Agile Software Development

abelski

The System Development Life Cycle

The SLDC

- “The Systems Development Life Cycle (SDLC) is the process of understanding how an information system (IS) can support the business needs, designing the system, building it and delivering it to the users.”

  System Analysis Design, Dennis, Wixon & Roth

The System Analyst

- “The System Analyst analyzes the business situation, identifies opportunities for improvements and designs an information system to implement them.”

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The Primary Goal

- The primary goal is creating value to the organization.
- Creating a wonderful system is not the primary goal!

SDLC Fundamental Phases

Planning > Project Plan

Why the system is needed? How to plan the project? Identify opportunities and analyze feasibilities. Creating the project plan. Study.

Analysis > System Proposal

Choose an analysis strategy, Use cases, Model processes, Model data.

Design > System Specification

How the system will work? System Architecture, Software & Hardware Spec, Interface Design, Process Model, Program Design, Database and File Spec.

Implementation > Installed System

Testing plan, Code, Migration plan, Documentation, Support plan, Maintaining.

The Planning Phase

- Project Identification

  Identify the business need...

- Technical & Organizational Feasibility

  Identify whether the planned system is technical & organizational feasible...

- Economic Feasibility

  Identify how will the system generate value for the organization...

- Identify Tasks

  Identify the tasks.

>> System Request, Feasibility Study & Project Plan

The Analysis Phase

- Analysis Strategy

  This strategy is important to guide the project team.

- Requirements Gathering

  Interviews, questionairs, observations

- Use Case Analysis

  Identify the major steps in each use case, relationships between use cases

- Data Modeling

  Creating ERD (Entity Relationship Diagram).

>> System Proposal

The Design Phase

- Design strategy

  Buying an existing software? Develop internally? Outsource?

- Basic Architecture Design

  Software, hardware and network infrastructure. Interface design.

  >> System Specification, Architecture Design

The Implementation Phase

- The System is Developed...

  System construction, installation, support...

  >> Installed System

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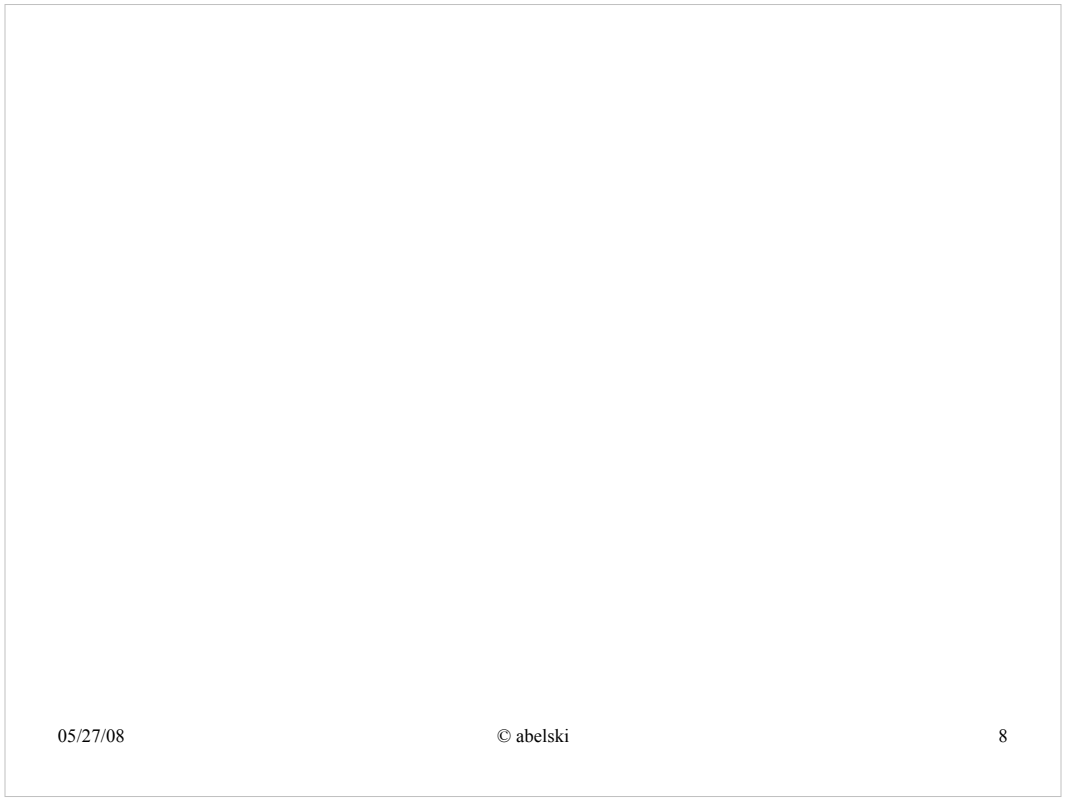
Understand the business needs first before you understand the technologies!

