SOFTWARE REQUIREMENT SPECIFICATION (SRS)

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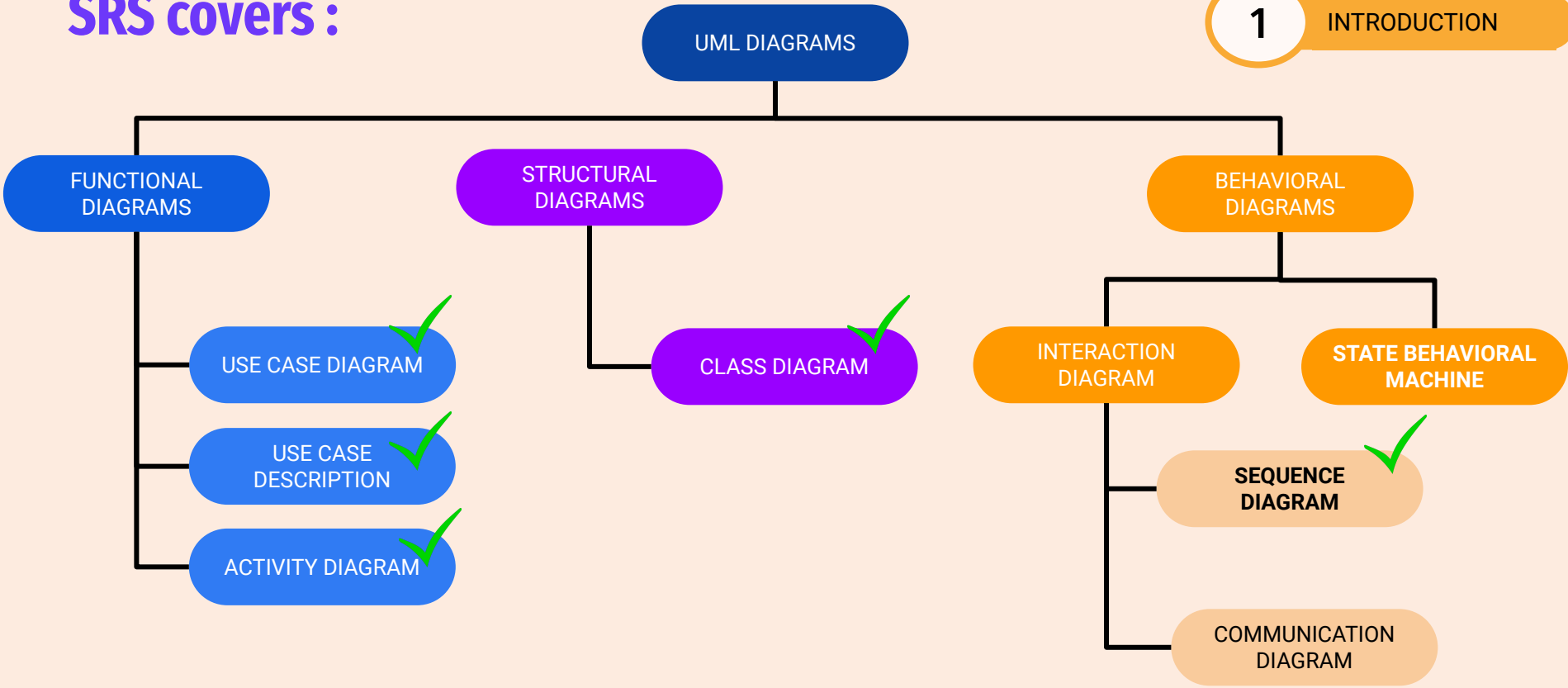
S.M.I.L.E

“Janganlah meremehkan sesuatu kebaikan, walaupun hanya bertemu saudaramu dengan wajah berseri-seri.”

Outline / Content of SRS

SRS covers :


UML DIAGRAMS
FUNCTIONAL DIAGRAMS
STRUCTURAL DIAGRAMS
BEHAVIORAL DIAGRAMS
USE CASE DIAGRAM
USE CASE DESCRIPTION
ACTIVITY DIAGRAM
CLASS DIAGRAM
INTERACTION DIAGRAM
STATE BEHAVIORAL MACHINE
SEQUENCE DIAGRAM
COMMUNICATION DIAGRAM

SRS covers :

I - Hardware Specification

Client Side	
Hardware	Specification
RAM	512
Hard Disk	10 GB
Processor	1.0 GHz

Server Side	
Hardware	Specification
RAM	512
Hard Disk	10 GB
Processor	1.0 GHz

In SPMP

SRS covers :

II - Software Specification

Client Side	
Web browser	Internet Explorer 8 and any compatible browser
Operating System	Windows and any equivalent OS

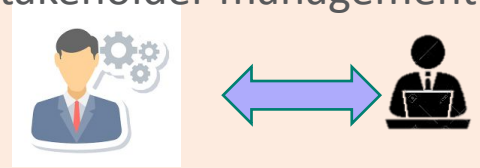
Server Side	
Web Server	IIS 7.5
Framework	NetBeans IDE 8.2 with JAVA
Database Server	MY SQL Workbench 8.0 CE
Web Browser	Internet Explorer 9 or any compatible browser

In SPMP

Requirement Elicitation

3 REQUIREMENT GATHERING TECHNIQUE

Stakeholder management



** Refer to Chapter 3 - lecture notes of SRE

Stakeholder RE

Interview

Single stakeholder

RE

Interview protocols / recordings

Questionnaire

Group of stakeholders

RE

Questionnaire Result/analysis

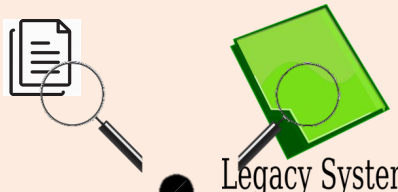
Observation

Single stakeholder

RE

Observation notes / recordings

System/Document Analysis



RE

System/ document analysis results

Creativity workshop

Group of stakeholders

RE

Idea list / Innovation

Grouping of Elicitation Techniques

** Refer to Chapter 3 - lecture notes of SRE

Survey Techniques

- Elicits as precise and unbiased statements as possible from stakeholders regarding their requirements.
- Assume stakeholder is able of explicitly expressing his/her knowledge
- Stakeholder needs to be committed to investing time and effort
- Elicits satisfiers

Creativity Techniques

- Develop innovative requirements
- Define an initial vision of the system
- Elicit excitement factors

Document-centric Techniques

- Reuse solutions and experiences made with existing systems
- Ensure that entire functionality of a legacy system is identified
- Combined with other elicitation tech. to ensure validity of requirements and identify new requirements.
- Elicit detailed requirements, dissatisfiers and satisfiers

Observation Techniques

- Are helpful if stakeholder cannot spend time or express knowledge
- Identify also inefficient processes
- Elicit detailed requirements and dissatisfiers (satisfiers only if implemented in legacy system)

Support Techniques

- Addition to elicitation techniques.
- Balance out weaknesses and drawbacks of chosen elicitation techniques.

3 REQUIREMENT GATHERING TECHNIQUE

** Refer to Chapter 3 - lecture notes of SRE

Survey
- Interview
- Questionnaire

Creativity
- Brainstorming
- Brainstorming Paradox
- Analogy
- Change of Perspective

Observation
- Field Observation
- Apprenticing

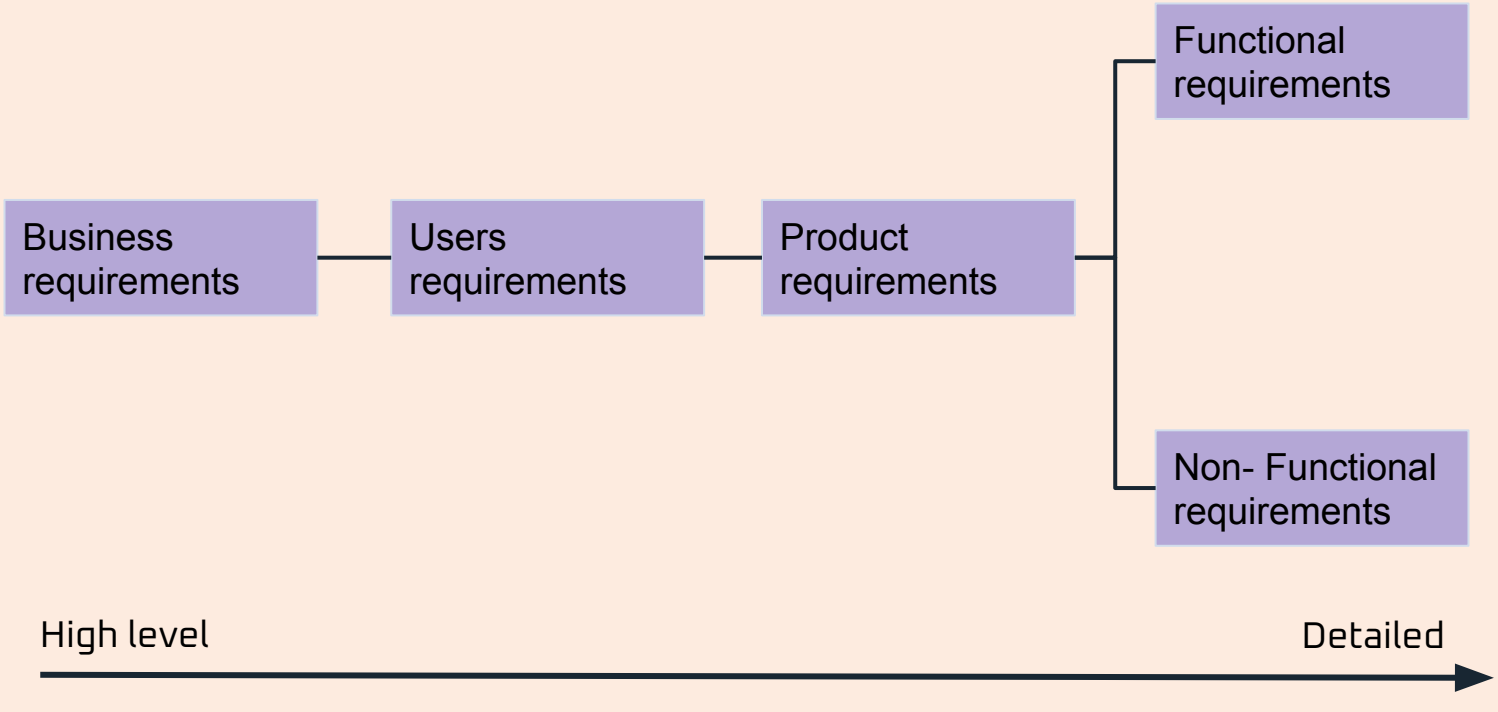
Document-centric
- System Archeology
- Requirement Reuse
- Perspective-based Reading

Supporting
- Audio/video Recordings
- Workshops
- Use Case Modeling
- Mind Mapping
- Prototypes

Fit the techniques with the SRS report

Examples :

4 FUNCTIONAL REQUIREMENT



Differences FR and NFR :

Functional Requirements	Non-functional Requirements
Describe what the system as a whole should do.	Describe the attributes of system quality and performance.
Cover all the functions that the software must perform.	Cover all aspects of good user experience.
Ensure all core functionality is well-performed.	Ensure users' needs are satisfied.
Easy to specify.	Difficult to specify.
They are tested first.	They are tested after functional testing.
What is tested: API testing, Functional testing of the whole system, Integration, End to End testing, etc.	What is tested: Usability, Performance, Security, Stress testing, etc.
Types: Business rules, Administrative functions, Data management, Certification requirements, Authorization levels, etc.	Types: Availability, Scalability, Capacity, Reliability, Data Integrity, etc.

