Computer Aided Software Engineering (CASE) Tools /lec٤

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Contents

Business Process Engineering

- Software engineering occurs as a consequence of a process called system engineering.
- Instead of concentrating solely on software, system engineering focuses on a variety of elements, analyzing ,designing, and organizing those elements into a system that can be a product, a service, or a technology for the transformation of information.
- The system engineering process is called business process engineering when the context of the engineering work focuses on a business enterprise.
- When a product (in this context, a product includes everything from a wireless telephone to an air traffic control system) is to be built, the process is called product engineering.

Business Process Engineering

BPE stands for Business Process Engineering , it is a method in which organizations analyze their current business practices and create new strategies to increase overall efficiency, productivity and operational costs. The aim of BPE is to discover the issues with a company's operations and redesign, recreate and implement new processes to ensure higher productivity. BPE works with an approach based on recent happenings and research to make significant changes that cause subsequent improvement.

Three different architectures must be analyzed and designed within the context of business objectives and goals:

- data architecture.
- applications architecture.
- technology infrastructure.

Business Process Engineering

data architecture: provides a framework for the information needs of a business or business function.

The individual building blocks of the architecture are the data objects that are used by the business.

A data object contains a set of attributes that define some aspect, quality, characteristic, or descriptor of the data that are being described.

For example, an information engineer might define the data object customer. To more fully describe customer, the following attributes are defined:

Object:

Customer

Attributes:

name, company name, job classification ,business address and contact information, date of last contact, status of contact.

Business Process Engineering

data architecture:

Once a set of data objects is defined, their relationships are identified.

A relationship indicates how objects are connected to one another. As an example, consider the objects: customer, and product A.

The two objects can be connected by the relationship purchases; that is, a customer purchases product A **or** product A is purchased by a customer.

The data objects flow between business functions, are organized within a database, and are transformed to provide information that serves the needs of the business.

Business Process Engineering

Application architecture:

encompasses those elements of a system that transform objects within the data architecture for some business purpose.

the application architecture to be the system of programs (software) that performs this transformation.

However, in a broader context, the application architecture might incorporate the role of people (who are information transformers and users) and business procedures that have not been automated.

Business Process Engineering

Technology infrastructure :

provides the foundation for the data and application architectures.

The infrastructure encompasses the hardware and software that are used to support the application and data.

This includes computers, operating systems, networks, telecommunication links, storage technologies.

Business Process Engineering tools:

By modeling the strategic information requirements of an organization, business process engineering tools provide a "meta-model" from which specific information systems are derived.

Rather than focusing on the requirements of a specific application, business information is modeled as it moves between various organizational entities within a company.

