

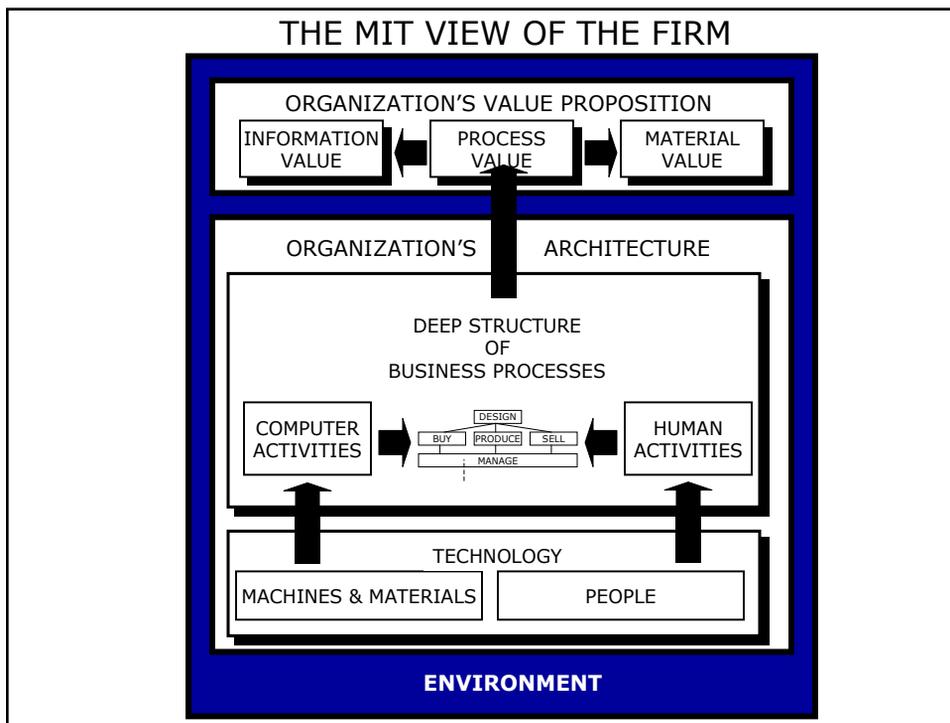
# 15.566 Information Technology as an Integrating Force in Manufacturing

## 15.566 Information Technology as an Integrating Force in Manufacturing

*American Crown and Software Development*

**Prof. Brian Subirana**

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## Problems with software development (1/2)

- Computerworld magazine\*
  - “Nearly one-third of all projects fail”
  - “More than half come in over budget”
  - “Only 16% of all projects come in on time and on budget”
- Key factor for success or failure:
  - “User involvement/input”

\*Survey of 8000 projects from 385 companies.

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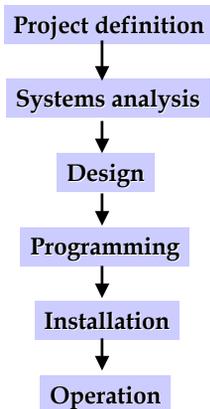
## Problems with software development (2/2)

- 70 % of IT and e-commerce projects either fail or are completed over budget with less functionality than planned (Standish Group Report, December 2001).
- IT now accounts for 50% of all business equipment spending (reference Bain & Co. Sept 2001 in Business Week).
- For example, the UK computer giant ICL confirmed that a multi-million pound crew-scheduling system it was developing for BA had to be junked after a two-year over-run.

## Approaches to software development

- Traditional systems development life cycle
- Prototyping
- Packaged software
- End-user development
- Outsourcing
- Open source

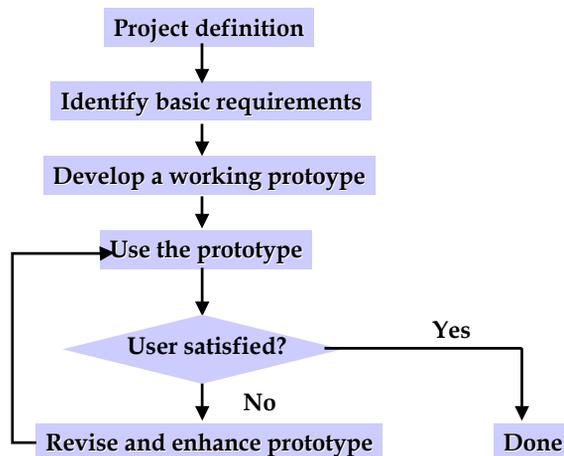
## Traditional systems development life cycle



