EBU6304 Software Engineering

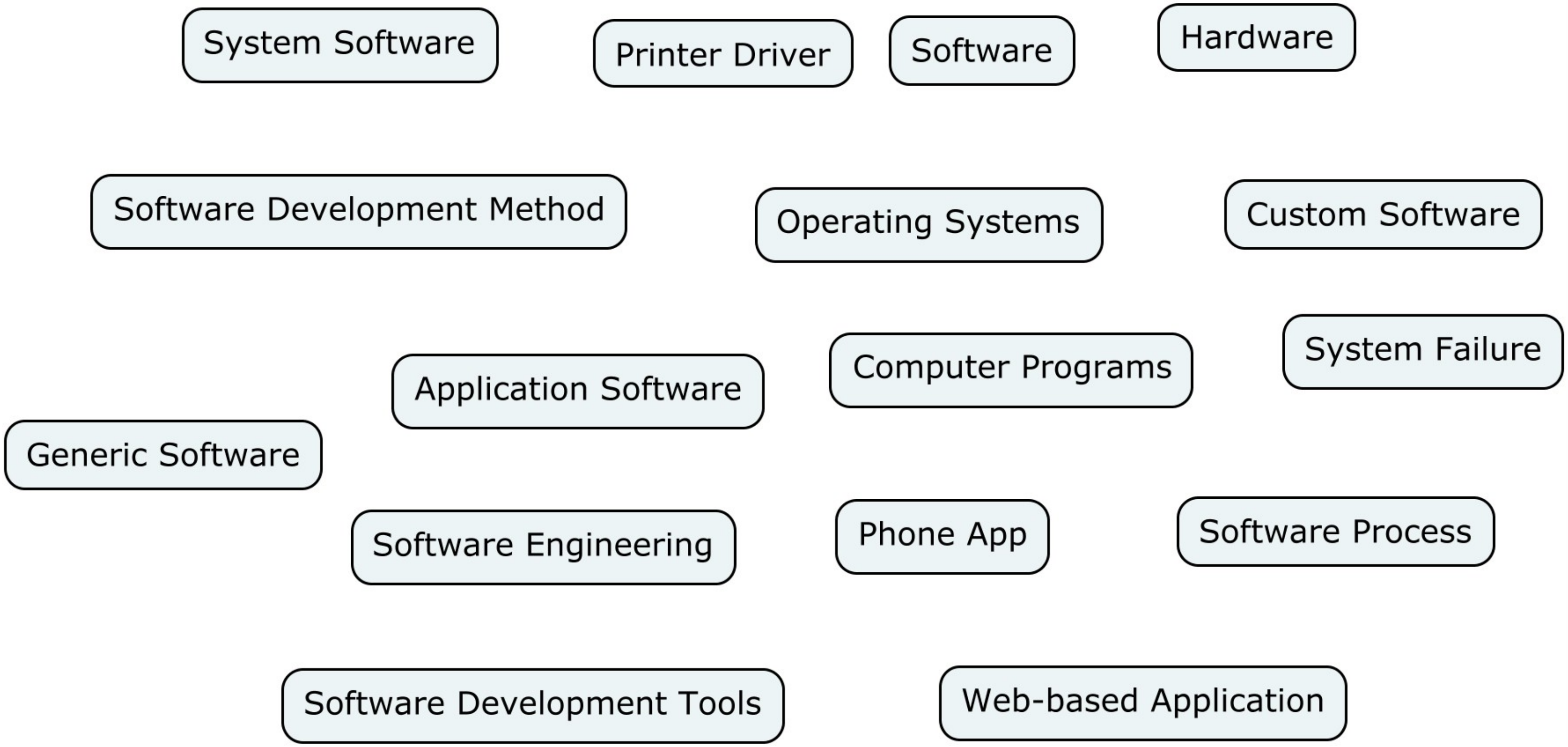
Exercises

Set 1

Software and Software Engineering

Concept Map

Draw a concept map (linking the following concepts together)