Differences FR and NFR :

Parameters	Functional Requirements	Non-Functional Requirements
Requirement	It is Mandatory	It is non-mandatory
Capturing Type	It is captured in use cases.	It is captured as a quality attribute.
End Result	Product Feature	Product Properties
Capturing	Easy to Capture	Hard to Capture
Objective	Helps to verify the functionality of the software.	Helps to verify the performance of the software.
Area of Focus	Focuses on user-requirement.	Focuses on the user's expectation & experience.
Documentation	Describe what the product does.	Describe how the product works.
Product Info	Product features	Product Properties

3 FUNCTIONAL REQUIREMENT

Definition

what the entire system or its individual components should be.

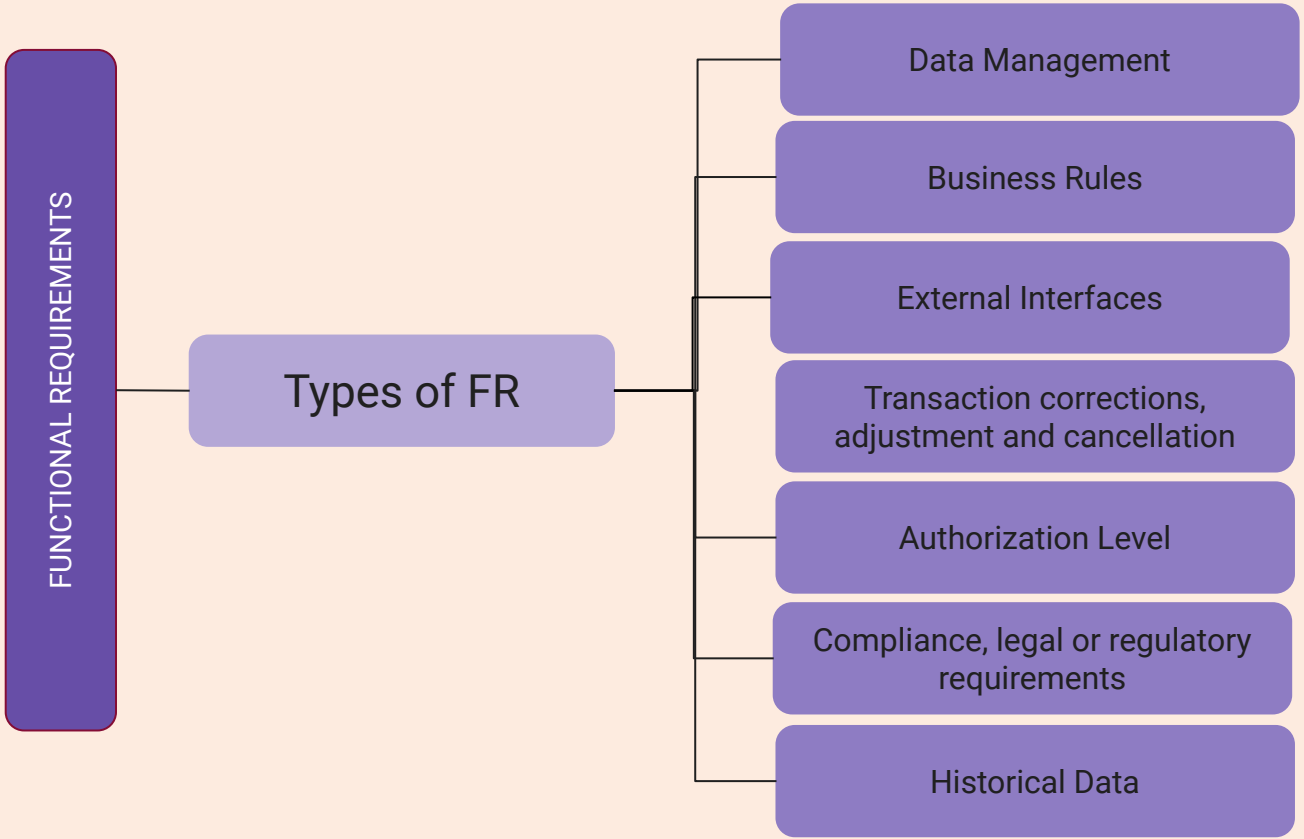
Covers

all the functions that the software must perform

The term "function" means

the outputs needed for a system to properly perform,
the inputs it produces, and its behavior.
This includes all the functionality describing what the system is supposed to do

3 FUNCTIONAL REQUIREMENT



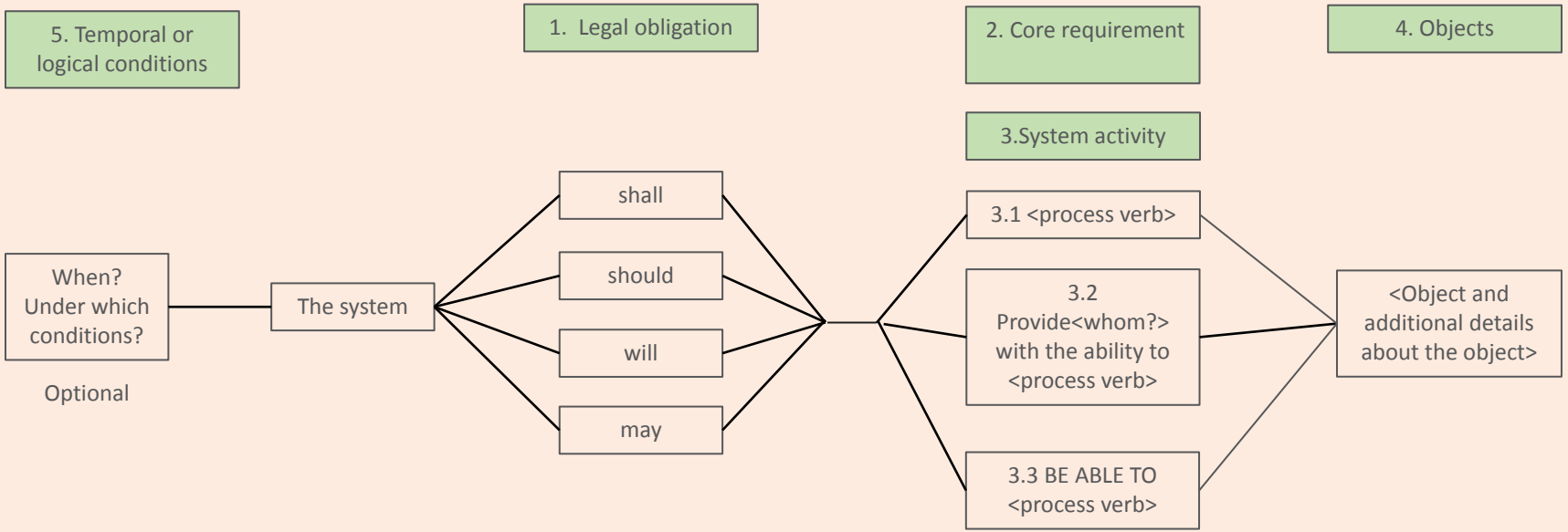
https://winatalent.com/blog/2020/05/what-are-functional-requirements-types-and-examples/

Requirement templates for functional requirements

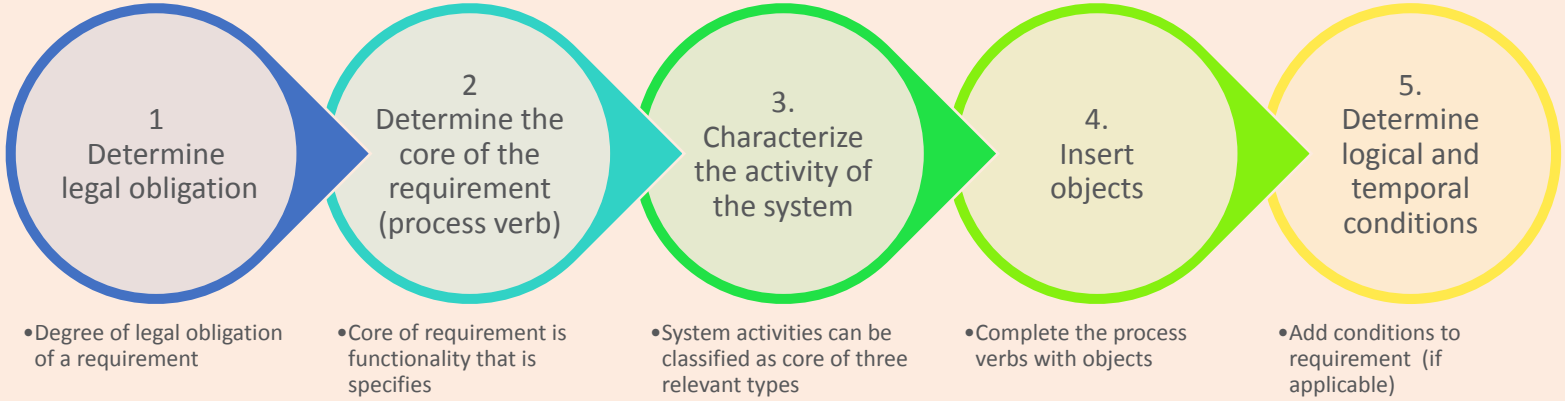
Definition :	• A building plan(blueprint) for the syntactical structure individual requirement.
Help	• To reduce language effects in the formulation of requirements • Support RE in creating high quality requirement
Example	• At 4.00 a.m, GMT+8, the system shall generate a sales report

Lecture Note SRE

Requirement Template



The five steps process using the requirement template



Requirement liability/Legal obligation

1.Determine legal obligation

Modal verb	Legal obligation	Explanation
shall	Duty	Legally binding
should	Wish	Strongly advised
Will (use with caution)	Intention	Prospective, future requirement
May	Recommendation	Desirable but not necessary

The three System Activities

3. Characterize the activity of the system

Autonomous system activity:

- the system starts and executes the function (the process) independently.
- The user does not interact with the function.
- Often processes such as report generation, archival or back up of data, notification of users or external systems

User interaction:

- the system provides the user with the ability to use the process functionality or or interacts directly with the user

Interface requirement:

- the system executes a function depending on a third system.
- The system is passive and waits for an external event.
- typically receiving data / getting notified

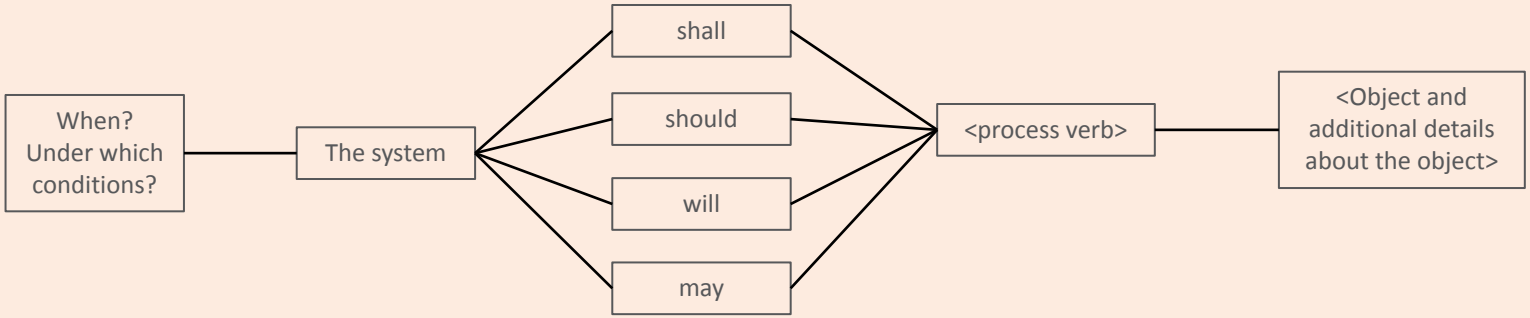
1. Examples for Autonomous system activity/ independent system activities

Example (1):

- During the processing at the day's end (22:00-23:59 GMT+1), the system shall print a vehicle reservation list

Example (2):

At the last day of each month if payments have been received, the system shall check all invoices.
If invoices have not been paid, the system shall send a payment reminder to the client.