## Traditional systems development life cycle

- Advantages
  - For well-understood problems, produces predictable outcomes
- Disadvantages
  - Inflexible
  - Long delay before any useful results
    - May be obsolete by then
  - Often hard to know requirements until actual use

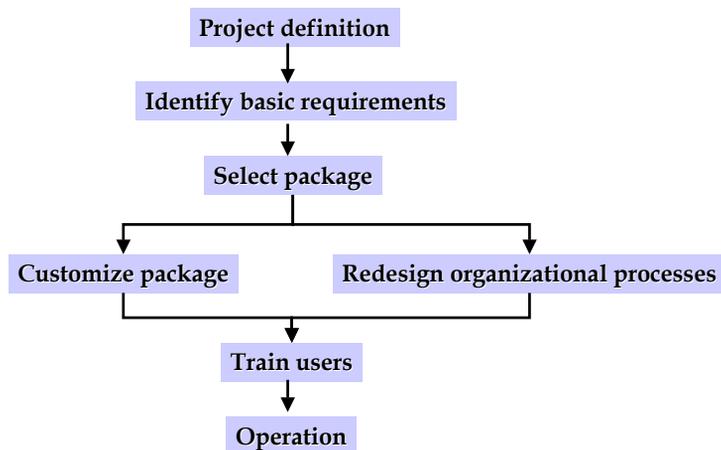
## Prototyping



## Prototyping

- Advantages
  - Especially useful when exact requirements are hard to know in advance
    - user interfaces
    - decision systems
    - electronic commerce?
  - Encourages user involvement
- Disadvantages
  - Hard to predict and control outcomes reliably
  - If repeated, significant reimplementations are needed, can be very expensive
  - May result in systems that are inefficient, unreliable, or hard to maintain

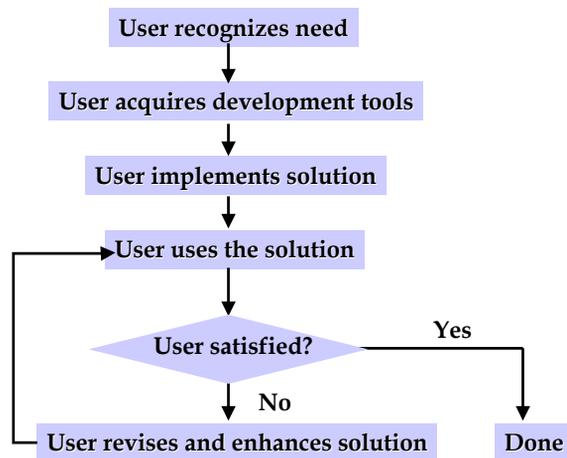
## Packaged software



## Packaged software

- Advantages
  - By amortizing development and maintenance costs over many organizations, it is possible to get superior solutions at much lower cost
- Disadvantages
  - Customizing software can be *very* time-consuming and expensive
  - May have to change organization to fit software, rather than vice versa

## End-user development



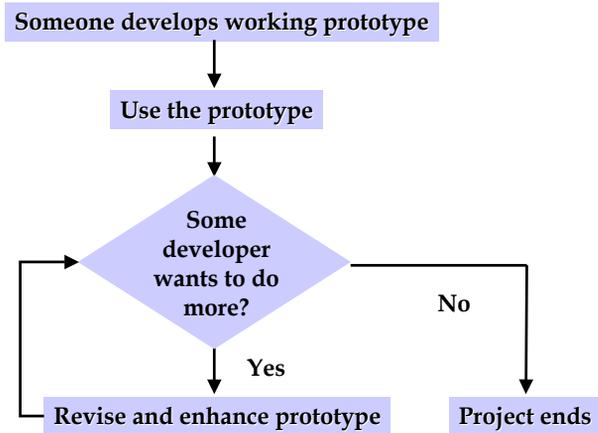
## End-user development

- Advantages
  - Can be *much* faster
  - Improved requirements determination
  - Increased user involvement and satisfaction
- Disadvantages
  - Many problems can't be solved within the limitations of the tools
  - Lack of quality assurance and standards for programs and data
  - Lack of sharing of programs and data

## Outsourcing

- Contract out the performance of any or all of the above steps to another firm
- Advantages
  - Economies of scale
  - Flexibility
  - Predictability
  - Freeing up human resources and capital
- Disadvantages
  - Loss of control
  - Vulnerability of strategic information
  - Dependency

## Open source



## Open source

- Advantages
  - Usually lower cost
  - Sometimes easier to adapt “packaged” software to own needs
  - “Philosophically” appealing to many people
- Disadvantages
  - Usually lower quality support
  - Only a few kinds of software are currently available in this format (Linux operating system, Apache web server, etc.)