System Software

Printer Driver

Software

Hardware

Software Development Method

Operating Systems

Custom Software

System Failure

Application Software

Computer Programs

Generic Software

Software Engineering

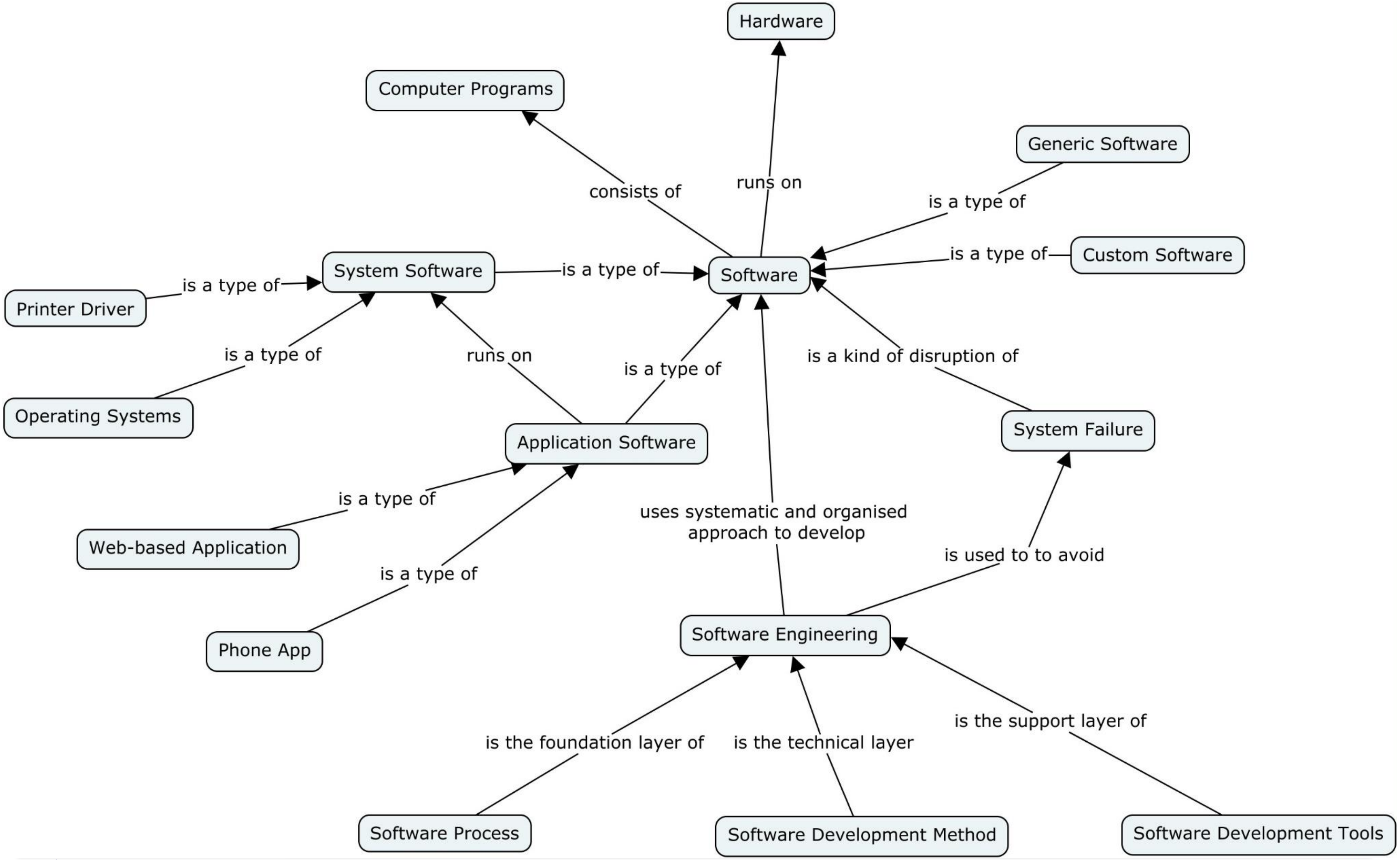
Phone App

Software Process

Software Development Tools

Web-based Application

Concept Map Example



Question

Generic Software and *Custom Software* are the basic two types of software products. However, the distinction between the two types of software products is becoming increasingly blurred. Explain this statement with an example.

Model answers

These are two good answers of the question.