2. Examples for user interaction

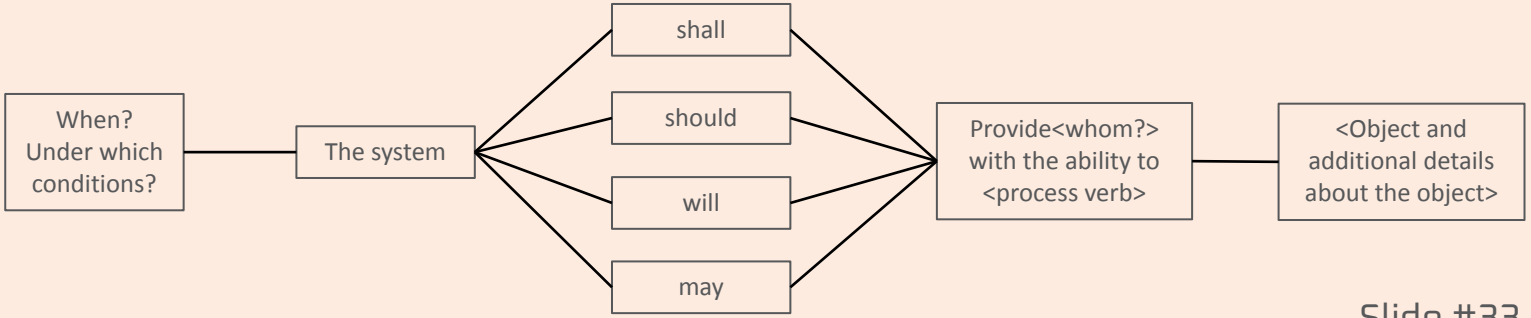
Example :

- If a client has reserved the vehicle only temporarily, the vehicle rental system shall provide the client with the ability to cancel the reservation
- The library platform shall provide the member with the ability to search for an item via search criteria

Example :

If a sales agent chooses a client in a reservation, the vehicle rental system shall provide the sales agent with the ability to view the name, address and account balance of the client.

The library platform may provide members with the ability to rate and comment items in the catalogue.

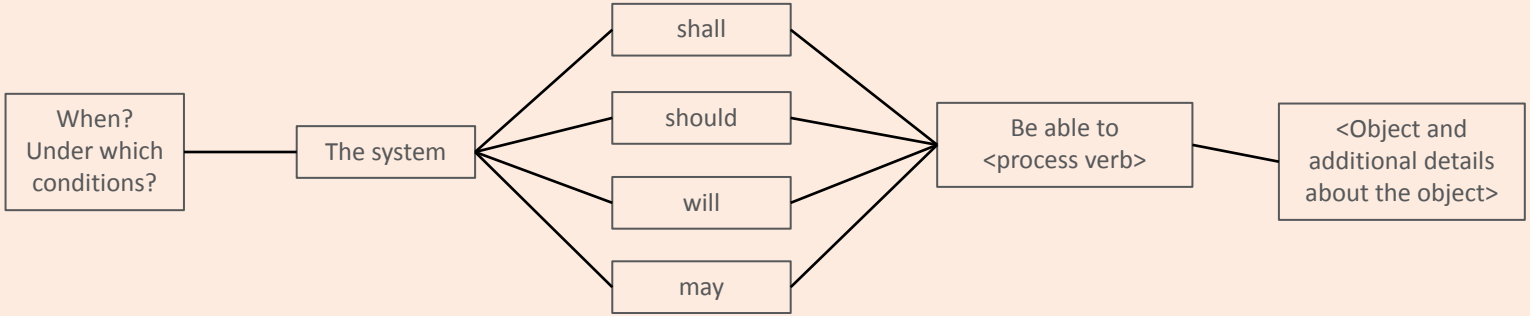


Slide #33

3. Examples for interface requirement

Example (1):

- The system shall be able to receive vehicle locations from the GPS system of the vehicle.
- The library platform should be able to receive student and university staff information from the University Directory System
- The library platform will be able to receive book details from the Publisher System
- The library platform shall be able to receive payment validation from the Payment System

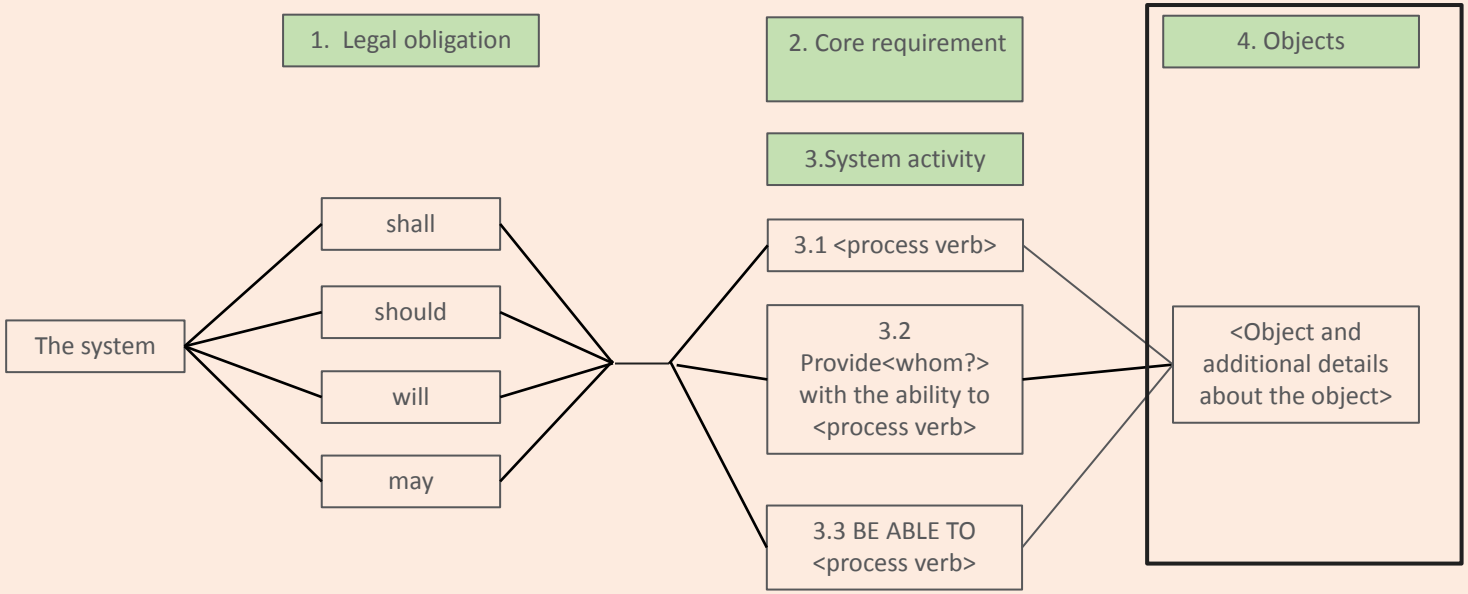


Requirement Template

4. Insert objects

Some process verbs require one or more objects

Eg: printing requires what will be printed and where will it be printed

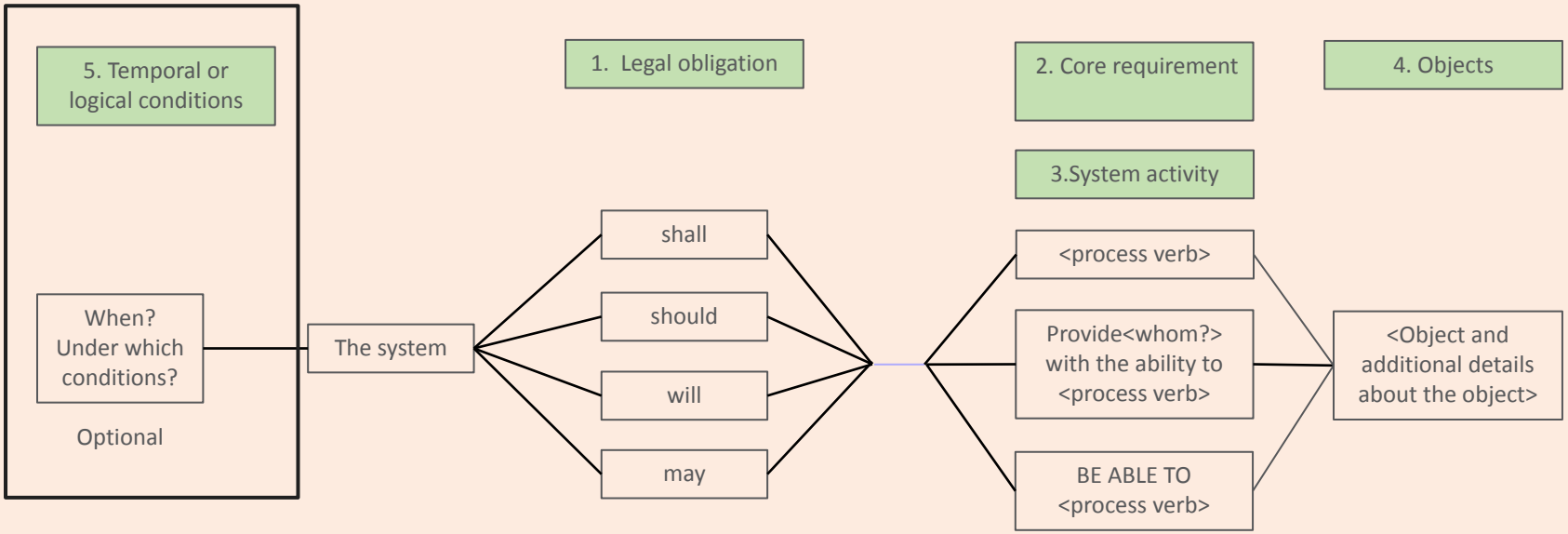


Requirement templates

5. Determine logical and temporal conditions

- ✔ Logical conditions if...then
- ✔ Temporal condition as soon as, after, during, as long as

5. Determine logical and temporal conditions



Examples :

Categories of Quality Requirements (ISO/IEC 25010:2011)

PERFORMANCES

(eg: response time behavior and resources utilization)

- The blade shaft calculation takes less than 5 seconds in 90% of the times
- The insurance app us
- than 1GB disk space including all data
- The web shop suppo concurrent users

USABILITY

(eg: understandability, learnability, ease of use)

The steam path tool provides an offline help system
- The insurance system supports all common touch screen gesture

Quality/Non Functional Requirements :

Need to be verifiable (eg: quantitative assertions)

Y (eg : eability,

cost of changes ral law

- The calculations for the cost of the insurance policy need to be tested via automated tests so that changes can validated automatically

SECURITY

- The insurance system provides user authentication
- The customer data is stored encrypted

RELIABILITY

(eg: availability, dependability, fault tolerance, recoverability)

The web shop is available 95% of the time
Downtime for maintenance is maximum 24 hours per month

PORTABILITY

- The client for the insurance system needs to run on Internet Explorer 10 and above.
- The client for the insurance system provides an automatic installer so that insurance agents can install the client themselves

CSE 3503 Software Requirement Engineering | UMT 2021

What is :

Now begin the process of turning the requirements into functional models

- Models are logical; i.e., independent of how they are implemented (manual or computerized)
- Develop use-cases from the requirements
  - Use-case: how a system interacts with its environment
  - Includes a diagram and a description to depict the discrete activities that the users perform

Develop activity diagrams from the use-cases

- These model the business processes or how a business operates
- Used to illustrate the movement of objects (data) between activities

https://docs.google.com/document/d/1qH2-f6zUls9cyTNt3PoOy0u8HwxSbGwAyJUs2MpPg40/edit?usp=sharing

SISTEM PENGURUSAN LATIHAN INDUSTRI (SPLIT)

Pelajar tahun akhir pengajian, pelajar dari program Sains Komputer iaitu Kejuruteraan Perisian dan Informatik Maritim akan diminta untuk memohon tempat latihan industri. Pelajar perlu memohon tempat untuk menjalani LI bermula pada awal semester II di akhir tahun pengajian mereka di UMT.

