Software Requirements

Team Teaching Software Engineering Course
Department of Information Technology
State Polytechnic of Malang

Purpose

- Understand software needs and types of software needs
- Understand OT needs collection methods

Understanding Software Requirements

- Software needs are conditions, criteria, requirements or abilities that must be possessed by software to meet what users require or want.

Understanding Requirements according to IEEE [IEE93]

The conditions or abilities necessary for the user to solve a problem, or to achieve a goal.

Conditions or capabilities that a system or system component must possess or possess to meet a contract, standard, specification, or other formal document.

User Requirement dan System Requirement

User requirements

- User Requirements are written in Natural Language and diagrams the services provided by the system and its operational constraints
- Written for customers.

System requirements

- A structured document that sets out detailed descriptions of the system's functions, services, and operational limitations.
- Define what should be implemented so that it can be part of the contract between the client and the contractor.

User Requirement dan System Requirement

- Contoh : mental health care patient management system (MHC-PMS)

User Requirement Definition

1. The MHC-PMS shall generate monthly management reports showing the cost of drugs prescribed by each clinic during that month.

System Requirements Specification

1.1 On the last working day of each month, a summary of the drugs prescribed, their cost, and the prescribing clinics shall be generated.

1.2 The system shall automatically generate the report for printing after 17.30 on the last working day of the month.

1.3 A report shall be created for each clinic and shall list the individual drug names, the total number of prescriptions, the number of doses prescribed, and the total cost of the prescribed drugs.

1.4 If drugs are available in different dose units (e.g., 10 mg, 20 mg) separate reports shall be created for each dose unit.

1.5 Access to all cost reports shall be restricted to authorized users listed on a management access control list.

Sumber : Sommerville, I., 9th. *Software Engineering*.

Functional dan non-functional requirement

Functional requirements

- A statement of the services the system should provide, how the system should react to certain inputs, and how the system should behave in certain situations.
- Can state what the system should not do.

Non-functional requirements

- Limitations on services or functions offered by the system such as time constraints, limitations on the development process, standards, etc.
- It often applies to the system as a whole rather than individual features or services.

Functional requirements

- Describe system functions or services.
- Depending on the type of software, the expected users, and the type of system on which the software is used.
- Functional user requirements can be high-level statements about what the system should do.
- Functional system requirements should describe system services in detail.

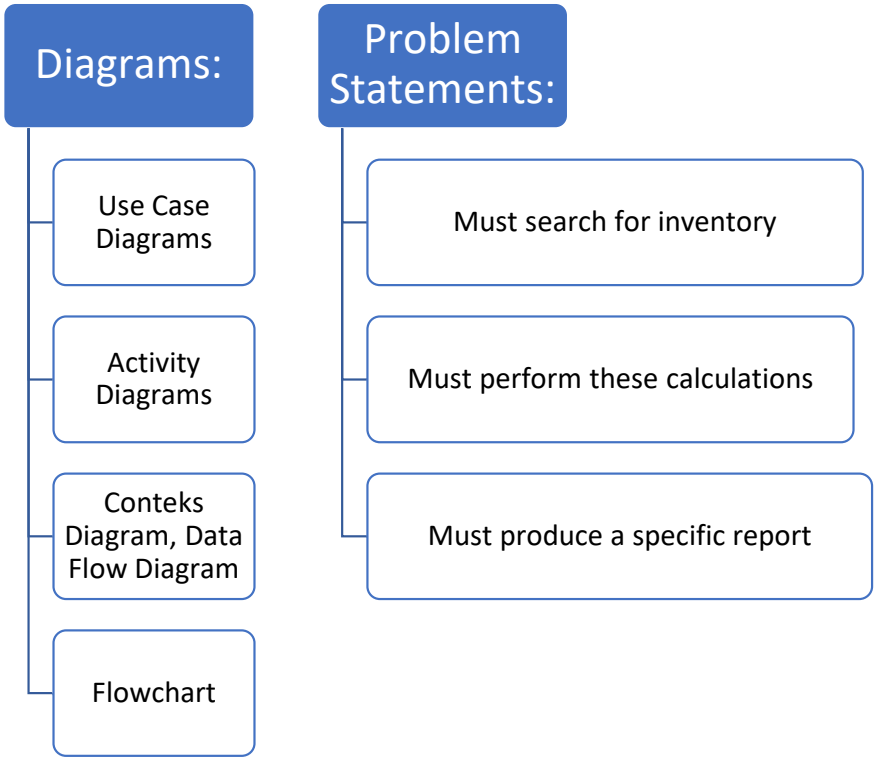
Contoh

Functional requirements for the MHC-PMS:

- A user shall be able to search the appointments lists for all clinics.
- The system shall generate each day, for each clinic, a list of patients who are expected to attend appointments that day.
- Each staff member using the system shall be uniquely identified by his or her 8-digit employee number.