Understand the relationship and the connectivity between the information system and the business.

Business needs might be identified when identifying new business opportunities, as a result of some kind of pain within the organization as a drop in sales and high competition. Business needs might also surface when identifying unique competitive technology.

The Project Plan will assist accomplishing a successful project management.

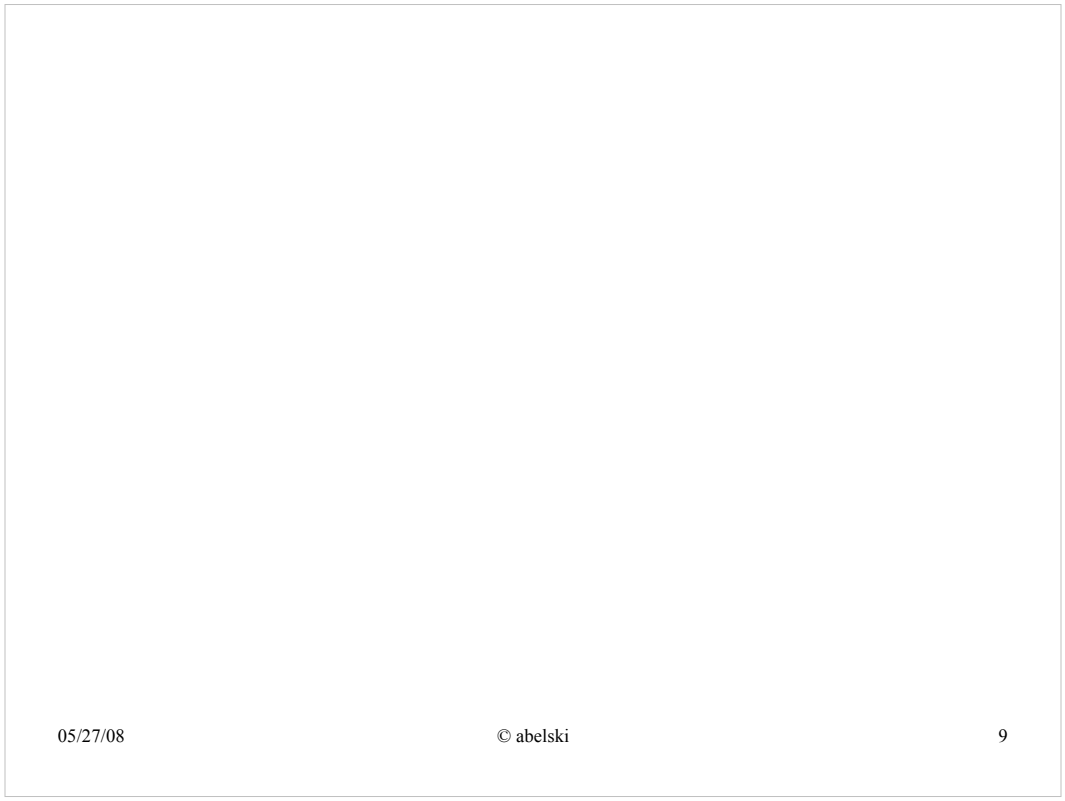
“Project management is the process of planning and controlling the development of a system within a specified time frame at minimum cost with the right functionality.” (System Analysis Design)



In order to succeed in our project management and in order to get a good project plan we best follow the following steps:
Identifying Project Size
The trade-off between the system size, the time to complete it and the cost.
“Function Points” is a concept developed in 1979 and can be used to identify the system size.
Estimate Effort Required
Trying to identify the number of lines of code (or another assessed resource).
Estimate Time Required
Trying to identify the time required based on the estimated effort.