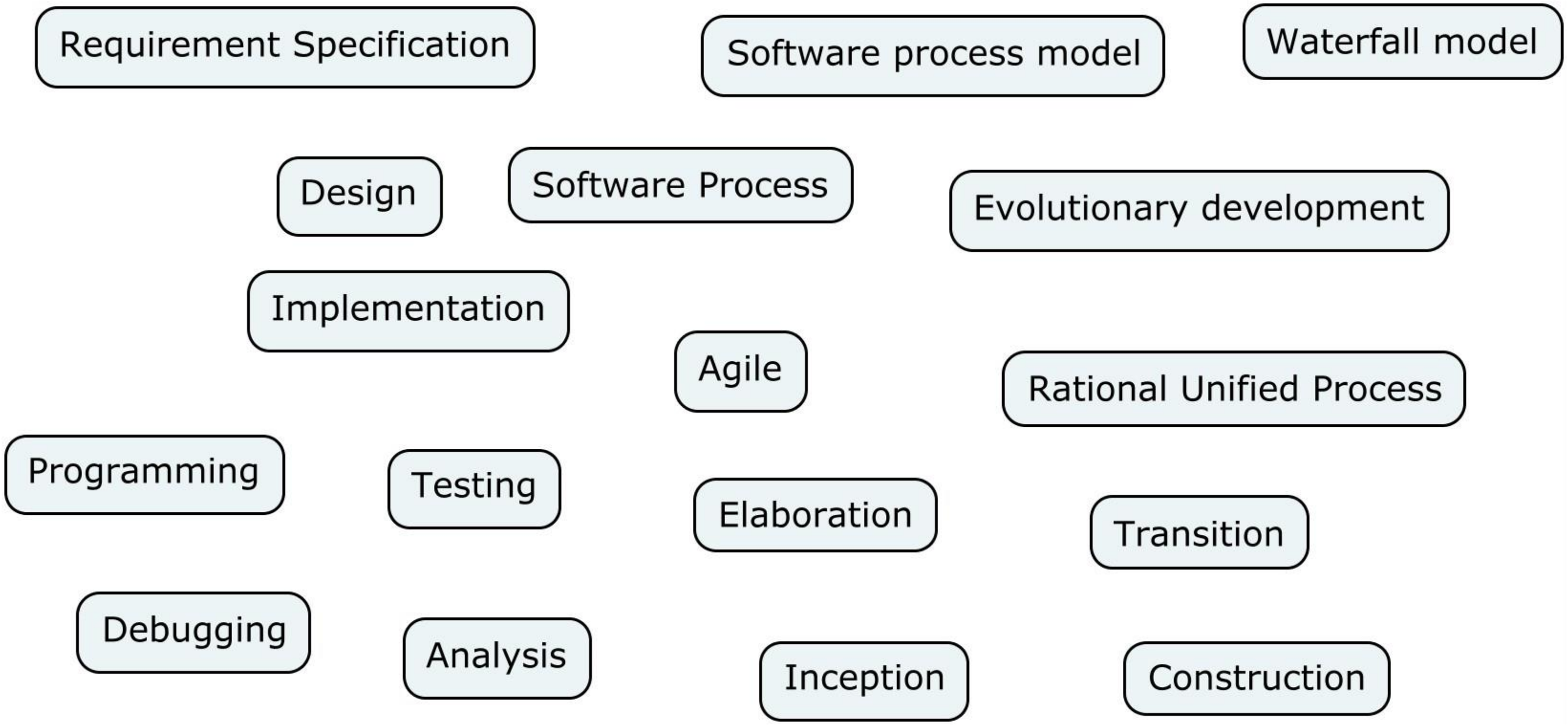
1. Software companies are starting with a generic system and customising it to the needs of a particular customer. For example, Moodle is a generic learning platform to create learning environment and QMPlus is a customised version of Moodle used in QMUL.

2. Software products are delivered as standard software and can be adjusted to the specific needs of the customer. An example is the SAP. SAP is a generic enterprise resource planning software and many companies use the customised version for their specific needs.

Software Processes

Concept Map

Draw a concept map (linking the following concepts together)