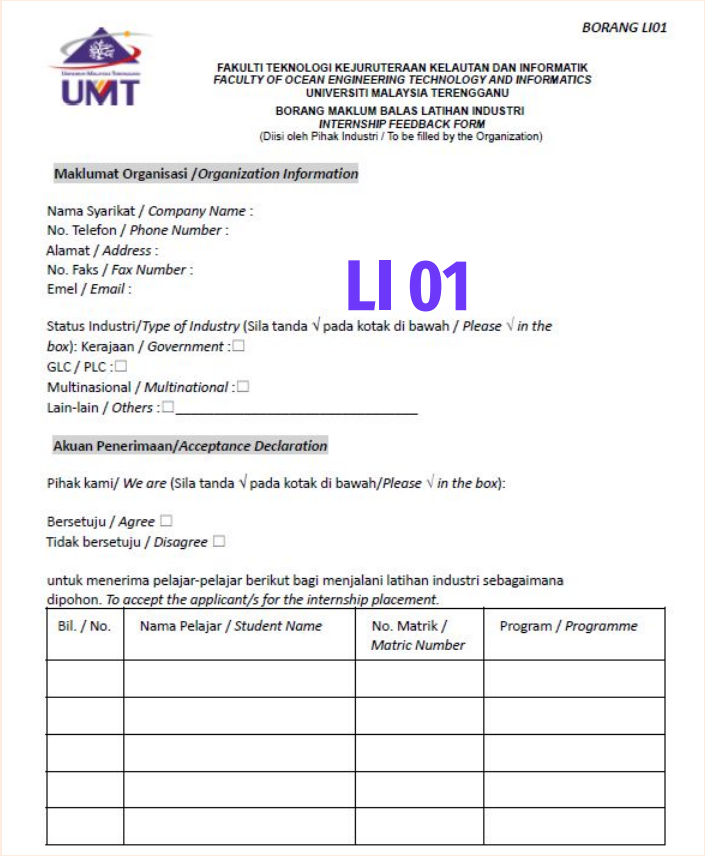
Pada peringkat awal, pelajar perlu mengenal pasti syarikat yang diingini. Pelajar boleh menyemak senarai tempat LI yang ingin dimohon. Senarai semak ini disediakan oleh Penyelaras LI. Penyelaras LI akan mengeluarkan surat permohonan penempatan dan borang LI01 untuk diberikan oleh pelajar kepada pihak industri. Dalam masa yang sama, pelajar perlu memohon tempat LI yang diingin dan menyediakan *resume* dan surat iringan (*cover letter*). Surat permohonan penempatan, borang LI01, resume dan surat iringan perlu dilampirkan di dalam permohonan mereka kepada industri. Pelajar boleh memohon sekurang-kurangnya tiga tempat LI yang diingini. Selepas mendapat maklum balas penerimaan dari industri, pelajar perlu mengemaskini tempat yang telah dipersetujui untuk menjalani latihan industri serta memulangkan borang LI01 yang telah diisi oleh pihak industri sebagai tanda persetujuan menerima pelajar tersebut. Penyelaras kemudiannya akan mengeluarkan surat pengesahan penempatan LI untuk pelajar terlibat.

Semasa menjalani LI, pelajar perlu menghantar beberapa borang pengurusan LI iaitu borang LI02 (Borang Lapor Diri), LI03 (Borang Perancangan Aktiviti) dan LI04 (Borang Laporan Kemajuan). Penyelaras LI bertindak dengan menyemak setiap pelajar yang sedang menjalani LI menghantar kesemua dokumen yang dinyatakan. Jika ada berlaku kegagalan penghantaran borang-borang tersebut, penyelaras akan menghantar notifikasi dan memaparkan maklumat tersebut untuk hebahan pelajar.

Penyelaras juga akan menyusun agihan pelajar mengikut kumpulan untuk diselia oleh penyelia UMT. Penyelia UMT dilantik di kalangan pensyarah program Sains Komputer. Setiap pelajar akan diminta untuk membuat pembentangan berkenaan projek yang telah mereka lakukan sepanjang menjalani LI. Penyelia Industri akan menilai pembentangan tersebut dan mengisi borang pemarkahan LI05. Penyelia UMT juga perlu membuat penilaian pelajar dengan mengisi borang LI06. Seterusnya, pada akhir LI, pelajar perlu menghantar laporan secara atas talian dan markah akan diberikan oleh penyelia berdasarkan ketepatan pelajar menghasilkan laporan yang memenuhi kriteria yang ditetapkan. Penyelaras kemudiannya mengumpul kesemua markah pelajar daripada penyelia dan memasukkan markah keseluruhan dalam sistem untuk menghasilkan laporan penuh markah pelajar dan juga laporan keseluruhan latihan industri untuk diberikan kepada pihak pengurusan fakulti.

https://sites.google.com/view/lisksemi202324/home

https://drive.google.com/file/d/1U1jY58KQ1HskWEXqklagQ_RWTBnIWkyz/view



BORANG LI01

FAKULTI TEKNOLOGI KEJURUTERAAN KELAUTAN DAN INFORMATIK
FACULTY OF OCEAN ENGINEERING TECHNOLOGY AND INFORMATICS
UNIVERSITI MALAYSIA TERENGGANU

BORANG MAKLUM BALAS LATIHAN INDUSTRI
INTERNSHIP FEEDBACK FORM
(Diisi oleh Pihak Industri / To be filled by the Organization)

Maklumat Organisasi /*Organization Information*

Nama Syarikat / *Company Name* :
No. Telefon / *Phone Number* :
Alamat / *Address* :
No. Faks / *Fax Number* :
Emel / *Email* :

LI 01

Status Industri/*Type of Industry* (Sila tanda √ pada kotak di bawah / *Please √ in the box*): Kerajaan / *Government* :☐
GLC / PLC :☐
Multinasional / *Multinational* :☐
Lain-lain / *Others* :☐_____

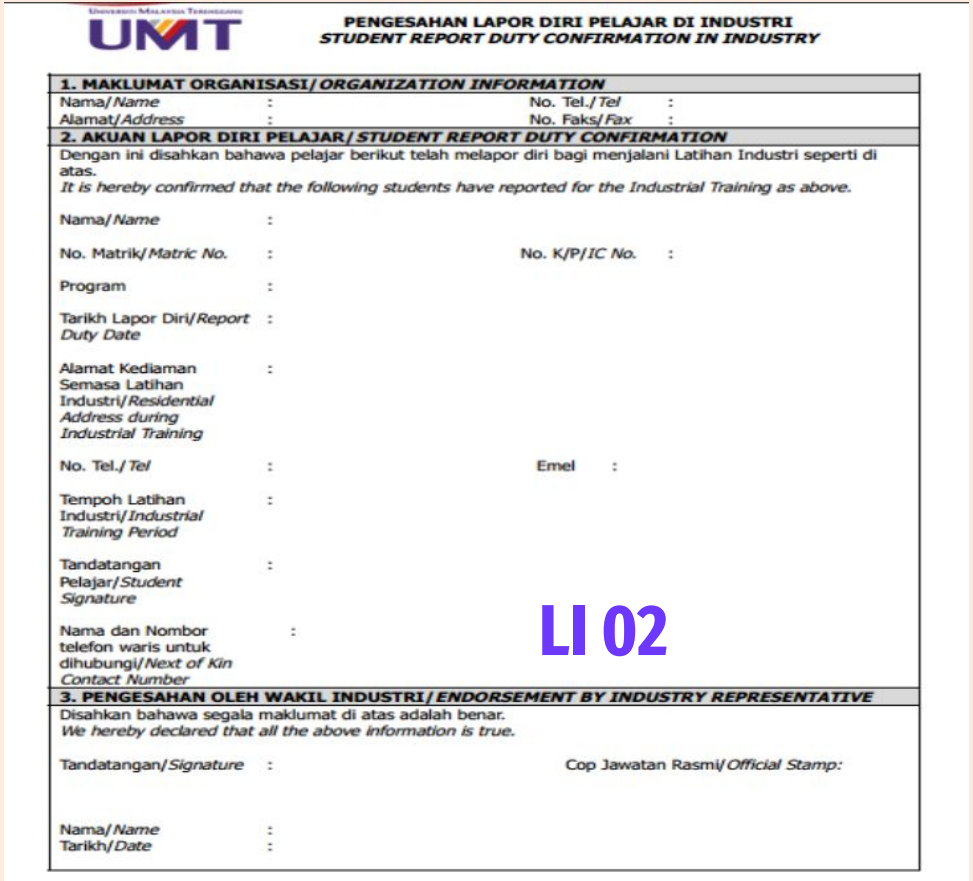
Akuan Penerimaan/*Acceptance Declaration*

Pihak kami/ *We are* (Sila tanda √ pada kotak di bawah/*Please √ in the box*):

Bersetuju / *Agree* ☐
Tidak bersetuju / *Disagree* ☐

untuk menerima pelajar-pelajar berikut bagi menjalani latihan industri sebagaimana dipohon. *To accept the applicant/s for the internship placement.*

Bil. / No.	Nama Pelajar / *Student Name*	No. Matrik / *Matric Number*	Program / *Programme*



PENGESAHAN LAPOR DIRI PELAJAR DI INDUSTRI
STUDENT REPORT DUTY CONFIRMATION IN INDUSTRY

1. MAKLUMAT ORGANISASI/*ORGANIZATION INFORMATION*
Nama/*Name* : No. Tel./*Tel* :
Alamat/*Address* : No. Faks/*Fax* :

2. AKUAN LAPOR DIRI PELAJAR/*STUDENT REPORT DUTY CONFIRMATION*
Dengan ini disahkan bahawa pelajar berikut telah melapor diri bagi menjalani Latihan Industri seperti di atas.
It is hereby confirmed that the following students have reported for the Industrial Training as above.

Nama/*Name* :
No. Matrik/*Matric No.* : No. K/P/*IC No.* :
Program :
Tarikh Lapor Diri/*Report Duty Date* :
Alamat Kediaman Semasa Latihan Industri/*Residential Address during Industrial Training* :
No. Tel./*Tel* : Emel :
Tempoh Latihan Industri/*Industrial Training Period* :
Tandatangan Pelajar/*Student Signature* :
Nama dan Nombor telefon waris untuk dihubungi/*Next of Kin Contact Number* :

LI 02

3. PENGESAHAN OLEH WAKIL INDUSTRI/*ENDORSEMENT BY INDUSTRY REPRESENTATIVE*
Disahkan bahawa segala maklumat di atas adalah benar.
We hereby declared that all the above information is true.