When creating and managing the project we first need to decide about the tasks. Gantt chart can assist us. So is PERT chart.

During the project life time we will refine the estimates in our plan.



During the project life time there is a need to manage its scope. Scope creep happens when new requirements emerge.

Timeboxing is another technique to scope management, through which the time dead line is above everything. When getting to the deadline the project will be delivered no matter what.

Staffing the project means determining how many people should be assigned and with what skills.

Motivation is highly important for the performance. Avoid the following:
- Unrealistic deadlines
- Low quality product
- Giving all people the same bonus / raise
- Avoid the team input
- Poor working conditions

Coordinating project activities can benefit from case tools, setting standards, documentation.

The Analysis Phase

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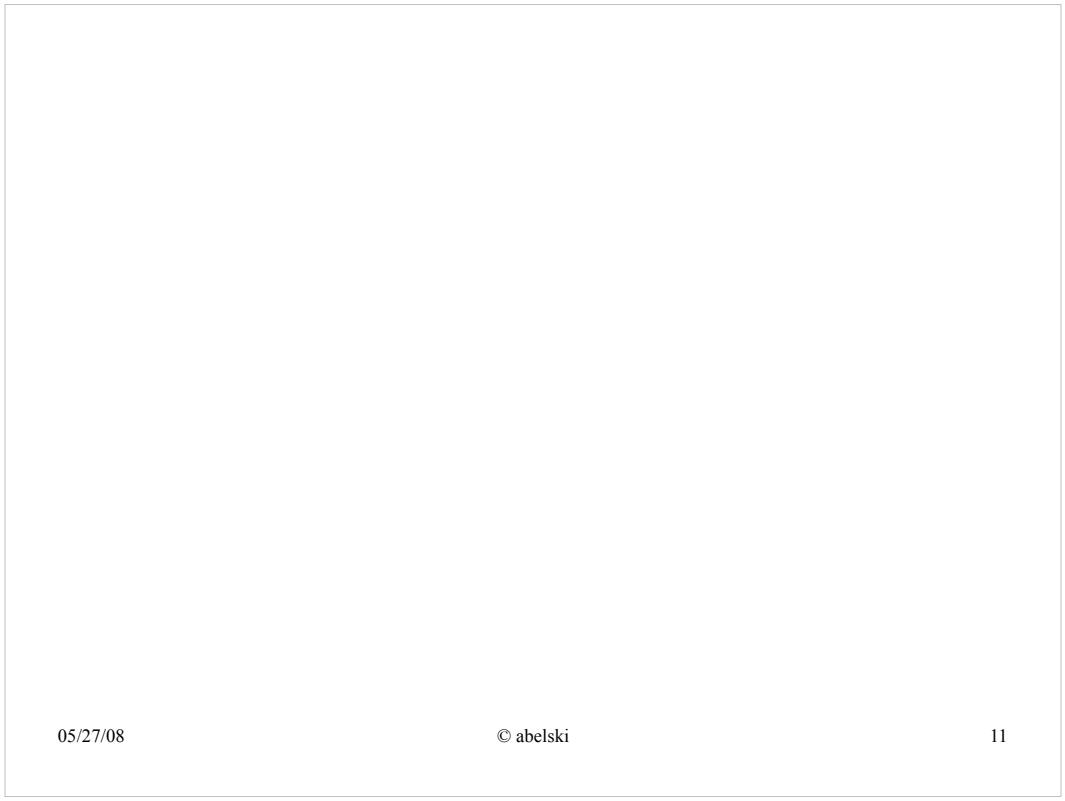
Analysis refers to breaking a whole into parts, with the intent to understand each one of the parts' nature, function and interrelationships.