Requirement Specification

Software process model

Waterfall model

Design

Software Process

Evolutionary development

Implementation

Agile

Rational Unified Process

Programming

Testing

Elaboration

Transition

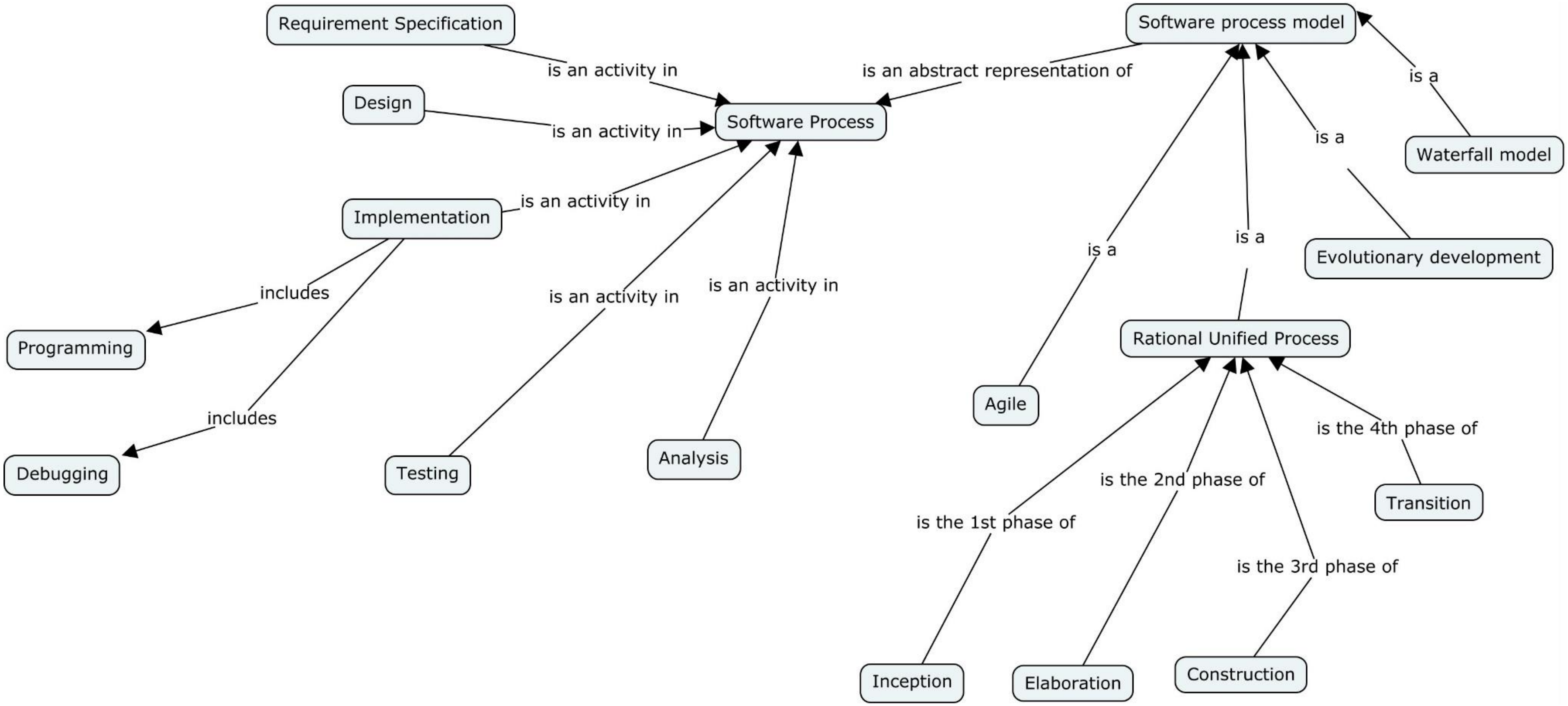
Debugging

Analysis

Inception

Construction

Concept Map Example



Question

Suggest the most appropriate software process that might be used as a basis for developing a system to control anti-lock braking in a car. Give your reasons.

Model answer

A waterfall model is the most appropriate process to use. Because anti-lock braking system is a safety-critical system. so requires a lot of up-front analysis before implementation. Waterfall model is a plan-driven process with the requirements carefully analysed.

Agile Software Development

Concept Map

Draw a concept map (linking the following concepts together)