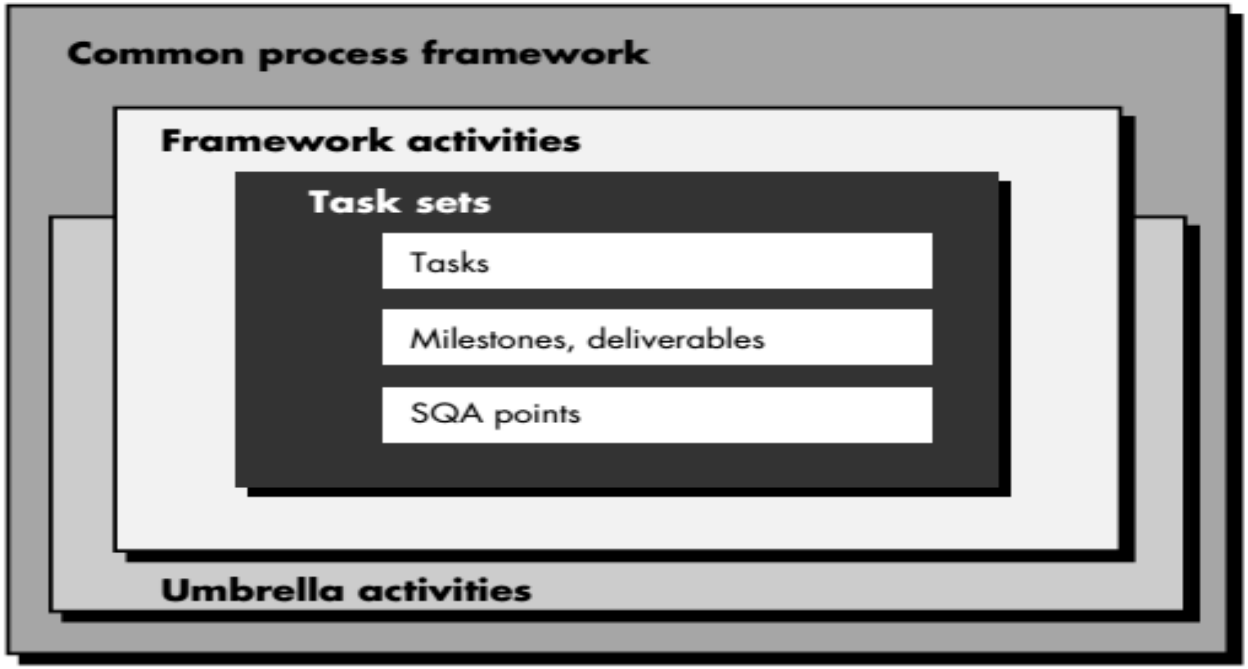
The primary objective for tools in this category is to represent business data objects, their relationships, and how these data objects flow between different business areas within a company.

Process modeling and management

What is the process?

When you build a product or system, it's important to go through a series of steps—a road map that helps you create a timely, high-quality result. The road map that you follow is called a "software process."

A software process can be characterized as shown in Figure 1.5.



Process modeling and management

- A common process framework is established by defining a small number of framework activities that are applicable to all software projects, regardless of their size or complexity.

- A number of task sets—each a collection of software engineering work tasks, project milestones, work products, and quality assurance points—enable the framework activities to be adapted to the characteristics of the software project and the requirements of the project team.

- Finally, umbrella activities—such as software quality assurance and software configuration management. Umbrella activities are independent of any one framework activity and occur throughout the process.

Process modeling and management tools

An organization works to improve a software process, it must first understand it.

Process modeling tools (also called process technology tools) are used to represent the key elements of a process so that it can be better understood.

Such tools can also provide links to process descriptions that help those involved in the process to understand the work tasks that are required to perform it.

Process management tools provide links to other tools that provide support to defined process activities.

Project planning

What is Project planning?

Software project planning actually involves estimation your attempt to determine how much money, how much effort, how many resources, and how much time it will take to build a specific software-based system or product.

Why is it important?

Would you build a house without knowing how much you were about to spend?

Of course not, and since most computer-based systems and products cost considerably more to build than a large house, it would seem reasonable to develop an estimate before you start creating the software.

Project planning tools

Tools in this category focus on two primary areas:

software project effort and cost estimation and project scheduling.
Estimation tools compute estimated effort, project duration, and recommended number of people for a project.

Project scheduling tools enable the manager to define all project tasks (the work breakdown structure), create a task network (usually using graphical input), represent task interdependencies, and model the amount of parallelism possible for the project.

Risk analysis

What is it?

Risk analysis and management are a series of steps that help a software team to understand and manage uncertainty. Many problems can plague a software project.

A risk is a potential problem—it might happen, it might not.

But, regardless of the outcome, it's a really good idea to identify it, assess its probability of occurrence, estimate its impact, and establish a contingency plan should the problem actually occur.

Who does it?

Everyone involved in the software process—managers, software engineers, and customers—participate in risk analysis and management

Risk analysis

Risk identification is a systematic attempt to specify threats to the project plan (estimates, schedule, resource loading, etc.). By identifying known and predictable risks, the project manager takes a first step toward avoiding them when possible and controlling them when necessary.