Gathering the requirements... a requirement is a simple statement of what the system must do or what characteristics it should have... a requirement is either a functional requirement or a non functional one (characteristic one).

The requirements definition report is a textual report that list the requirements.... both the functional ones... and the non functional ones.

Both business and IT perspectives are needed to determine the requirements.

The basic analysis process is composed of three steps:
+ understand the current state (as-is)
+ identify the required improvements
+ define the requirements to get new system (to-be)



Usually we shall deal with one of the following cases:
Business Process Automation
Business Process Improvement
Business Process Reengineering

When dealing with reengineering business processes the risk, the breadth of analysis, the cost and the potential business value are the highest.

Questions can be very general (high level) or very specific (low level).

The joint application development is a known technique for gattering the requirements together... project team, users and management.

The Design Phase

- Design strategy

  Buying an existing software? Develop internally? Outsource?

- Basic Architecture Design

  Software, hardware and network infrastructure. Interface design.

  >> System Specification, Architecture Design

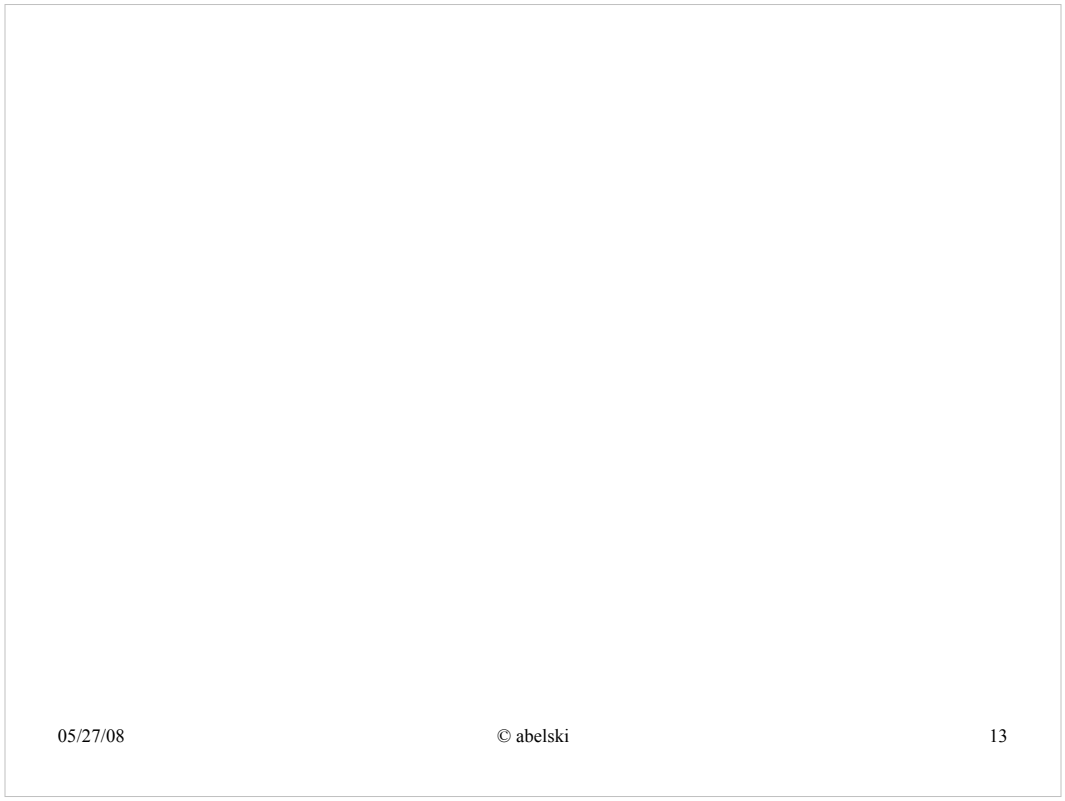
Via the design phase we will decide how the system will operate.