Iteration

Agile

Code

TDD

Rapid Software Development

End Users

Extreme Programming

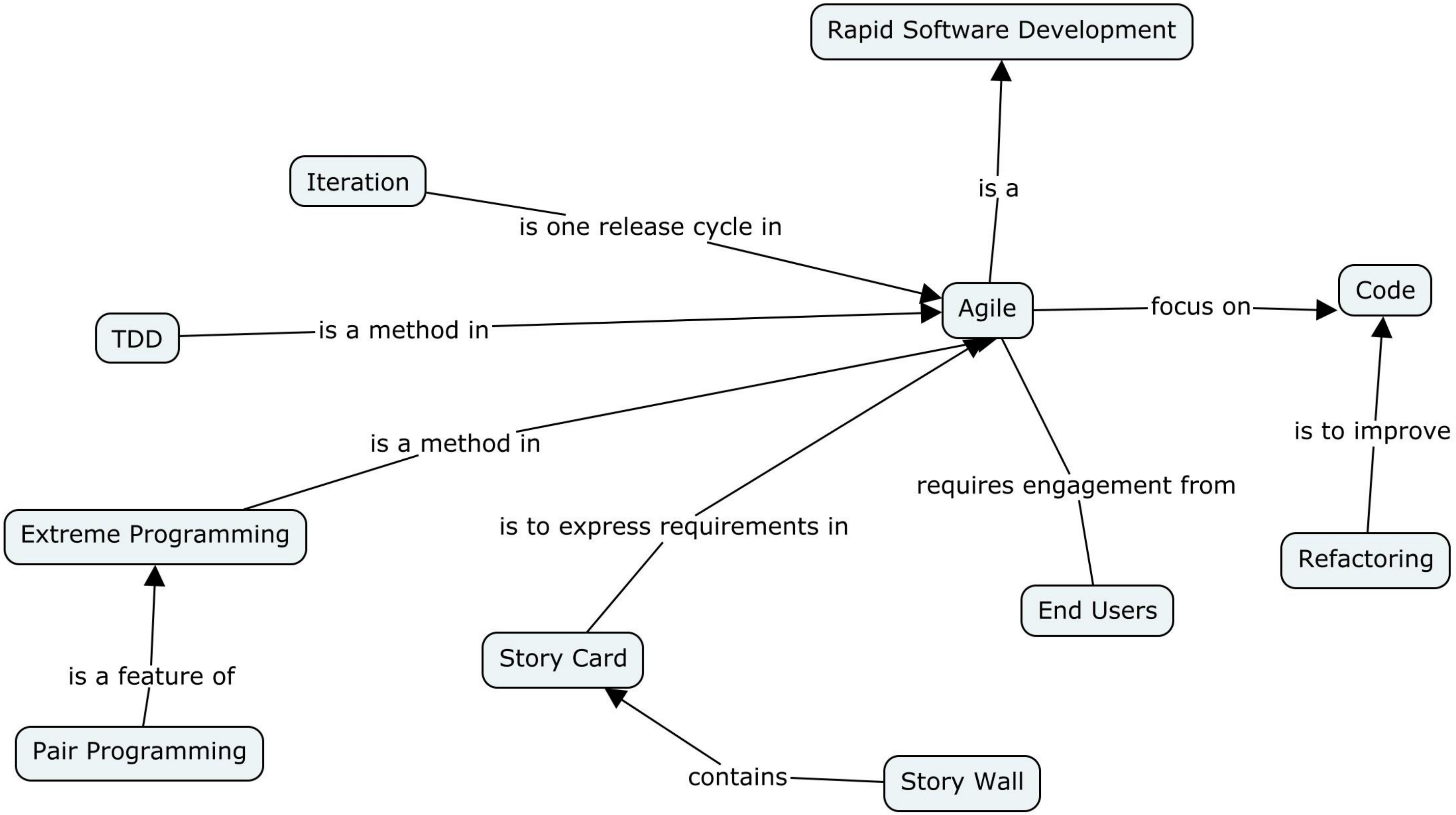
Refactoring

Story Wall

Pair Programming

Story Card

Concept Map Example



Question

Describe pair programming and discuss the advantages of pair programming.

Model answer

In pair programming, two programmers sitting together to develop code using one workstation.

This helps develop common ownership of code and spreads knowledge across the team.

It serves as an informal review process, as each line of code is looked at by more than 1 person.

It encourages refactoring, as the whole team can benefit from this.

Question: Is Agile suitable if…

1. It is not possible to get rapid feedback from customers.
2. The system can be developed with a small co-located team who can communicate informally.
3. It is a long-lifetime systems that requires more design documentation to communicate the original intentions of the system developers to the support team.
4. The development team is distributed or if part of the development is being outsourced.
5. A system has to be approved by an external regulator (e.g. the FAA approve software that is critical to the operation of an aircraft).

