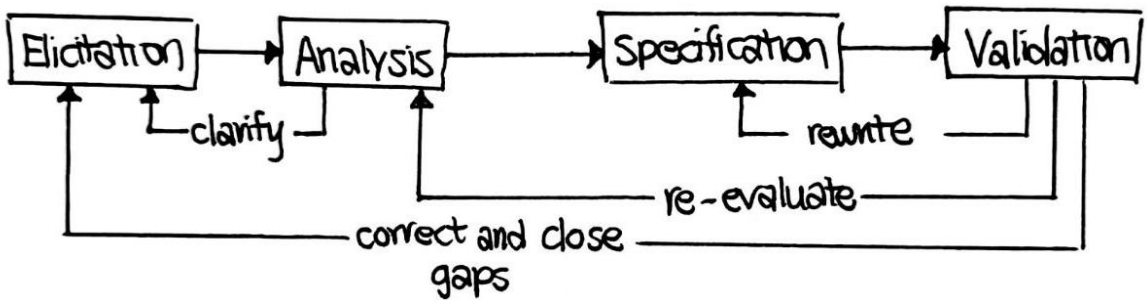
Solver: Margaret Claire Koesno

1)

a) There are 4 major steps involved, namely Elicitation, Analysis, Specification and Validation. The steps are related as shown in the diagram below, where the arrow indicates the flow of execution.



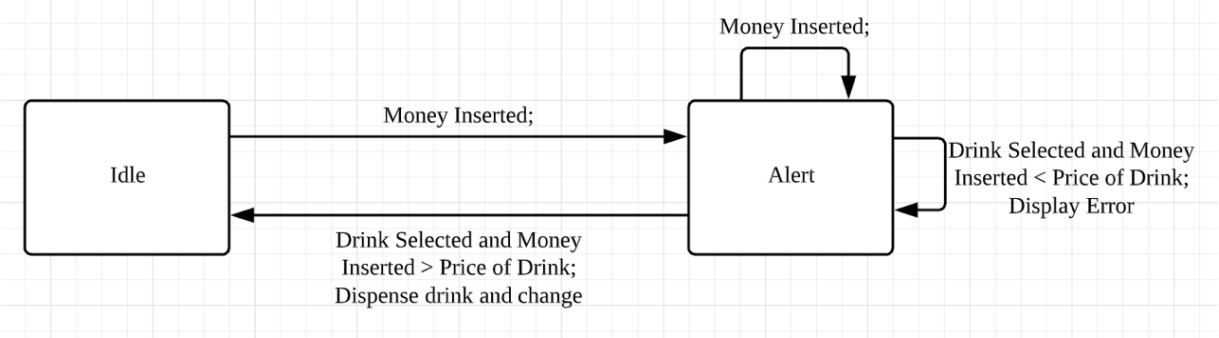
b) *Multiple techniques can be used for any given case and as long as you can justify your answer it should be fine. Below are the answers I gave during the exam.*

i) **Interview stakeholders**. There are a lot of types of social networking services, each focusing on different things, for instance Instagram focuses on more imagery such as photos and videos while Twitter on text and quotes. Interviewing stakeholders would be a good way to get a more specific idea on what type of product is needed and what are the key features that needs to be focused on.

ii) **Task Analysis.** Analyzing the specific scenarios or use cases that would facilitate this software is a good way to understand the product that needs to be created. Because this is an internal product, the workflow and features can be specifically designed to suit the employee's needs and only need to cater to use cases that could happen in that company

iii) **Marketing Survey.** Food delivery systems is now common, and a lot of people use it in their daily life. By conducting a survey, we can find out what users already like in existing systems and what they think needs to be improved. We can gather substantial data to tailor the system to the public's wishes.

c) <u>State Transition Diagram</u>



2)

a) **Inverse.** This is because when you try to increase the portability of a system you will need to add more code in order to make the system compatible with various machines, thus decreasing the efficiency. On the other hand, if you want to make the code more efficient you need it to be clean and simple, however, it will be platform/machine specific, thus less portable. For example, C is known to be fast and efficient once it is compiled, however the compiled code is platform dependant. On the other hand, java is relatively slower and less efficient, however, it is cross platform because it runs on a JVM. The need for a JVM also reduces efficiency but improves portability.