Functional requirements

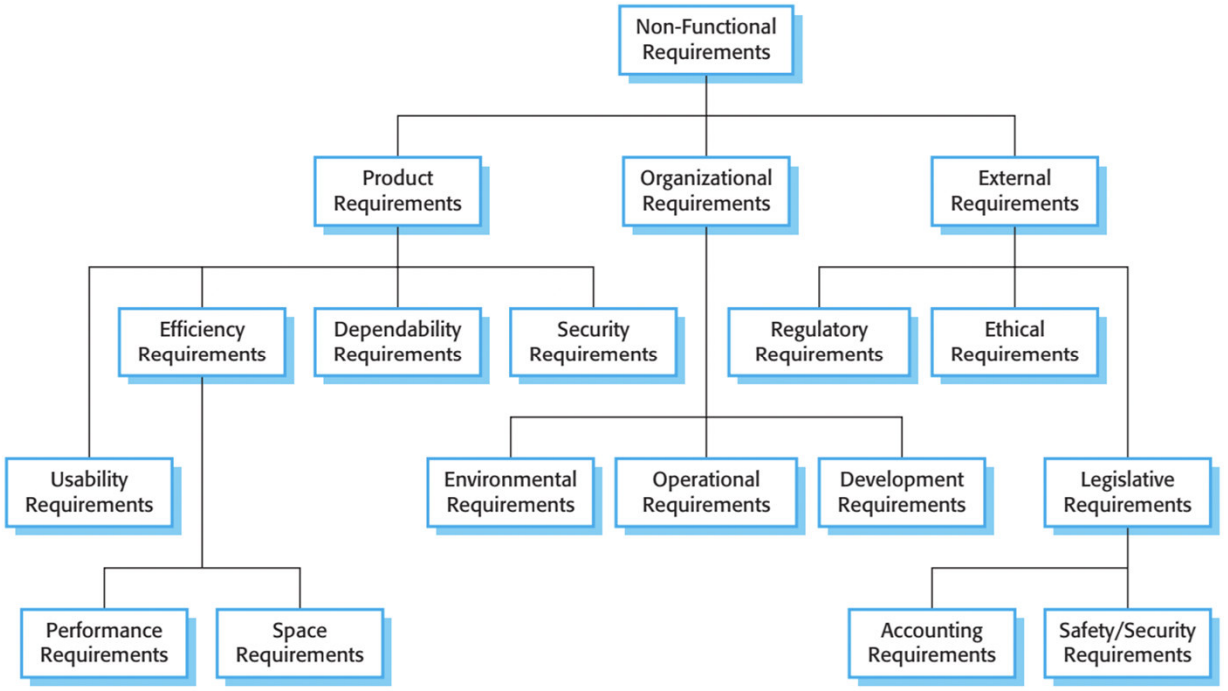
Pemodelan dengan UML, ataupun penjelasan fitur-fitur dalaLimitations on services or functions offered by the system such as time constraints, limitations on the development process, standards, etc.
It often applies to the system as a whole rather than individual features or services.m bentuk problem statements, adalah termasuk dalam Functional Requirement



Non-functional requirements

- Describe the properties and limitations of the system. For example: reliability, response time, and storage requirements. Limitations of I/O device capabilities, system representations, etc.
- Non-functional requirements may be more important than functional requirements. If this is not met, the system may be useless.

Tipe Non-Functional Requirements



Sumber : Sommerville, I., 9th. *Software Engineering*.

Tipe Non-Functional Requirements

Product requirements

- Requirements that specify that the delivered product must behave in a certain way e.g. speed of execution, reliability, etc.

Organisational requirements

- Requirements that are a consequence of organizational policies and procedures e.g. process standards used, implementation requirements, etc.