Tandatangan/*Signature* : Cop Jawatan Rasmi/*Official Stamp:*

Nama/*Name* :
Tarikh/*Date* :

LI 03

BORANG/FORM LI03

UNIVERSITI MALAYSIA TERENGGANU

BORANG PERANCANGAN LATIHAN INDUSTRI / *INDUSTRIAL TRAINING PLANNING FORM*

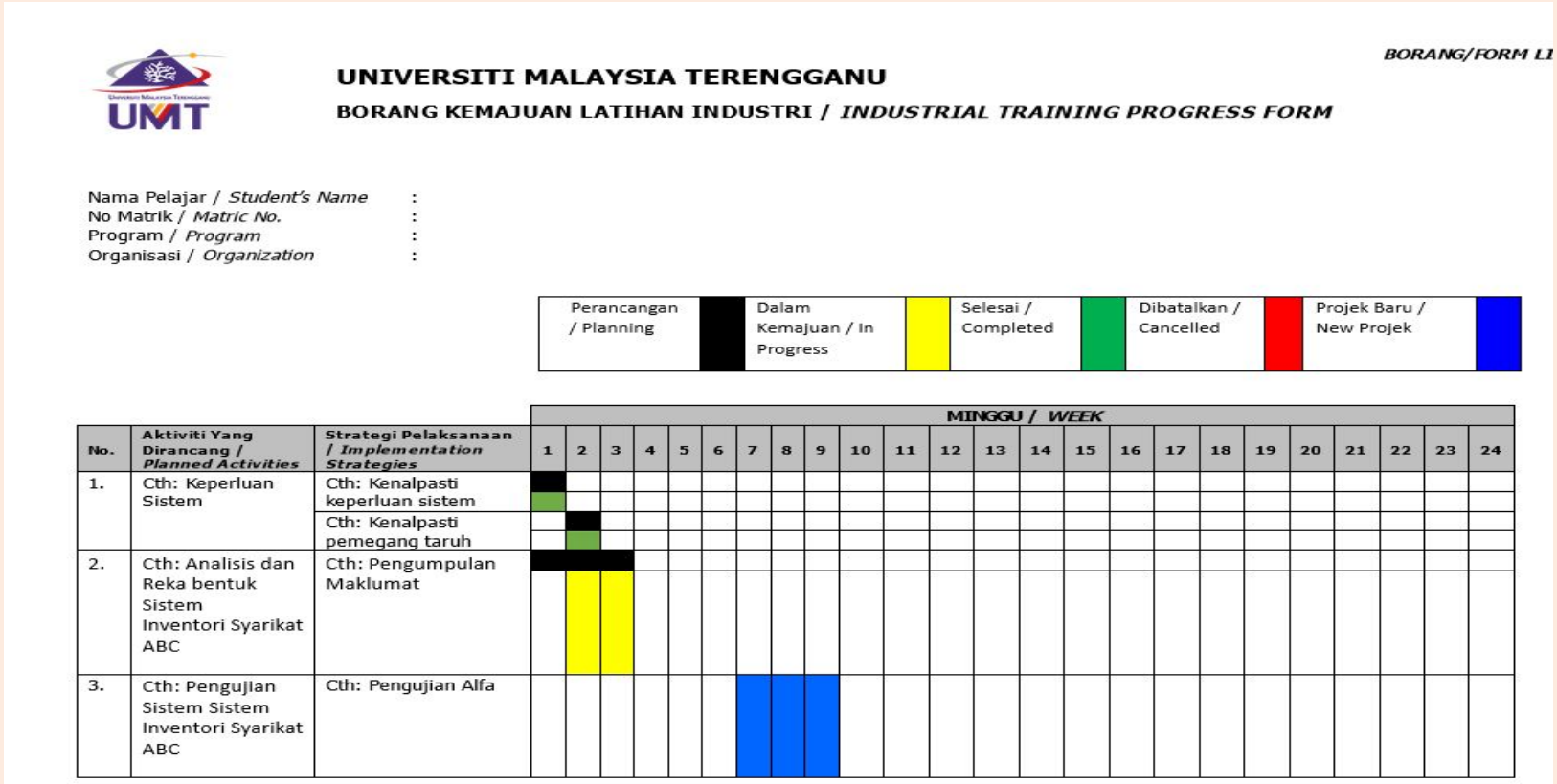
Nama Pelajar / *Student's Name* :
No Matrik / *Matric No.* :
Program / *Program* :
Organisasi / *Organization* :

No.	Aktiviti Yang Dirancang / *Planned Activities*	Strategi Pelaksanaan / *Implementation Strategies*	MINGGU / *WEEK*																							
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
1.	Cth: Keperluan Sistem	Cth: Kenalpasti keperluan sistem																								
		Cth: Kenalpasti pemegang taruh																								

Dengan ini disahkan bahawa segala maklumat di atas adalah benar. / *It is hereby confirmed that all the above information is true.*

Tandatangan / *Signature* :
Penyelia Industri / *Industrial Supervisor* :
Tarikh / *Date* :

LI 04



BORANG/FORM LI

UNIVERSITI MALAYSIA TERENGGANU

BORANG KEMAJUAN LATIHAN INDUSTRI / *INDUSTRIAL TRAINING PROGRESS FORM*

Nama Pelajar / *Student's Name* :
No Matrik / *Matric No.* :
Program / *Program* :
Organisasi / *Organization* :

Perancangan / Planning	Dalam Kemajuan / In Progress	Selesai / Completed	Dibatalkan / Cancelled	Projek Baru / New Projek

No.	Aktiviti Yang Dirancang / *Planned Activities*	Strategi Pelaksanaan / *Implementation Strategies*	MINGGU / *WEEK* 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
1.	Cth: Keperluan Sistem	Cth: Kenalpasti keperluan sistem																								
		Cth: Kenalpasti pemegang taruh																								
2.	Cth: Analisis dan Reka bentuk Sistem Inventori Syarikat ABC	Cth: Pengumpulan Maklumat																								
3.	Cth: Pengujian Sistem Sistem Inventori Syarikat ABC	Cth: Pengujian Alfa																								

Identifying Major Use Case:

Identifying Major Use Case (Review the requirements definition)

Pelajar

Mohon tempat LI
Semak tempat LI (extend?)
Sediakan resume dan surat iringan
Sahkan tempat LI
Pulangkan borang LI 01-?
Hantar borang **LI 02,** LI 03-LI 04
Hantar laporan

Penyelia UMT

Menilai pembentangan dan laporan

Penyelaras LI

Sediakan cadangan tempat LI
Sediakan surat pengesahan dan borang LI 01
Semak penghantaran borang LI 02-LI 04
Kemaskini status penghantaran borang (include?)
Agihkan pelajar mengikut kumpulan penyelia
Memasukkan markah keseluruhan
Menjana laporan

Penyelia Industri

Menilai pembentangan dan laporan

Identifying Major Use Case:

Pelajar

Mohon tempat LI
Semak tempat LI (extend?)
Sediakan resume dan surat iringan
Sahkan tempat LI (include?)

Pulangkan borang LI 01
Hantar borang LI 02
Hantar borang LI 03-LI 04
Hantar laporan

Penyelaras LI

Sediakan cadangan tempat LI
Sediakan surat pengesahan dan borang LI 01
Semak penghantaran borang LI 02-LI 04
Kemaskini status penghantaran borang (include?)
Agihkan pelajar mengikut kumpulan penyelia
Memasukkan markah keseluruhan
Menjana laporan

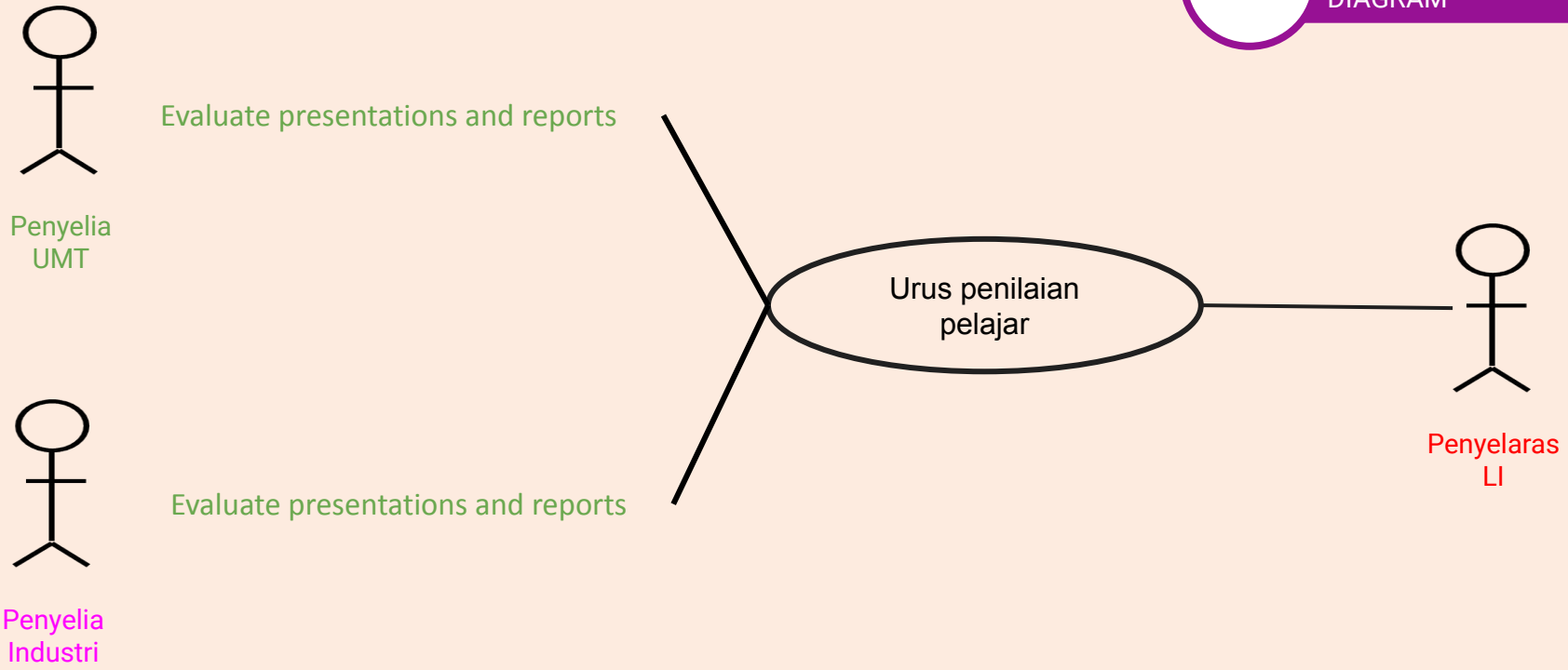
Urus permohonan LI

Urus dokumen pengurusan LI

Menyusun penempatan pelajar

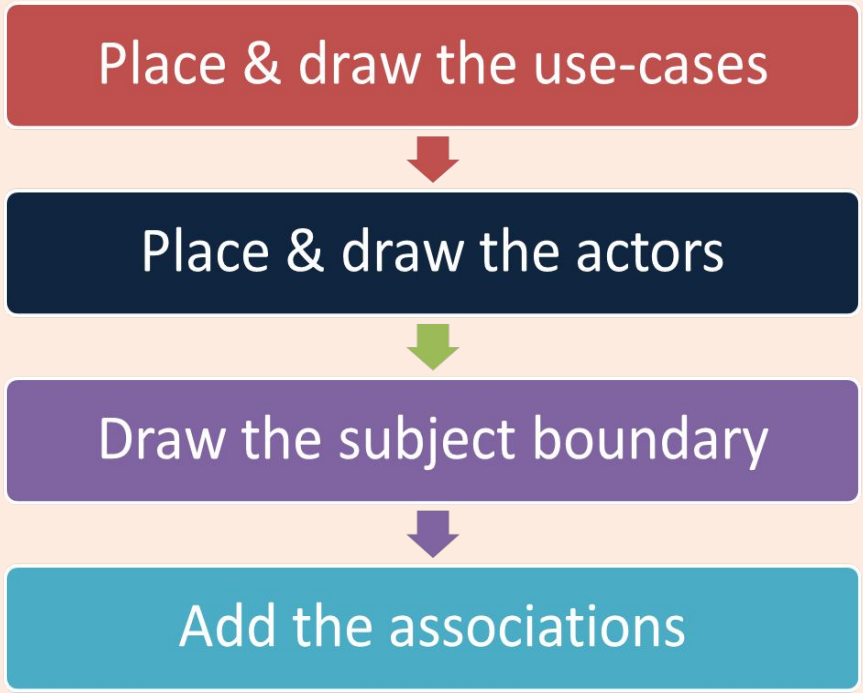
Jana laporan

Identifying Major Use Case:



GENERALIZATION?