The program design lists the exact required programs and exactly what each program does.

The architecture design, interface design, database and file specifications and the program design... all of these together are called the system specification.

The result of the design phase is the system specification that will be handed to the programming team.

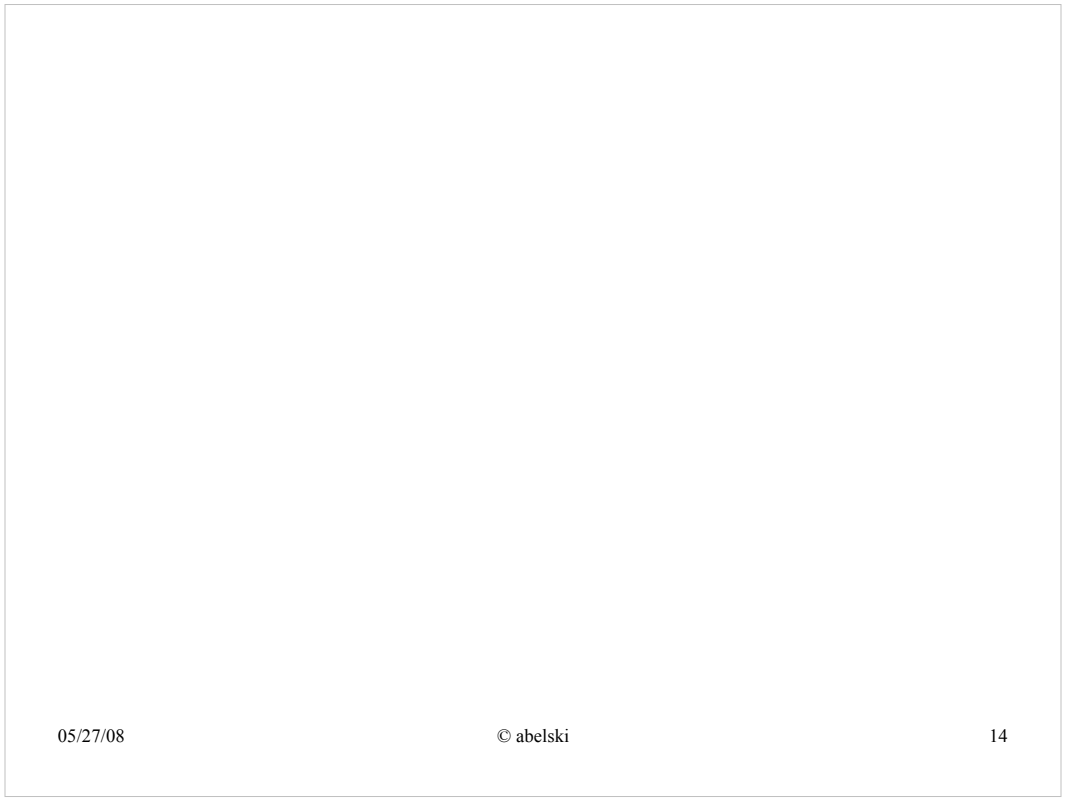
The design phase is the last phase before we move forward to the implementation costly phase. Before moving forward with the implementation the feasibility analysis and the project plan are reexamined, refined and revised as needed. At this point, the project sponsor and the approval committee reconsider whether to terminate the project.. or to move forward.



The initial part of the design phase deals with converting the business requirements into requirements technically describing the system... so the developers can use them.