External requirements

- Requirements arising from factors external to the system and its development process such as statutory requirements, etc.

Non-Functional Requirements Example

Product requirement
The MHC-PMS shall be available to all clinics during normal working hours (Mon–Fri, 0830–17.30). Downtime within normal working hours shall not exceed five seconds in any one day. Backup all data every 24hours

Organizational requirement
Users of the MHC-PMS system shall authenticate themselves using their health authority identity card.

External requirement
The system shall implement patient privacy provisions as set out in HStan-03-2006-priv.

Software Requirements Collection Methods

- Document Analysis
- Interviews
- Joint Application Design (JAD)
- Questionnaires
- Observation

Document Analysis

- Used to figure out the "rules of the game" from an existing system
- Document form
- Form
- Reports
- Juklak/Juknis
- Find out who are the users of the system
- Find out which system elements can be efficiently
- Do it before the interview

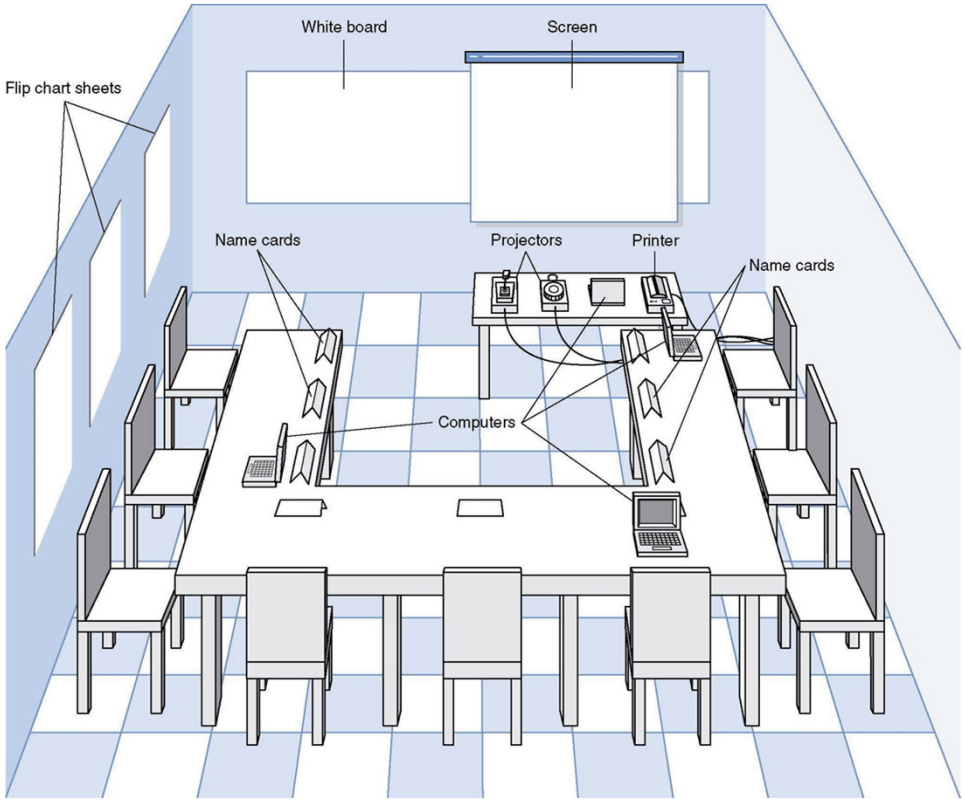
Interviews

- The most commonly performed techniques
- If you need to know something, you ask someone
- 5 basic steps:
- Select participants
- Design questions
- Prepare for an interview
- Conduct the interview
- Follow-up interview

Joint Application Design (JAD)

- Done so that project managers, users, and developers can work together
- Can reduce project scope by up to 50%
- Can avoid requirements that are too specific or too broad
- 10 to 20 users
- Lasts for 5 to 10 days within a period of 3 weeks.