Create a use case :



Examples of statement (Refer to template) :

STUDENTS :

- R1 : The system shall provide students with ability to manage LI application
- R2 : The system shall provide students with ability to manage LI forms documentations

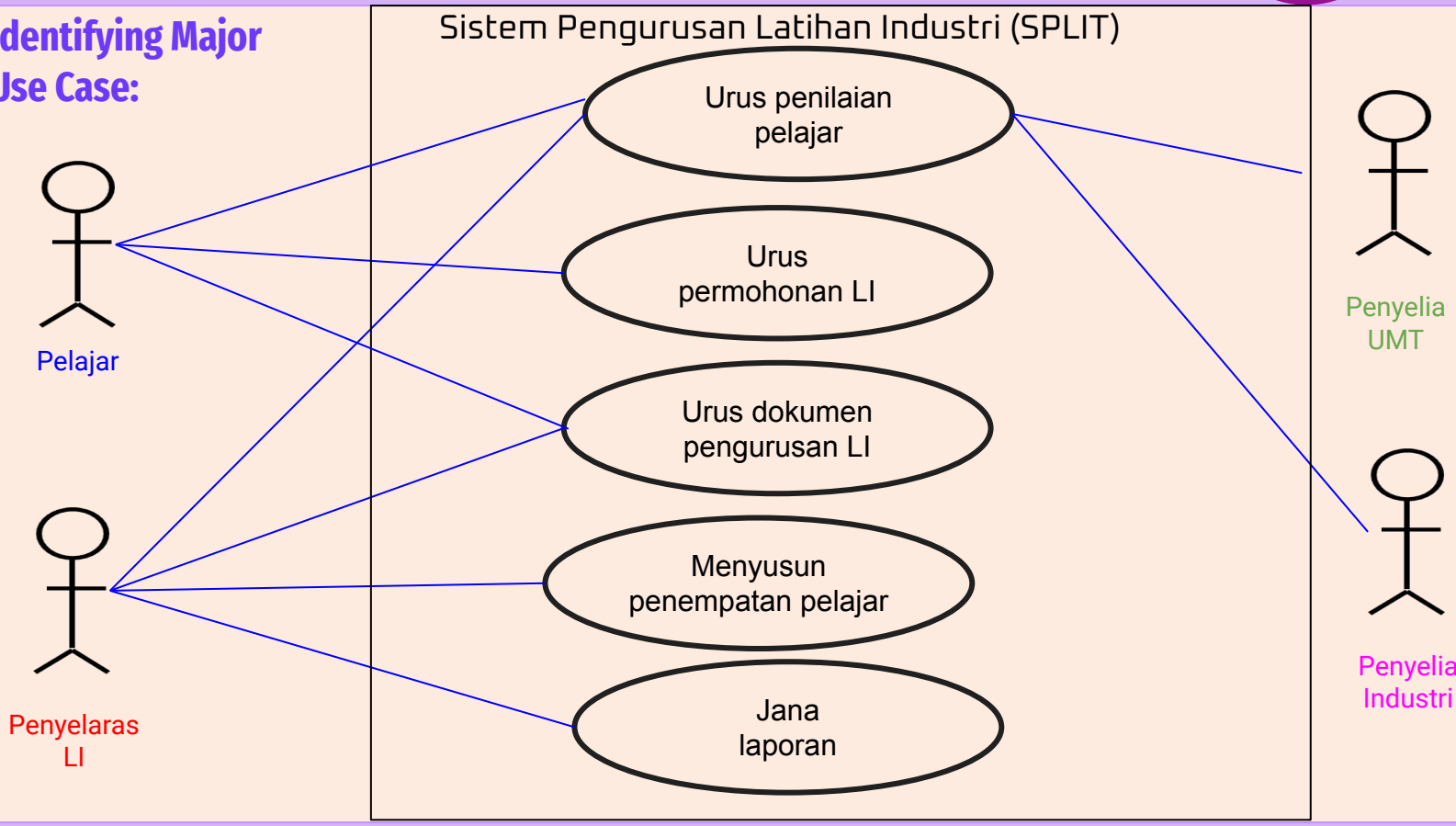
COORDINATOR :

- R3: The system shall provide coordinator with ability to manage students evaluation
- R4:The system shall provide coordinator with ability to manage LI forms documentations
- R5:The system shall provide coordinator with ability to allocate student replacement
- R6:The system shall provide coordinator with ability to generate LI reports

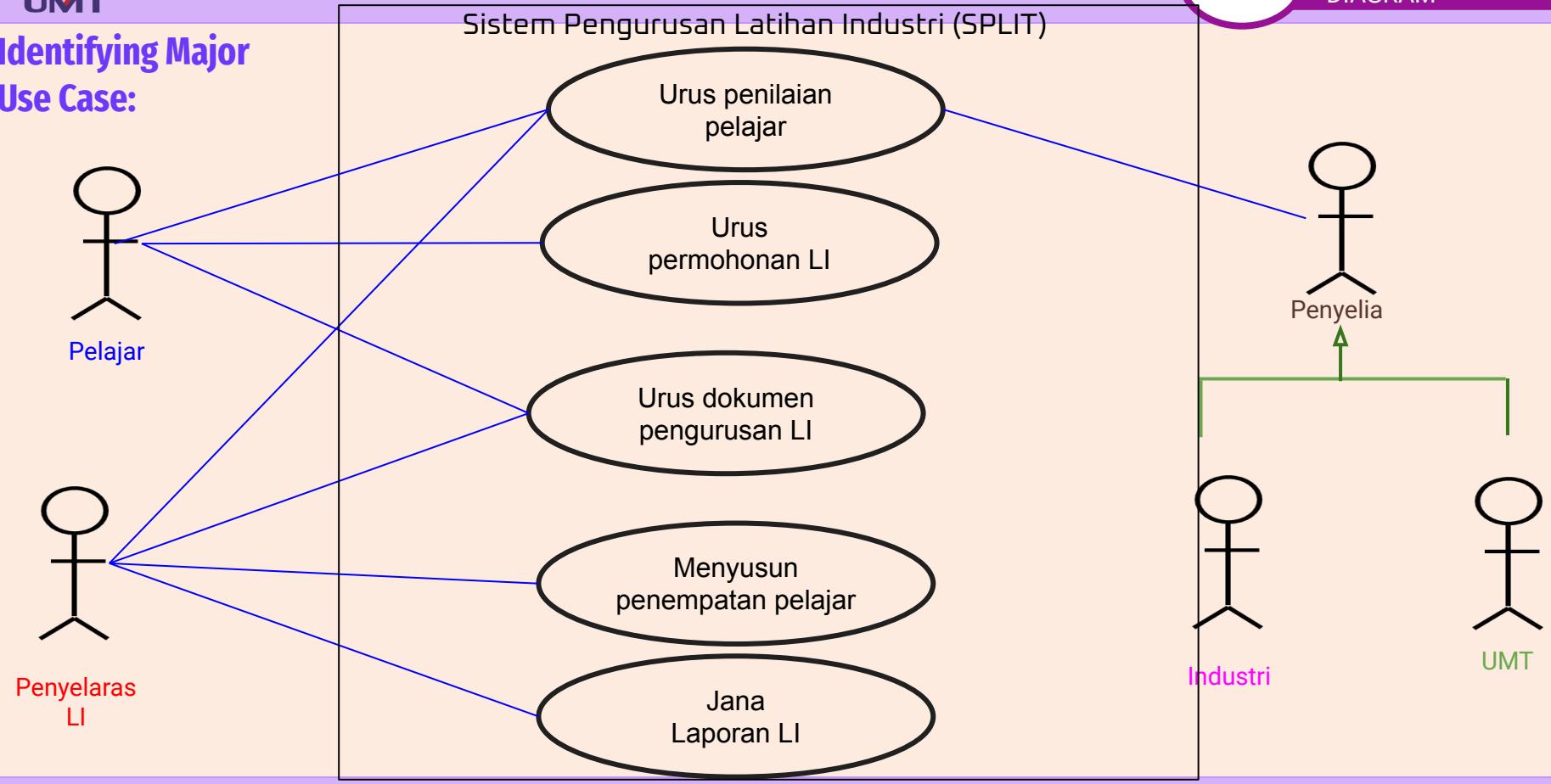
SUPERVISOR

- R7 : The system shall provide supervisors with ability to manage students evaluation Slide #18

Identifying Major Use Case:



Identifying Major Use Case:



Use Case Name:	ID:	Importance Level:
Primary Actor:	Use Case Type:	
Stakeholder and Interests:		
Brief Description:		
Trigger: Type: External		
Relationships: Association: Include: Extend: Generalization:		
Normal Flow of Events:		
Sub-Flows:		
Alternate/Exceptional Flows:		

Use Case Name:	Urus dokumen pengurusan LI	ID: 3	Importance Level: High
Primary Actor:	Pelajar	Use Case Type:	Primary, Essential
Stakeholder and Interests:	Pelajar - serahkan LI 01, hantar LI 02-04 Penyelaras -uruskan borang LI01-LI04 dan semak status penghantaran borang tersebut		
Brief Description:	Rajah kes guna ini menerangkan tentang proses pengurusan dokumen sepanjang LI dijalankan		
Trigger: Pelajar ingin memohon tempat LI Type: External			
Relationships: Pelajar dan Penyelaras Association: Include: Extend: Generalization:			

Normal flows of event:

1. Pelajar menghantar borang pengurusan LI iaitu LI02, LI03, LI04
2. Penyelaras akan menyemak penerimaan semua dokumen tersebut
3. Pelajar akan menyemak status penghantaran borang tersebut

Sub flows :

Alternate / Exceptional Flows :

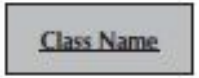
Jika pelajar tersalah menghantar borang, penyelaras akan meminta pelajar supaya menghantar semula borang terlibat

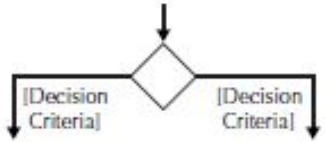
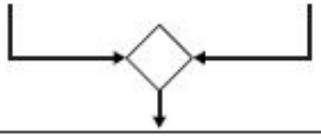
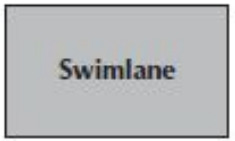
What is

Business processes consist of a number of activities

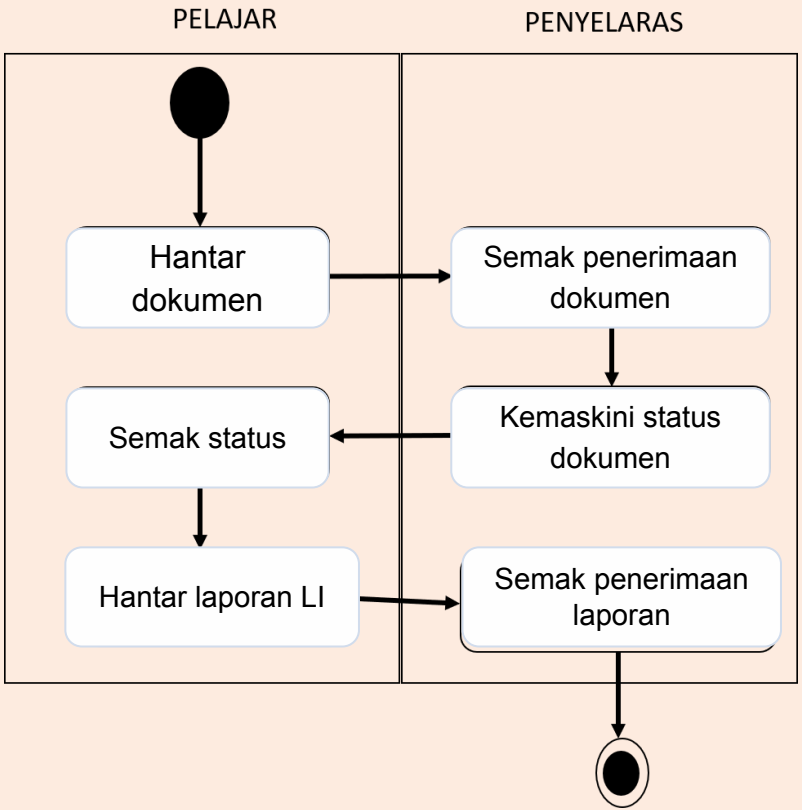
Activity diagrams depict the sequence of these activities

- Diagrams are abstract and describe processes in general
- They model behavior independent of objects
- Can be used for any type of process

An action: ■ Is a simple, nondecomposable piece of behavior. ■ Is labeled by its name.	
An activity: ■ Is used to represent a set of actions. ■ Is labeled by its name.	
An object node: ■ Is used to represent an object that is connected to a set of object flows. ■ Is labeled by its class name.	
A control flow: ■ Shows the sequence of execution.	
An object flow: ■ Shows the flow of an object from one activity (or action) to another activity (or action).	
An initial node: ■ Portrays the beginning of a set of actions or activities.	
A final-activity node: ■ Is used to stop all control flows and object flows in an activity (or action).	
A final-flow node: ■ Is used to stop a specific control flow or object flow.	