Risks	Category	Probability	Impact	RMMM
Size estimate may be significantly low	PS	60%	2	
Larger number of users than planned	PS	30%	3	
Less reuse than planned	PS	70%	2	
End-users resist system	BU	40%	3	
Delivery deadline will be tightened	BU	50%	2	
Funding will be lost	CU	40%	1	
Customer will change requirements	PS	80%	2	
Technology will not meet expectations	TE	30%	1	
Lack of training on tools	DE	80%	3	
Staff inexperienced	ST	30%	2	
Staff turnover will be high	ST	60%	2	
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Risk analysis

the risk components are defined in the following manner:

- *Performance risk.*
- *Cost risk.*
- *Support risk*.
- *Schedule risk*.

The impact of each risk driver on the risk component is divided into one of four impact:
negligible, marginal, critical, or catastrophic.

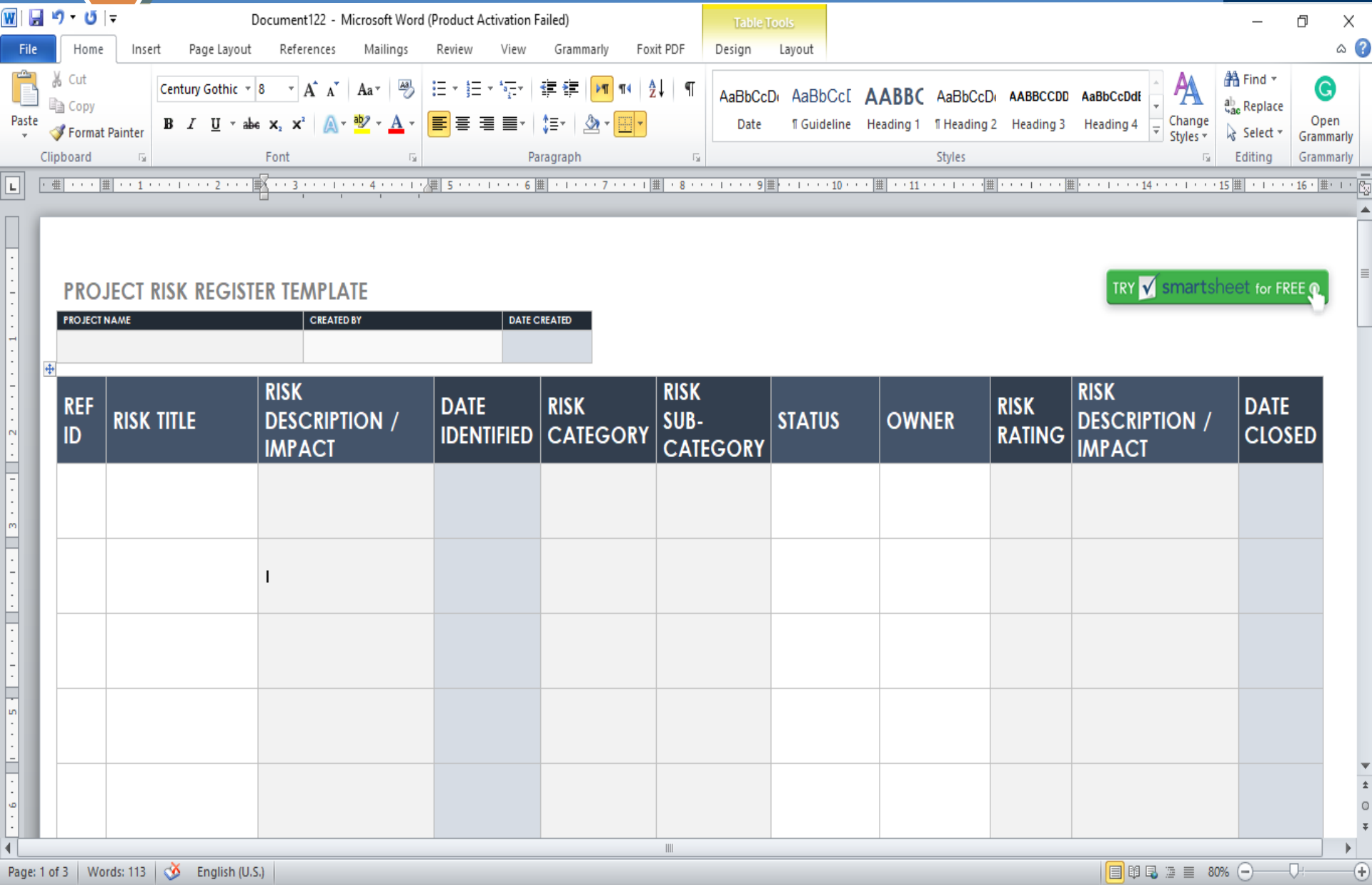
Risk analysis tools

It Identifying potential risks and developing a plan to mitigate, monitor, and manage them is of paramount importance in large projects.
Risk analysis tools enable a project manager to build a risk table by providing detailed guidance in the identification and analysis of risks.

Risk Register tool

it is a risk management tool, is identify and describe the risk. It then will provide space to explain the potential impact on the project and what the planned response is for dealing with the risk if it occurs. Furthermore, the risk register allows a project manager to prioritize the risk, assign an owner responsible for resolving it and gives a place to add notes as needed.

Risk Register tool



PROJECT RISK REGISTER TEMPLATE

PROJECT NAME	CREATED BY	DATE CREATED

REF ID	RISK TITLE	RISK DESCRIPTION / IMPACT	DATE IDENTIFIED	RISK CATEGORY	RISK SUB-CATEGORY	STATUS	OWNER	RISK RATING	RISK DESCRIPTION / IMPACT	DATE CLOSED
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Project management tools

Project management tools.

The project schedule and project plan must be tracked and monitored on a continuing basis.

In addition, a manager should use tools to collect metrics that will ultimately provide an indication of software product quality. Tools in the category are often extensions to project planning tools. For example Clarizen, Airtable , ProofHub, etc,…