JAD Meeting Room



Questionnaire

- Select participants
  - Using samples of the population
- Design a questionnaire
- More important than interview questions
- Prioritize attention-grabbing questions
- Distinguish between:Fact-oriented questions (specific answers)
    1. Opinion questions (agree – disagree scale)
- Conduct a questionnaireExplain its importance & how it will be used
  - Give expected response date
  - Follow up on late returns and have supervisors follow up
  - Promise to report results
- Questionnaire follow-up
  - Send results to participants

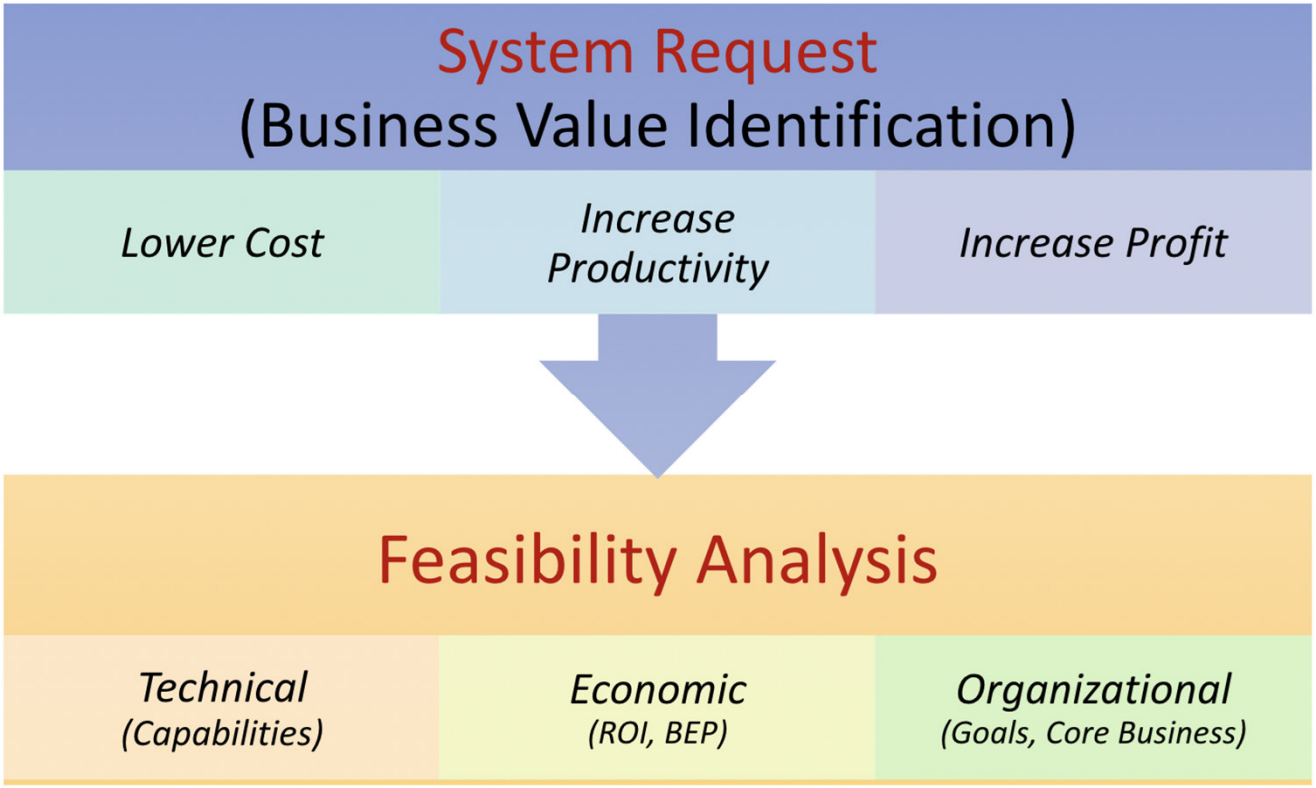
Observation

- Users/managers often don't remember what they do
- Validate information obtained by other means
- Behavior changes as people are observed
- Keep a low profile, don't switch processes
- Be careful not to forget periodic activities
- Weekly... Monthly... Annual

Feasibility Study

- Prior to software requirements analysis is often conducted Feasibility Study
- Feasibility study is used to determine the likelihood of whether the development of a PL system project is worth continuing or stopping