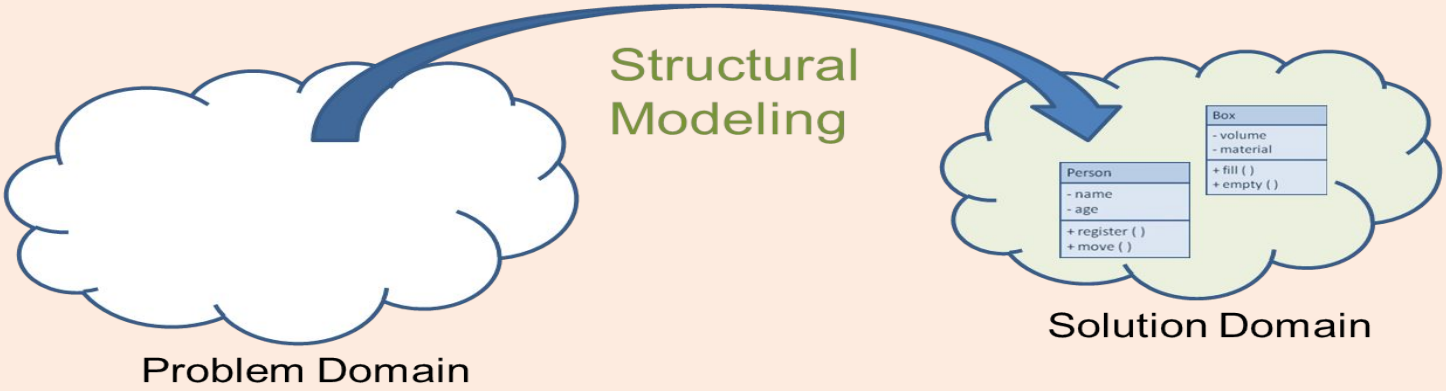
A decision node: ■ Is used to represent a test condition to ensure that the control flow or object flow only goes down one path. ■ Is labeled with the decision criteria to continue down the specific path.	
A merge node: ■ Is used to bring back together different decision paths that were created using a decision node.	
A fork node: Is used to split behavior into a set of parallel or concurrent flows of activities (or actions)	
A join node: Is used to bring back together a set of parallel or concurrent flows of activities (or actions)	
A swimlane: Is used to break up an activity diagram into rows and columns to assign the individual activities (or actions) to the individuals or objects that are responsible for executing the activity (or action) Is labeled with the name of the individual or object responsible	

LI02?



Aktiviti diagram bagi rajah kes guna ‘Urus dokumen pengurusan LI

Main goal: to discover the key data contained in the problem domain and to build a structural model of the objects

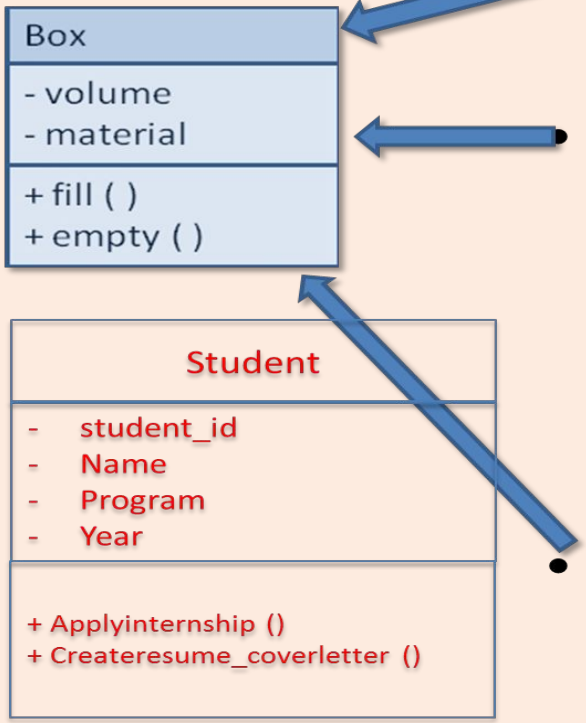


A static model that shows

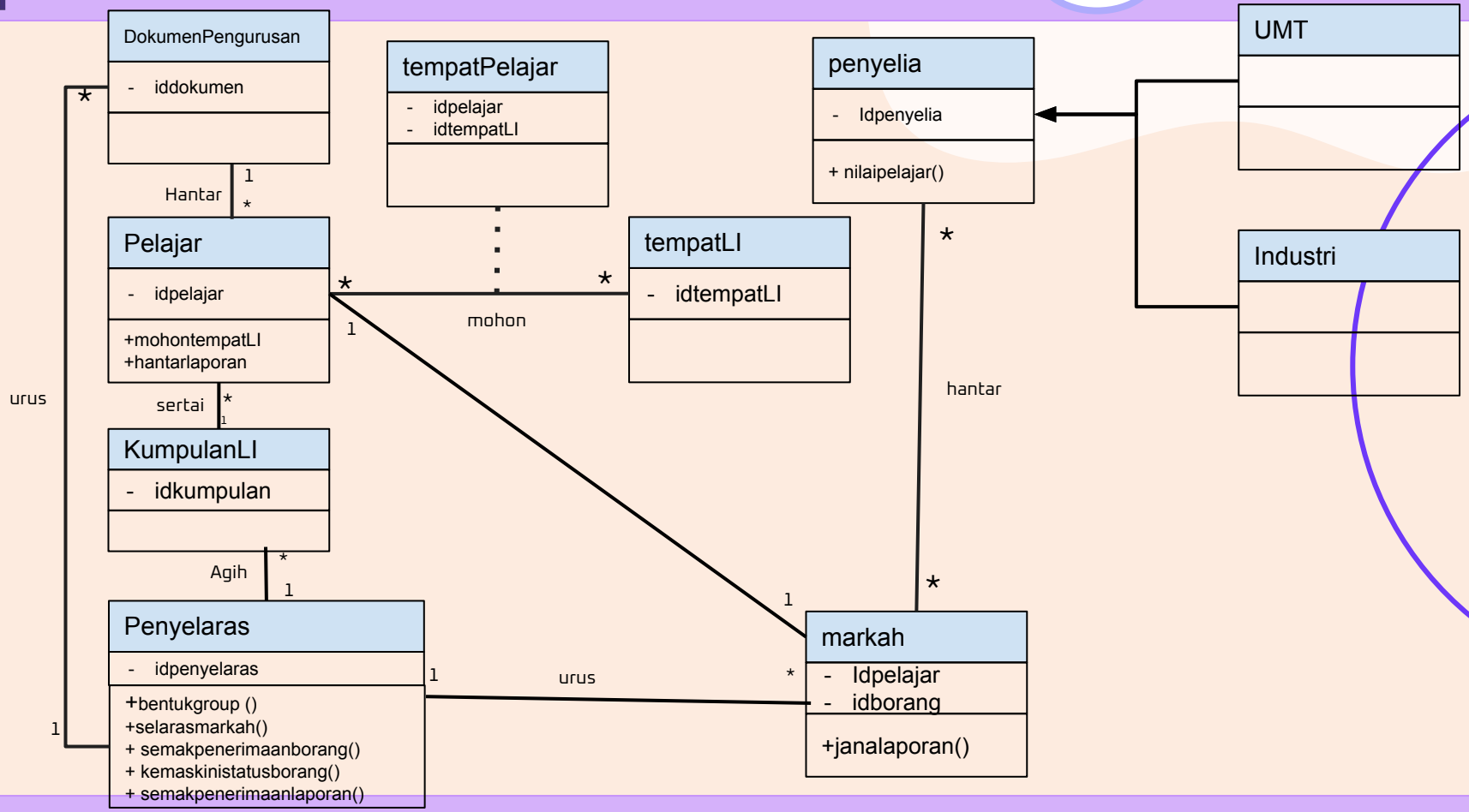
- classes and their relationships to one another

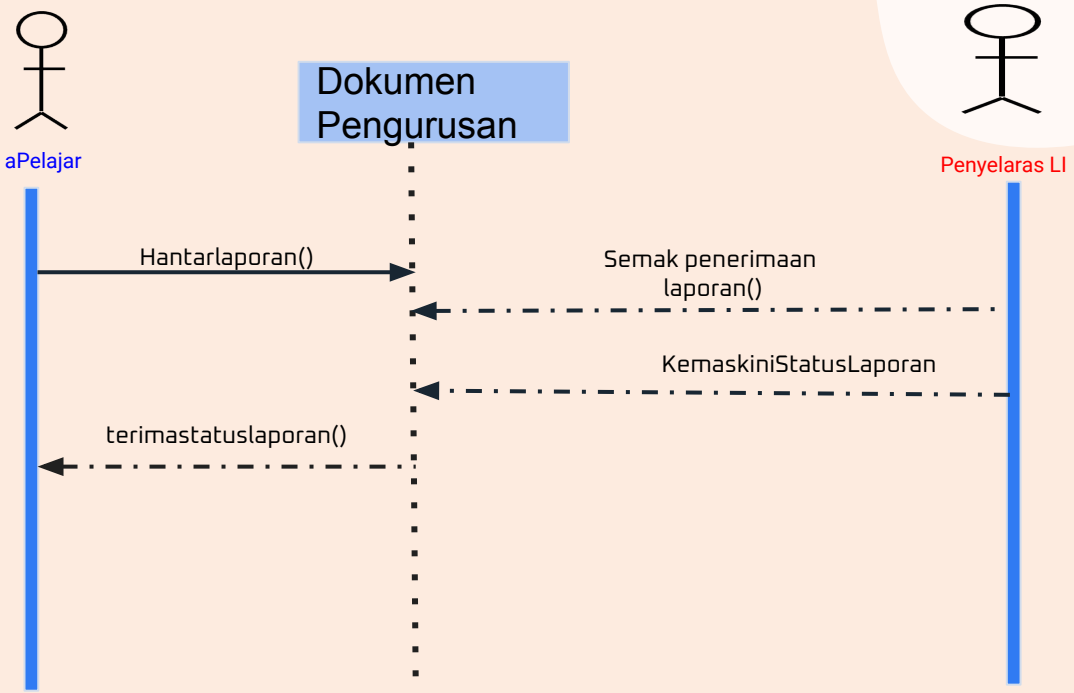
Elements

- Classes
  - Objects within the system (a person, place or thing)
  - Stores and manages information in the system and contains:
    - Attributes—characteristics of the class
    - Operations—activities the class can perform
- Relationships—the associations between classes
  - Depicted as lines between classes
  - Multiplicity indicates how many of one object is/are associated with other objects