ProofHub

gives a centralized workspace for task lists, workflows, Gantt charts, discussions, calendars, and documents. It helps you plan, organize, and keep track of your team's tasks.

Requirements tracing tools

Requirements engineering provides the appropriate mechanism for understanding what the customer wants, analyzing need, specifying the solution unambiguously, validating the specification, and managing the requirements .

Requirements management is a set of activities that help the project team to identify, control, and track requirements and changes to requirements at any time as the project proceeds. Many of these activities are identical to the software configuration management techniques .

Requirements tracing tools

requirements management begins with identification. Each requirement is assigned a unique identifier that might take the form:

<requirement type><requirement #>
where requirement type takes on values such as *F* = functional requirement, *D* = data requirement, *B* = behavioral requirement, *I* = interface requirement, and *P* = output requirement. Hence, a requirement identified as F09 indicates a functional requirement assigned requirement number 9.
Once requirements have been identified, **traceability tables** are developed.

Requirements tracing tools

Requirements tracing tools:

When large systems are developed, things "fall into the cracks." That is, the delivered system does not fully meet customer specified requirements.

The objective of requirements tracing tools is to provide a systematic approach to the isolation of requirements, beginning with the customer request for proposal or specification.

Requirements tracing tools

GatherSpace: was founded in 2006 to help agencies and startups optimize requirements management. This requirements management tool comes with project management functionality. Feature of it:
Requirements status tracking
Prioritization of requirements

Aqua ALM: is primarily a test management platform featuring requirements management. This tool lets you define requirements at the start of the project, update them as the changes happen, and track requirements as the project timeline progresses.

THANKS