Three strategies to create new system:
<1> Developing a customer application in house
<2> Buying or Getting a packaged system and customize it
<3> Outsource the system developing to an external vendor

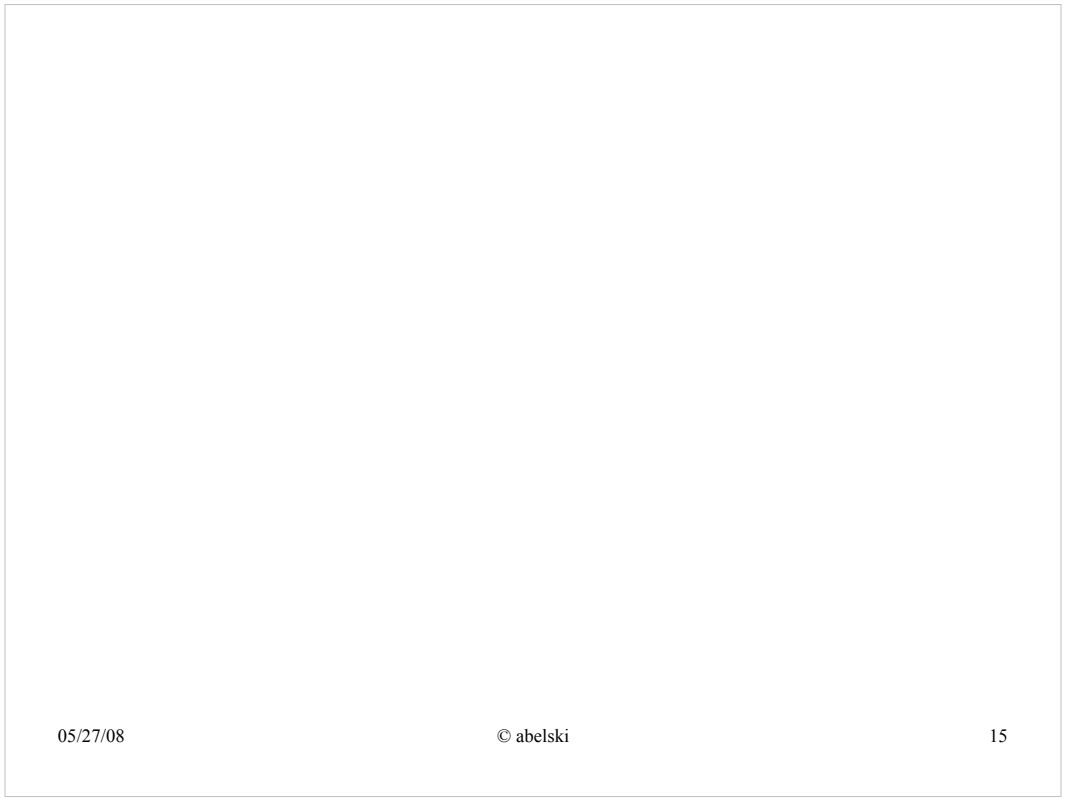
Project characteristics that influence the strategy we choose:
Business Need
When dealing with a common business need a packaged system solution that already exists might be the best solution. When dealing with a unique business need it might be more reasonable to develop a custom system in house. Outsourcing the work to another company should be avoided when the business need is critical for the business.
In House Experience
When the required experience exists we can go or in house development. When it doesn't exist outsourcing will bring in the required experience, and getting a packaged system and customize it might be a good solution as well.



Project Skills
Similar to In House experience.
Project Management
Developing in house custom application requires project management skills that might not be available in house. Going for outsourcing or for a packaged solution doesn't require the project management skills at the same level.
Time Frame
When exists we might better avoid the in house custom developing... as well as the outsourcing option.

If going for the outsourcing or the packaged system options it might be helpful to advertise RFP.

The architecture design describes the system's hardware, software and network environment.



The architecture design possibilities include the following:
Architectural Components
Server Based Architectures
Client Server Architecture
Client Based Architecture
Client Server Tiers

The Architectural Components refer both to software components and to hardware components.

The architecture design specifies the overall architecture and placement of software and hardware components to be used. Using the UML Deployment diagram can be highly useful for this stage.

Types of nonfunctional requirements:

Operational
Technical environment requirement
System integration requirements
Portability requirements
Maintainability requirements

Performance
Speed requirements
Capacity requirements
Availability and Reliability requirement

Security
System Value requirements
Access Control requirements
Encryption and Authentication requirements
Virus control requirements

Cultural / Political
Multilingual requirements
Customization requirements
Legal requirements

The interface design is the process of defining how the system will interact with external entities (customers, employees and other systems).