Model answer

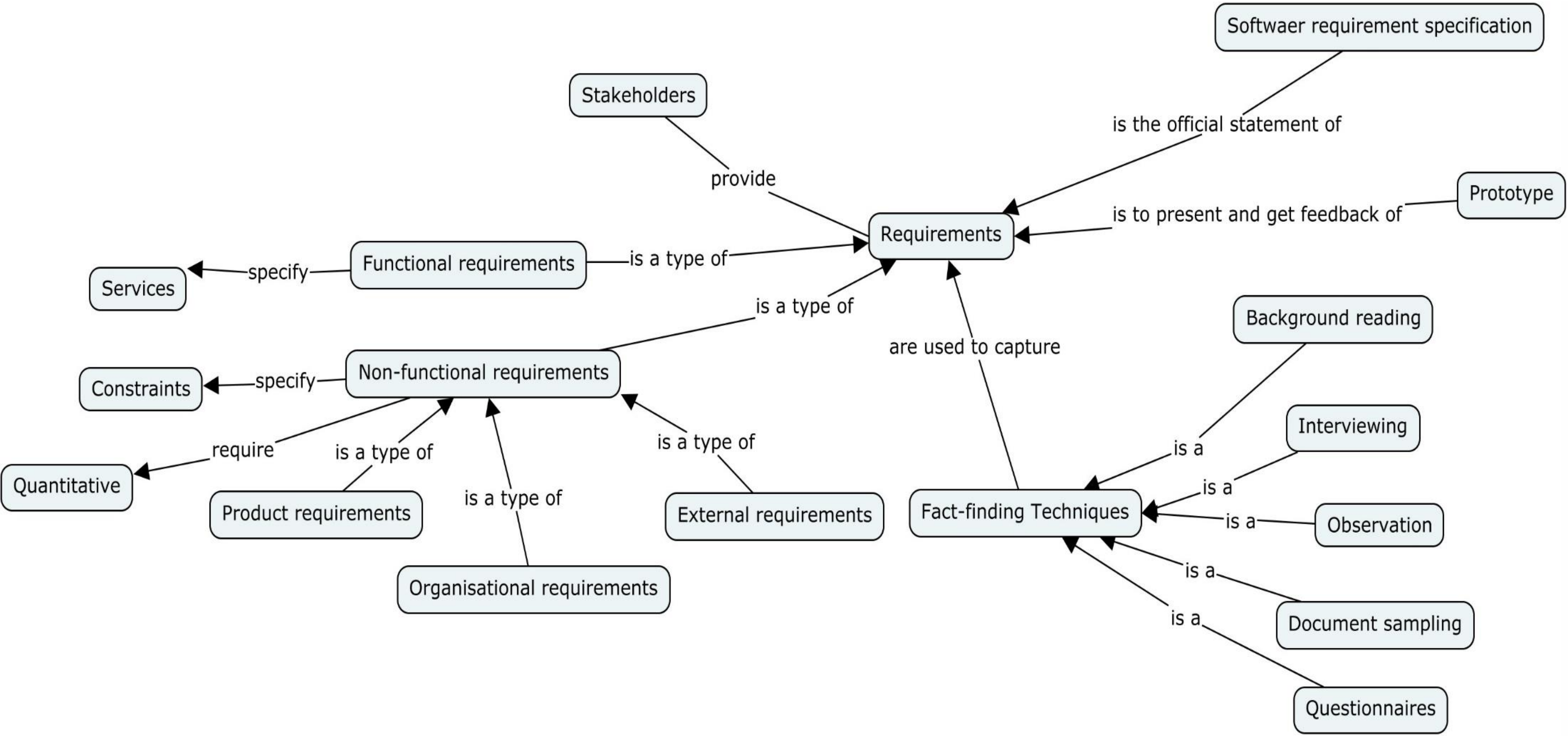
1. No. because customers involvement is the key of Agile.
2. Yes.
3. No. because Agile's focus is on working software, too many documents is not good for Agile.
4. Depends on if the communication is difficult or not.
5. No. because in order to get approved by external regulators, need to prepare a lot of documents.

