  - to understand the organization and its business objectives
- sources of information:
  - reports
  - organization charts
  - policy manuals
  - job descriptions
  - documentation of existing systems
- appropriate situations:
  - analyst is not familiar with the organization
  - initial stages of fact finding



Background Reading

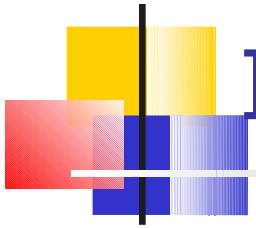
- advantages:
  - helps to understand the organization before meeting the people who work there
  - helps to prepare for other types of fact finding
  - documentation of existing system may provide formally defined requirements for the current system
- disadvantages:
  - written documents may be out of date or not match the way the organization really operates



Interviewing

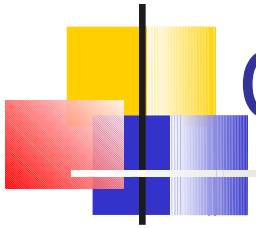
- aim:
  - to get an in-depth understanding of the organization's objectives, users' requirements and people's roles
- includes:
  - managers to understand objectives
  - staff to understand roles and information needs
  - customers and the public as potential users
- appropriate situations:
  - most projects
  - at the stage in fact finding when in-depth information is required

Interviewing guidelines (Box 6.1)



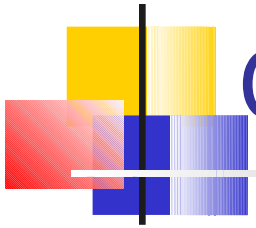
Interviewing

- advantages:
  - personal contact allows the interviewer to respond adaptively to what is said
  - it is possible to probe in greater depth
  - if the interviewee has little or nothing to say, the interview can be terminated
- disadvantages:
  - can be time-consuming and costly
  - requires skill and sensitivity
  - notes must be written up or tapes transcribed after the interview
  - can be subject to bias
  - if interviewees provide conflicting information this can be difficult to resolve later



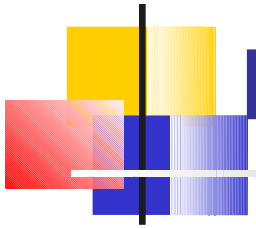
Observation

- aim:
  - to see what really happens, not what people say happens
- includes:
  - seeing how people carry out processes
  - seeing what happens to documents
  - obtaining quantitative data as baseline for performance improvements provided by the new system
  - following a process through end-to-end
- appropriate situations:
  - when quantitative data is required
  - to verify information from other sources
  - when conflicting information from other sources needs to be resolved
  - when a process needs to be understood from start to finish



Observation

- advantages:
  - first-hand experience of how the current system operates
  - high level of validity of the data can be achieved
  - verifies information from other sources and looks at exceptions
  - allows the collection of baseline data about the performance
- disadvantages:
  - people don’t like being observed and may behave differently, distorting the findings
  - requires training and skill
  - logistical problems for the analyst with staff who work shifts or travel long distances
  - ethical problems with personal data



Document Sampling

- aim:
  - to find out the information requirements that people have in the current system
  - to provide statistical data about volumes of transactions and patterns of activity
- includes:
  - obtaining copies of blank and completed documents
  - counting numbers of forms filled in and lines on the forms
  - screenshots of existing computer systems
- appropriate situations:
  - always used to understand information needs
  - where large volumes of data are processed
  - where error rates are high

Agate

Campaign Summary

Date 23rd February 2005

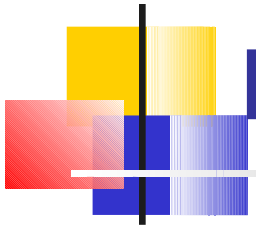
Client
Yellow Partridge
Park Road Workshops
Jewellery Quarter
Birmingham B2 3DT
U.K.

Campaign Spring Collection 2005

Billing Currency GBP £

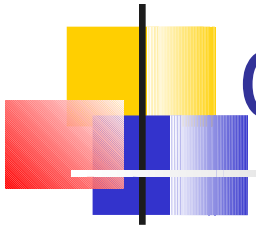
Item	Curr	Amount	Rate	Billing amount
Advert preparation: photography, artwork, layout etc.	GBP £	15,000.00	1	15,000.00
Placement French Vogue	EUR €	6 500,00	1.47	4,421.77
Placement Portuguese Vogue	EUR €	5 500,00	1.47	3,741.50
Placement US Vogue	USD $	17,000.00	1.77	9,604.52
Total				32,767.79

This is not a VAT Invoice. A detailed VAT Invoice will be provided separately.



Document Sampling

- advantages:
  - for gathering quantitative data
  - for finding out about error rates
- disadvantages:
  - not helpful if the system is going to change dramatically



Questionnaires

- aim:
  - to obtain the views of a large number of people in a way that can be analysed statistically
- includes:
  - postal, web-based and email questionnaires
  - yes/no and multiple choice questions
  - gathering opinions (scaled questions) as well as facts
- appropriate situations:
  - when views of a large number of people need to be obtained
  - when staff of the organization are geographically dispersed
  - for systems that will be used by the general public and a profile of the users is required

Questionnaire guidelines (Box 6.2)

YES/NO Questions

Do you print reports from the existing system? YES NO 10
(Please circle the appropriate answer.)

Multiple Choice Questions

How many new clients do you obtain in a year? 11
(Please tick one box only.)

a) 1–10 ☐
b) 11–20 ☐
c) 21–30 ☐
d) 31 + ☐

Scaled Questions

How satisfied are you with the response time of the stock update?
(Please circle one option.)

1. Very satisfied 2. Satisfied 3. Dissatisfied 4. Very dissatisfied 12

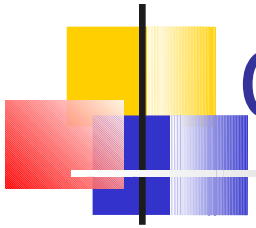
Open-ended Questions

What additional reports would you require from the system?

_____

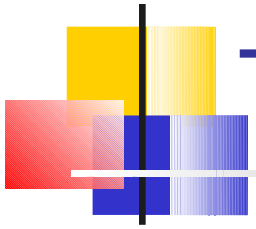
_____

_____



Questionnaires

- advantages:
  - economical way of gathering information from a large number of people
  - effective way of gathering information from people who are geographically dispersed
  - a well designed questionnaire can be analysed by computer
- disadvantages:
  - good questionnaires are difficult to design
  - no automatic way of following up or probing more deeply
  - postal questionnaires suffer from low response rates



Take Home Messages

- User Requirements
  - Current System v New System
  - Functional and Non-functional (usability, etc.)
  - Measurable Objectives in Design
  - MoSCoW
- Fact Finding Techniques
  - SQIRO