User Interface Design Principles
Layout
Content Awareness
Aesthetics
User Experience
Consistency
Minimize User Effort
Input Validation

Output Design
Understand Report Usage
Manage Information Load
Minimize Bias

The Implementation Phase

- The System is Developed...

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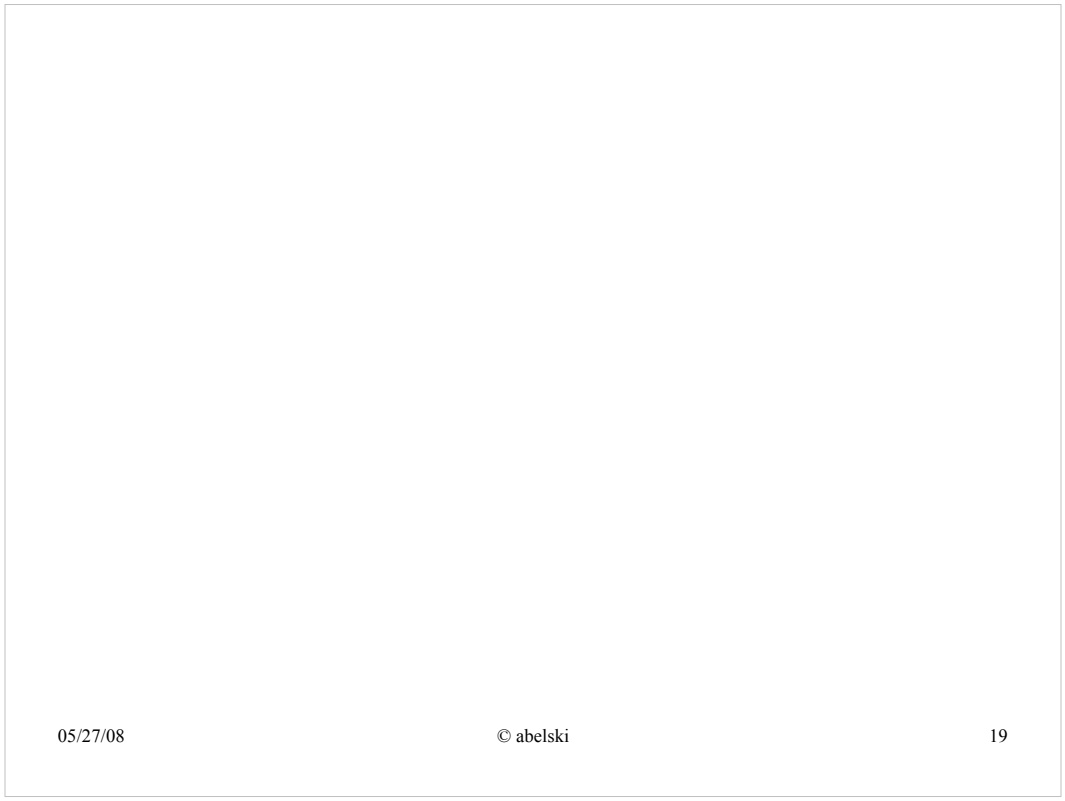
Decide about the testing:
> Unit testing
> Integration testing
> System tests
> Acceptance tests

Software documentations!!!

Kurt Lewin three step transition process:
> Unfreeze
> Move
> Refreeze



The transition to the new system should be carefully planned!
The migration plan should include the following three elements:
Preparing The Business
Selecting the best conversion strategy
Preparing a business contingency plan
Preparing The Technology
Install the required hardware
Install the required software
Data conversion
Preparing The People
Create an adoption motivation
Prepare a training plan
Introduce required management policies changes

The conversion can be:
> Direct Conversion
> Pilot Conversion
> Conversion Modules

Expect the words and prepare a business contingency plan!