Spesifikasi Kebutuhan



Brainmatics
Ilmukomputer.com

System Request

Elemen	Deskripsi	Contoh
Business Need	• The business-related reason for initiating the software development project • Reason prompting the project, and why the project should be funded?	• Increase sales • Reduce operational costs • Increase employee productivity • Improve service quality • Reduce leaks/fraud • Reduce manufacturing defects • Improve work efficiency
Business Value	• The benefits that the software will create for the organization • Tangible value (a quantiable value) and intangible value (intuitive believe)	• 3% increase in sales • 10% reduction in operating costs • 10% increase in employee productivity (calculated ratio of work and salary) • 20% reduction in manufacturing defects • 20% increase in working efficiency
Business Requirements	• The business capabilities that software will provide • Can be replaced by Use Case Diagram	• Registration, login, and logout features • User data management features • Automatic notification sending feature • Features of printing monthly and annual reports

System Request: Sistem Penjualan Musik Online	
Project Sponsor:	Margaret Mooney, Vice President of Marketing
Business Needs:	Project ini dibangun untuk: 1. Getting new customers over the Internet 2. Improve the efficiency of handling customer problems through the internet

Business Requirements:

- A system that supports online music sales. Must-have features:
- Product Search Feature
- Store Search Feature that Provides Product Stock
- Product Order Features Through Stores That Provide
- Payment Features with Various Payment Options

Business Value:

Intangible Value:

- Increase customer comfort and satisfaction
- Increase brand recognition about companies in the Internet world

Tangible Value:

1. Increase sales from new customers over the Internet:
   Rp 400 million increase in sales from new customers and Rp 600 million from existing customers
2. Reduce operational costs to handle complaints from customers
   Rp 100 million annual reduction in telephone costs for handling customers

Feasibility Study

Technical FeasibilityAre We Capable of Building and Using?

- Familiarity with Application: Developer and user understanding of the application
- Familiarity with Technology: Developer and user understanding of the technology that powers the application
- Project Size: Number of developers and time required
- Compatibility: Compatibility with existing systems in the organization

Economic Feasibility: Is it Profitable to Build?

- Break-even Point (BEP): Payback time
- Return on Investment (ROI): The percentage return on investment

Organizational Feasibility: If we wake up, will it be used?

- Team members
- Does the software align with the organization's vision and mission?
- Is the software in accordance with the tasks and functions of the organization's work unit?
- Does the software automate the business processes of the organization's work units?

Feasibility Study of Online Music Sales System

Margaret Mooney and Alec Adams made a feasibility study for the development of an Online Music Sales System

Technical Feasibility

- Online music selling systems are technically feasible, although they come with some risks.
- Risks Associated with Application Familiarity: High Risk
- The Marketing Division has no experience using online sales systems
- The IT division has a good understanding of offline sales systems, but is inexperienced in developing online music sales systems
- Risk Associated with Familiarity with Technology: Medium Risk
- The IT division does not master infrastructure and ISP issues, but will hire consultants
- The IT division is quite familiar with the framework and IDE that will be used
- The Marketing Division has no experience using Web technologies
- Risk associated with Project Size: Low Risk
- The company has a total of 30 developers
- The project was carried out by 5 developers with an estimated time of 6 months
- Compatibility with existing systems and infrastructure: Low Risk
- The current ordering system uses open standards, so it is very compatible with the web-based sales system that will be built

Economic Eligibility
• Cost benefit analysis has been conducted. Online music sales systems have a good opportunity to increase company revenue. • Return on Investment (ROI) after 3 years: 31% • Break-even point (BEP): 2.25 years • Total profit after 3 years: Rp. 503.559.986,-
Organization Eligibility
• Organizationally, the risk is low. The goal of developing an online music sales system is to increase the company's sales. And this is in line with marketing KPIs that are towards increasing sales quantity • The project champion of the development of this online music sales system is Margaret Mooney, Vice President of Marketing

Contoh

Technical Feasibility

musicpedia				
Date: 26 Oktober 2018				
Penjelasan isian	1. Sangat Kurang	2. Kurang	3. Baik	4. Sangat Baik