b) **Separation of Concerns** is a design principle for separating a computer program into distinct sections such that each section addresses a separate concern.
Low Coupling and High Cohesion means keeping part of a code base that are related to each other in a single place and separating unrelated past of the code base as much as possible

The open close principle states that entities should be open for extension but closed for modification. It supports the separation of concerns principle as it promotes modularity, hence the need to separate each functionality into its own block and discourages adding in new features into existing code. It also promotes low coupling and high cohesion because while separating functionalities, it promotes extending existing ones hence allowing related modules to still interact with each other.

c) *This question is specific to each group as it depends on what architecture your group adopted for the lab project. The reasoning is also specific to each group as some groups might adopt the same architecture for different reasons depending on their software. As long as you have read your group's report and participated in the group discussions, just right a paragraph of your group's rationale and that is enough.*

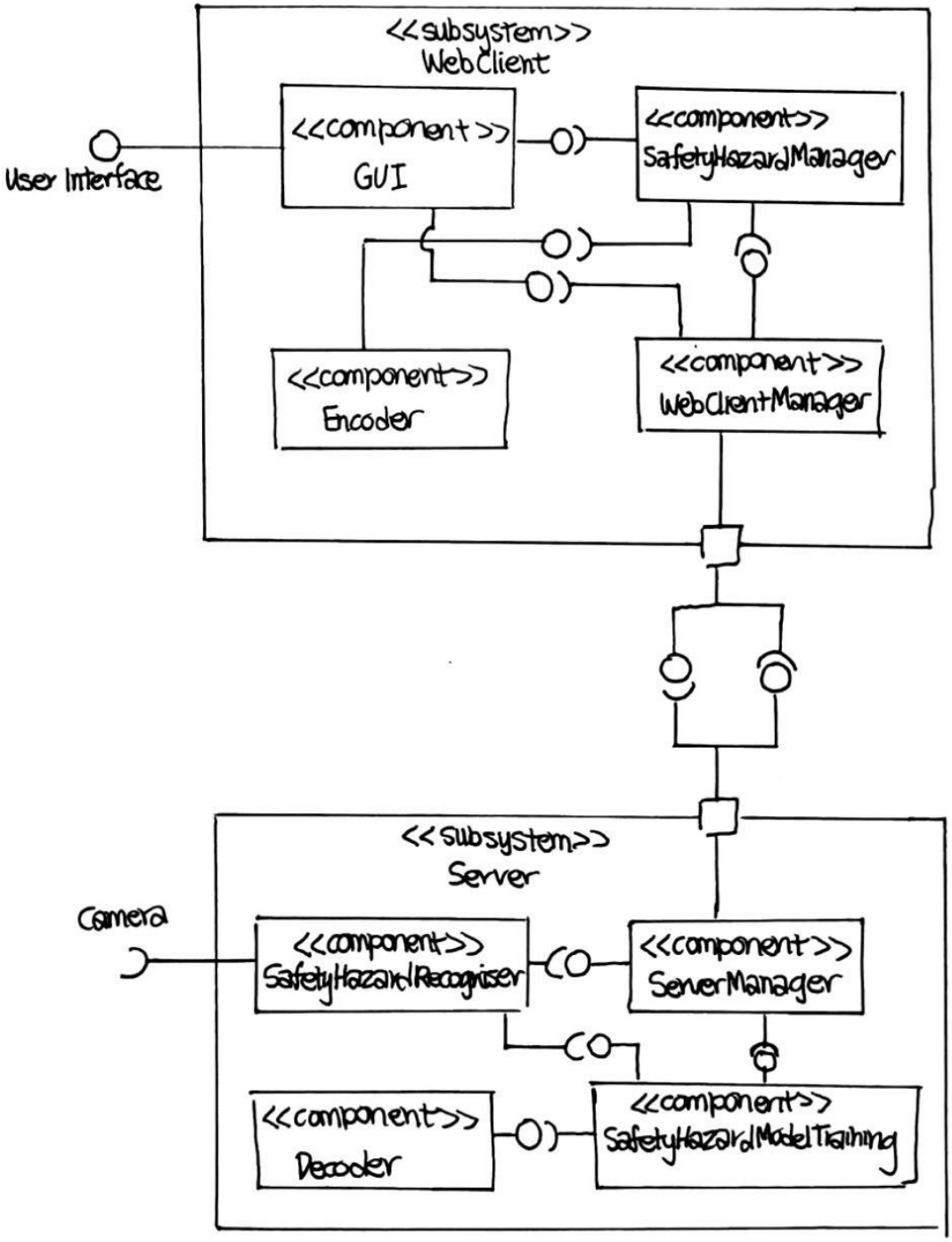
d) Decision Table

Condition	Requirement number			
	1	2	3	4
Number of days of applicant's leave balance is sufficient	F	T	T	T
Duty of applicant during vacation period is delegated to someone else		F	T	T
Applicant is managing an urgent project			T	F
Action				
Application approved				X
Application Rejected	X	X	X	

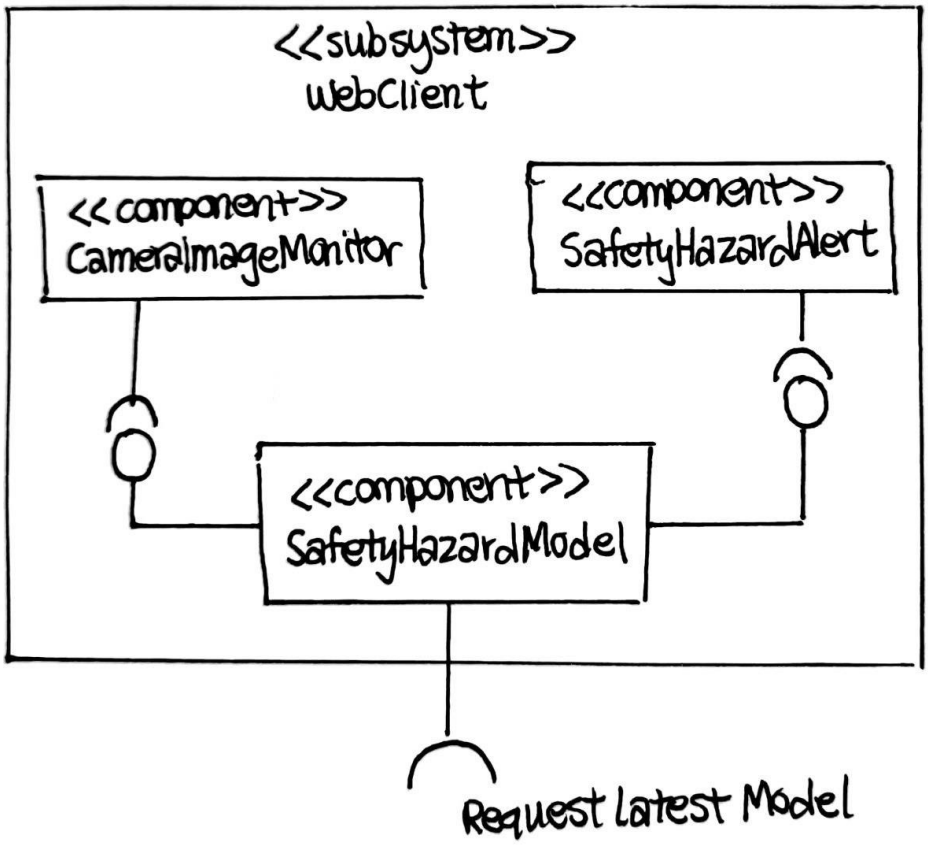
3)

a) **Encoder** in the web client subsystem and a **decoder** in the server subsystem

b) UML Component Diagram



c) UML Component Diagram



d) ServerManager – S
SafetyHazardModelTraining - T
SafetyHazardRecognizer - T
Decoder – I, R