Requirements

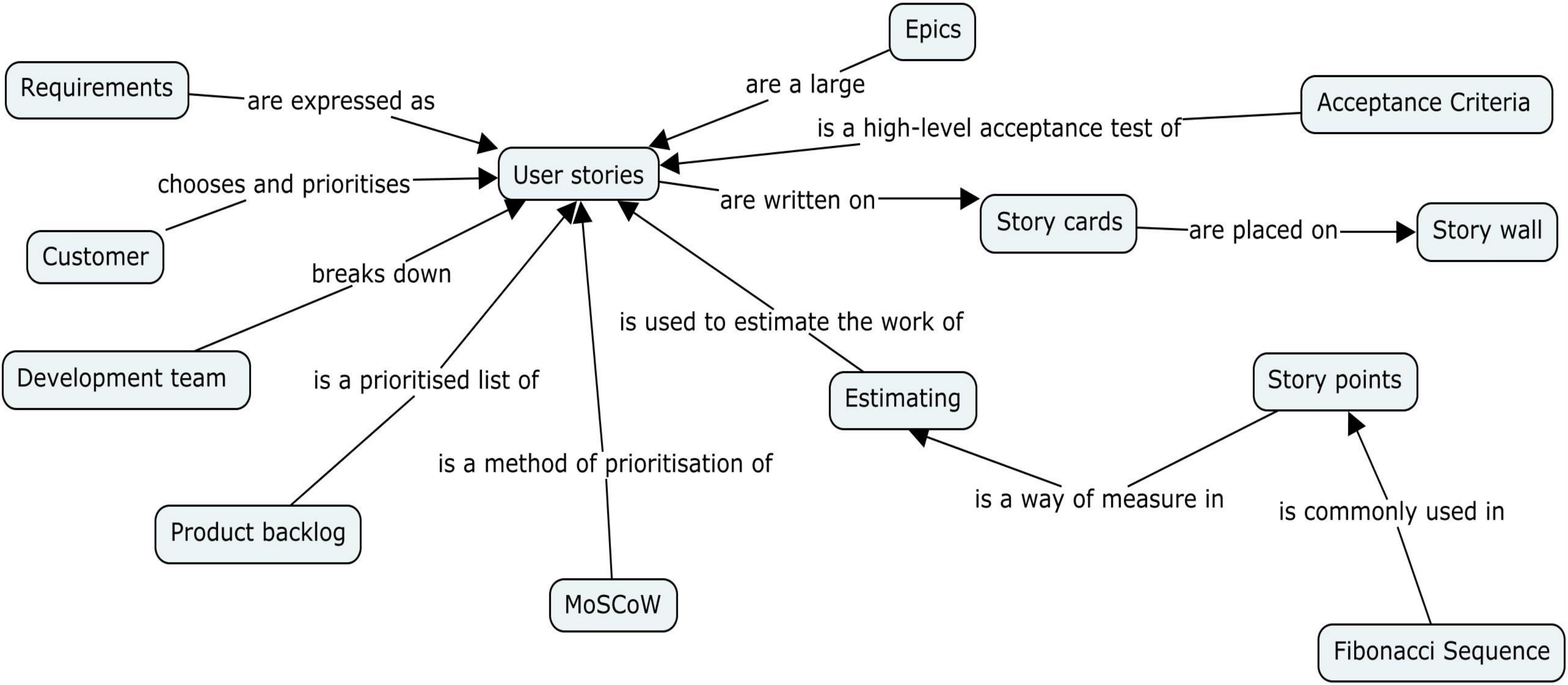
Concept Map

Identify the concepts and draw a concept map

Requirements in general



Requirements in Agile



Exercise – writing stories

Write a user story of “Withdraw Cash” on an ATM (Based on your own experience).

Model answer

As a customer, I insert my card into the machine. I am prompted for a PIN which is entered on the keypad. If correct, I am presented with a menu of options. The Withdraw Cash option is selected. I am promoted with a request for the amount of cash required and I input the amount. If there are sufficient funds in my account, the cash is dispensed, a receipt is printed and the account balance is updated. Before(or maybe after) the cash is dispensed, the card is returned.

Question

“*The software should be portable.*” Is it a functional requirement or a non-functional requirement? What is the problem with this requirement statement? Re-write the statement to correct the problem.

Possible answers

It is a non-functional requirement.

The problem is that it is not Verifiable.

- “The software should be able to run on 3 different operating systems.” OR
- “The software should be able to run on 90% of the operating systems in the market”. OR
- “The software should be able to run on both MacOS and Windows”.

Question

What is a sprint in Scrum?

Model answer

A sprint is a fixed length (or an iteration, typically 2 weeks) that corresponds to the development of a release of the system.