Kefamiliaran dengan Aplikasi	1	2	3	4
Pengguna familiar terhadap pengoperasian aplikasi ini.	☐	☐	☑	☐
Pengembang familiar terhadap pengembangan aplikasi ini.	☐	☐	☐	☑
Kefamiliaran dengan Teknologi	**1**	**2**	**3**	**4**
Pengguna familiar dengan teknologi pendukung aplikasi.	☐	☑	☐	☐
Pengembang familiar mengembangkan aplikasi dengan platform, bahasa pemrograman dan tool IDE yang dipilih.	☐	☐	☐	☑
Ukuran Proyek				
Jumlah pengembang yang dibutuhkan.	7 Man/Month			
Waktu yang dibutuhkan dalam mengembangkan aplikasi ini.	6 Month			
Kompatibilitas	**1**	**2**	**3**	**4**
Kebutuhan pengguna terhadap kompatibilitas aplikasi untuk terintegrasi dengan aplikasi lain.	☐	☐	☑	☐
Kompatibilitas aplikasi terhadap teknologi yang ada pada organisasi.	☐	☐	☐	☑

Secara analisi kelayakan teknis, apakah aplikasi layak dikembangkan sesuai kriteria di atas?	☑ Layak	☐ Tidak Layak

BRAINMATICS

Economic Feasibility

Cost-Benefit Analysis

Tahun	2019	2020	2021	2022
Peningkatan Pendapatan Penjualan Lagu		400,000,000	400,000,000	400,000,000
Pengurangan Biaya Sewa Ruangan		120,000,000	120,000,000	120,000,000
Pengurangan Biaya Komunikasi		6,000,000	6,000,000	6,000,000
Total Benefits	**0**	**526,000,000**	**526,000,000**	**526,000,000**
PV of Benefits	**0**	**468,138,127**	**441,639,743**	**416,641,267**
PV of All Benefits	**0**	**468,138,127**	**909,777,870**	**884,779,394**
Honor Tim (Analysis, Design and Implementation)	250,000,000	120,000,000	120,000,000	120,000,000
Total Development Costs	**250,000,000**	**120,000,000**	**120,000,000**	**120,000,000**
Honor Pengelola Web	72,000,000	72,000,000	72,000,000	72,000,000
Biaya Lisensi Software	10,000,000	10,000,000	10,000,000	10,000,000
Hardware upgrades	50,000,000	50,000,000	50,000,000	50,000,000
Biaya Komunikasi	1,000,000	1,000,000	1,000,000	1,000,000
Biaya Marketing	50,000,000	50,000,000	50,000,000	50,000,000
Total Operational Costs	**183,000,000**	**183,000,000**	**183,000,000**	**183,000,000**
Total Costs	**433,000,000**	**303,000,000**	**303,000,000**	**303,000,000**
PV of Costs	**408,490,566**	**269,668,921**	**153,650,329**	**144,953,140**
PV of all Costs	**408,490,566**	**678,159,487**	**831,809,816**	**976,762,957**
Total Project Costs Less Benefits	**-433,000,000**	**223,000,000**	**223,000,000**	**223,000,000**
Yearly NPV	**-408,490,566**	**198,469,206**	**187,235,100**	**176,636,887**
Cumulative NPV	**-408,490,566**	**-210,021,360**	**-22,786,260**	**153,850,627**
Return on Investment (ROI)	**-100.00%**	**-0.309693168**	**-0.027393593**	**0.15751071**
Break-even Point (BEP)				**3.129000574**

Organizational Feasibility

musicpedia			
Date	**26 Oktober 2018**		
Anggota Tim			
User/Product Owner	Wahyu Utomo		
Project Manager	Haris Dermawan		
System Analyst	Risa Dhani Horasman Purba		
Business Analyst	Mulyana		
Programmer	Achmad Fatkarrofiqi		
Tester	Januar Sapareza		
Apakah aplikasi ini mendukung visi dan misi organisasi?			
Ya			
Apakah aplikasi ini sesuai dengan tugas, fungsi dan KPI unit kerja anda?			
Ya			
Apakah aplikasi ini selaras dengan proses bisnis unit kerja anda?			
Ya			
Secara analisis kelayakan organisasi, apakah aplikasi layak dikembangkan sesuai kriteria di atas?		☑ Layak	☐ Tidak Layak

Task To Day

Please describe the functional and non-functional requirements of one specific application (Website). Include an overview of the application, functional requirements, and non-functional requirements. Complete the task in a PowerPoint file and upload it as a PDF file.

Reference

- Sumber : Sommerville, I., (2011) 9th. *Software Engineering*. Pearson
- Romi Satria Wahono, *Systems Analysis and Design.*