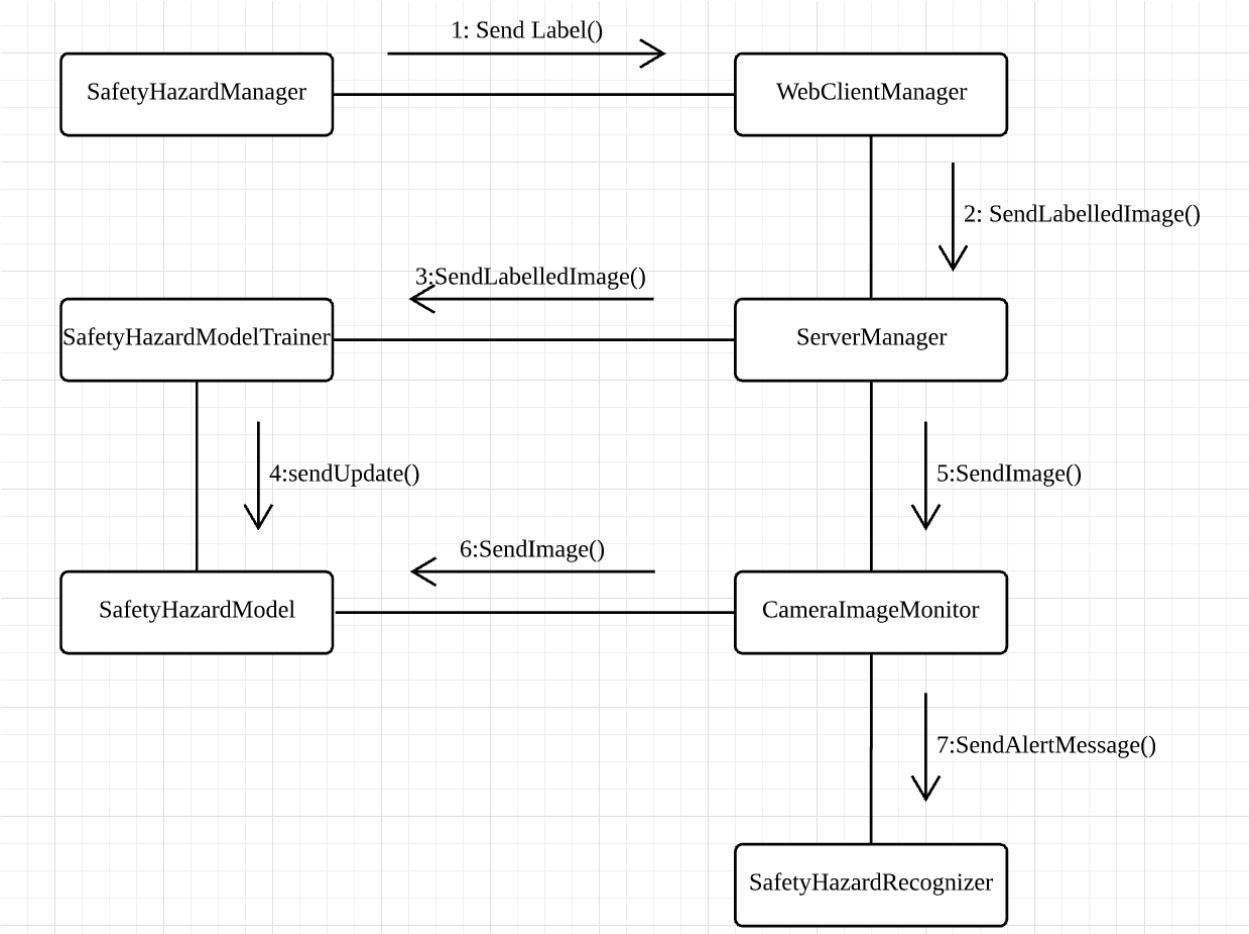
4)

a) Estimation of Minimum Number of Classes

Component	Façade Class	Nested Class
A	A	C1, C2
A1	A1	C1a
A2	A2	C2a
A3	A3	C3a, C3b, C3c, C3d

Ans: 12 classes

b) UML Communication Diagram



c) **Product**. Because it is a software product that can and probably will be installed on multiple machines and computers and is specific to fulfil this one goal.

d) The workers who are currently employed to monitor the camera images will oppose Smart Safety because with the use of Smart Safety, the company can significantly reduce the number of manpower needed. Furthermore, the few who do not lose their job as some monitoring is still needed to label the images might also oppose the need to learn a new technology as a learning curve will then be present.
The budgeting team will support Smart Safety because this allows them to cut down on expenses that was previously used to employ a lot of workers, thus freeing up budget for other things in the long run.

--End of Answers--