- **Classes**
  - — Templates for instances (objects) of people, places, or things
- **Attributes**
  - — Properties that describe the state of an instance of a class (an object)
  - — Only included attributes that are relevant to the task
  - — Only included primitive/atomic types of attributes (i.e, integers, strings, doubles, date, time, boolean, etc)
- **Operations**
  - — Actions or functions that a class can perform

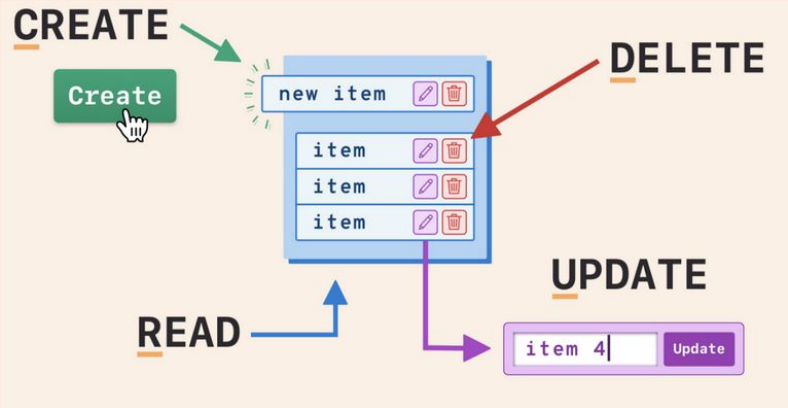

DokumenPengurusan
- iddokumen
tempatPelajar
- idpelajar
- idtempatLI
penyelia
- Idpenyelia
+ nilaipelajar()
UMT
Industri
Hantar
1
*
Pelajar
- idpelajar
+mohontempatLI
+hantarlaporan
mohon
tempatLI
- idtempatLI
urus
sertai
KumpulanLI
- idkumpulan
Agih
hantar
Penyelaras
- idpenyelaras
+bentukgroup ()
+selarasmarkah()
+ semakpenerimaanborang()
+ kemaskinistatusborang()
+ semakpenerimaanlaporan()
urus
markah
- Idpelajar
- idborang
+janalaporan()


Dokumen Pengurusan
aPelajar
Penyelaras LI
Hantarlaporan()
Semak penerimaan laporan()
KemaskiniStatusLaporan
terimastatuslaporan()

A CRUD matrix (Create, Read, Update, Delete)

- **a table that shows the links between processes and data, or between processes and resources**.

- When a link exists, it shows whether the process performs a Create, Read, Update, or Delete operation on the data or resource.



- **Completeness checking of models**
  - will help in the identification of omissions, both in the range of necessary use cases and in the set of classes in the class model.
- **Identification of dependencies**
  - the CRUD matrix helps decide which ones should be handled first.

- **Estimation of the time needed for development**
  - estimating the time needed to develop and test a specific piece of functionality.
- **Consistency checking**
  - estimating the time needed to develop and test a specific piece of functionality.

https://sites.google.com/site/dayshaconsulting/home/methodoligies/requirements-definition/requirements-modelling/crud-matrix

Entities / Function	Pelajar	Penyelaras	Penyelia	TempatLI	Markah
Mohon LI	CRU	RUD		R	
Kira markah	R		RU		CUD
Tambah tempat LI	R			CRUD	
Sahkan tempat	U			U	

Examples of statement (Refer to template) :

STUDENTS :

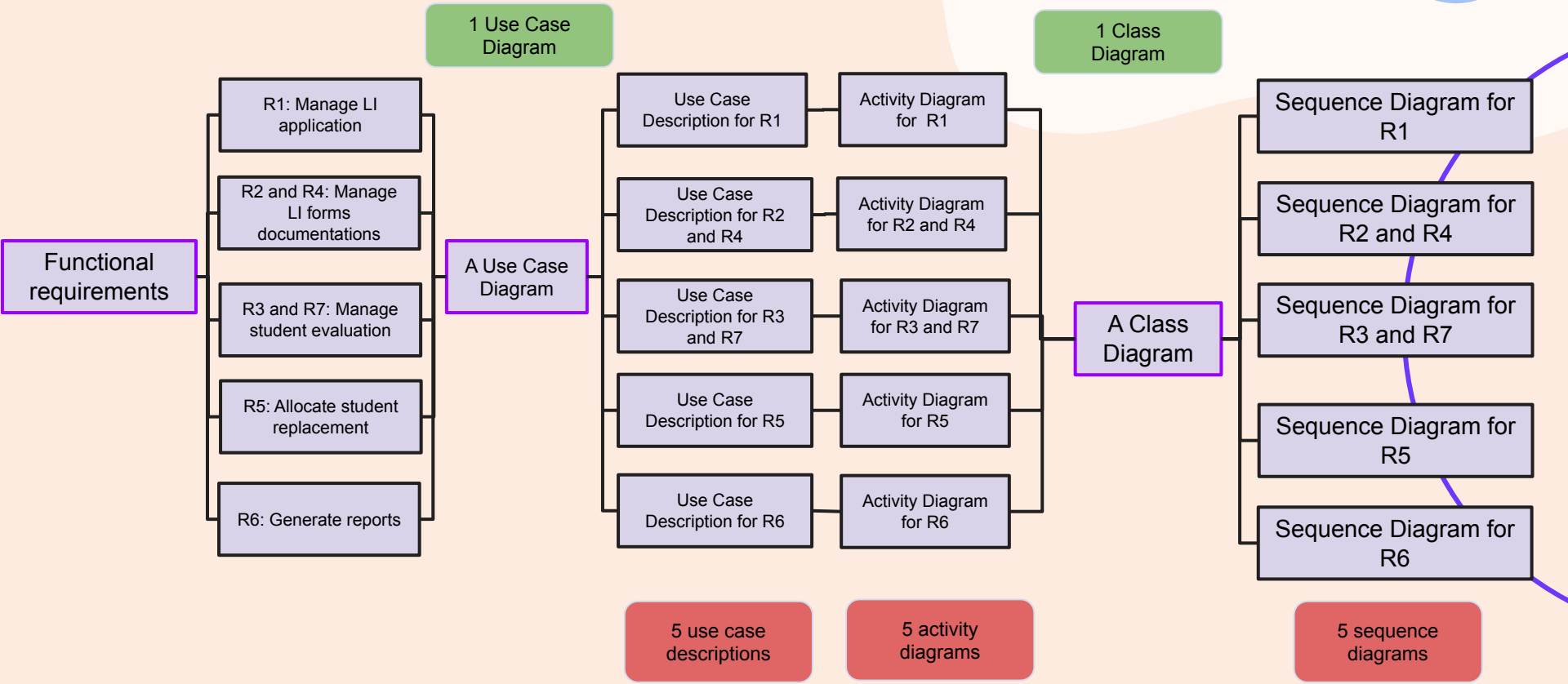
- R1 : The system shall provide students with ability to manage LI application
- R2 : The system shall provide students with ability to manage LI forms documentations

COORDINATOR :

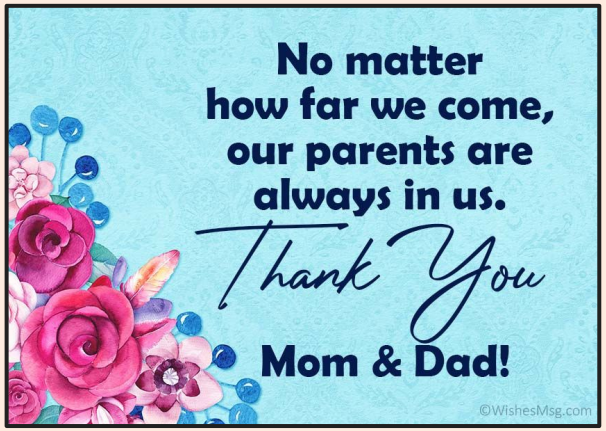
- R3: The system shall provide coordinator with ability to manage students evaluation
- R4:The system shall provide coordinator with ability to manage LI forms documentations
- R5:The system shall provide coordinator with ability to allocate student replacement
- R6:The system shall provide coordinator with ability to generate LI reports

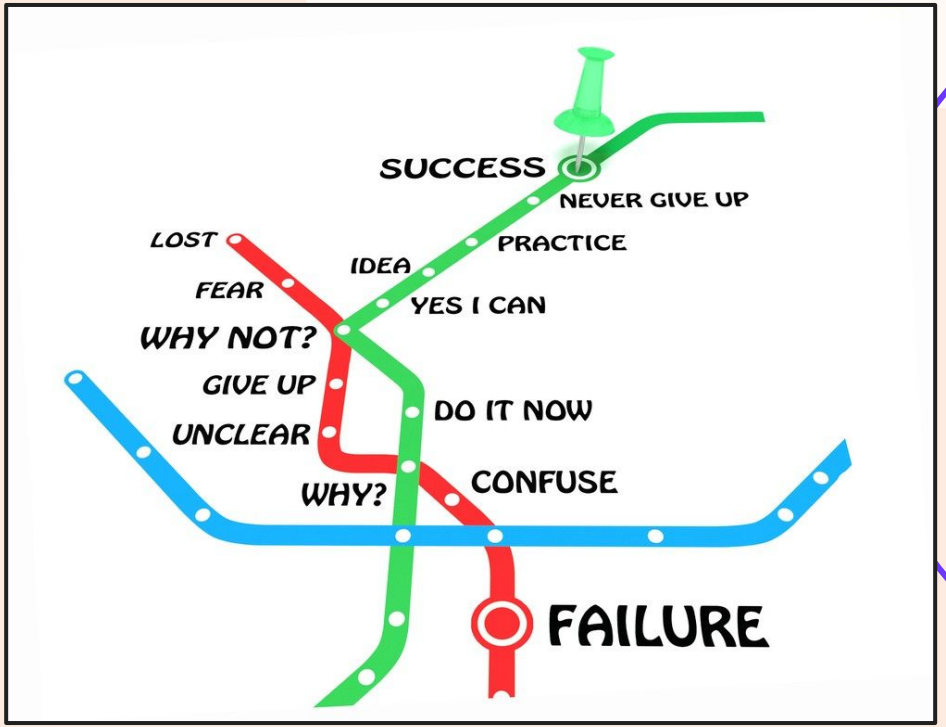
SUPERVISOR

- R7 : The system shall provide supervisors with ability to manage students evaluation Slide #18


Functional requirements
R1: Manage LI application
R2 and R4: Manage LI forms documentations
R3 and R7: Manage student evaluation
R5: Allocate student replacement
R6: Generate reports
A Use Case Diagram
1 Use Case Diagram
Use Case Description for R1
Use Case Description for R2 and R4
Use Case Description for R3 and R7
Use Case Description for R5
Use Case Description for R6
5 use case descriptions
Activity Diagram for R1
Activity Diagram for R2 and R4
Activity Diagram for R3 and R7
Activity Diagram for R5
Activity Diagram for R6
5 activity diagrams
A Class Diagram
1 Class Diagram
Sequence Diagram for R1
Sequence Diagram for R2 and R4
Sequence Diagram for R3 and R7
Sequence Diagram for R5
Sequence Diagram for R6
5 sequence diagrams


Banyak ilmu, namun lupa belajar adab dan akhlak
Imam Malik *rahimahullah* pernah berkata pada seorang pemuda Quraisy, "Pelajarilah adab sebelum mempelajari suatu ilmu."
Kenapa sampai para ulama mendahulukan mempelajari adab?
Sebagaimana Yusuf bin Al Husain berkata, "Dengan mempelajari adab, maka engkau jadi mudah memahami ilmu."


No matter
how far we come,
our parents are
always in us.
Thank You
Mom & Dad!
©WishesMsg.com


SUCCESS
NEVER GIVE UP
PRACTICE
IDEA
YES I CAN
LOST
FEAR
WHY NOT?
GIVE UP
UNCLEAR
DO IT NOW
WHY?
CONFUSE
FAILURE

Thanks!

Do you have any questions?

Noor Azliza binti Che Mat

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Kelautan dan Informatik
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