

1. a. Three types of UML diagrams: Activity, Sequence, Timing.

b.

(i) Define AI: artificial intelligence (AI) is the ability of a machine or a computer program to think and learn. The concept of AI is based on the idea of building machines capable of thinking, acting, and learning like humans. Further explanation can mention some requirements for a machine to be considered as AI: firstly it should be able to mimic human thought process and behaviour, and secondly it behaves similarly to a human: in an intelligent, rational and ethical way.

(ii) Three user stories:

+ As a frequent user of Netflix, I want to have a recommendation of films related to those I often watch so that I can save my time researching.

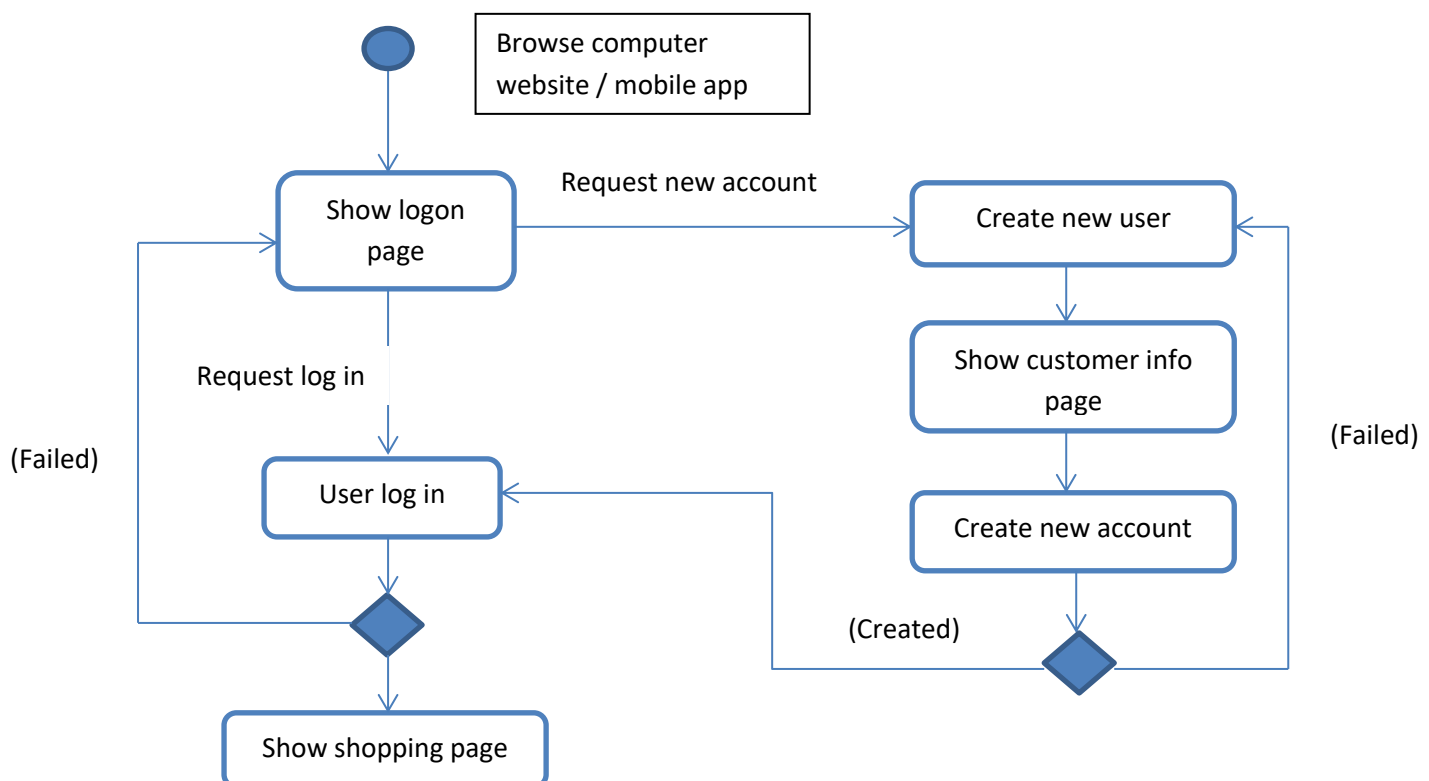
+ As a big manufacturer of circuit boards, I want to limit/detect microscopic defects as many as possible so that the quality of products is ensured.

+ As a supply chain executive, I want to detect the patterns of demand for products in different countries and time so that I can predict market demand and better prepare inventory.

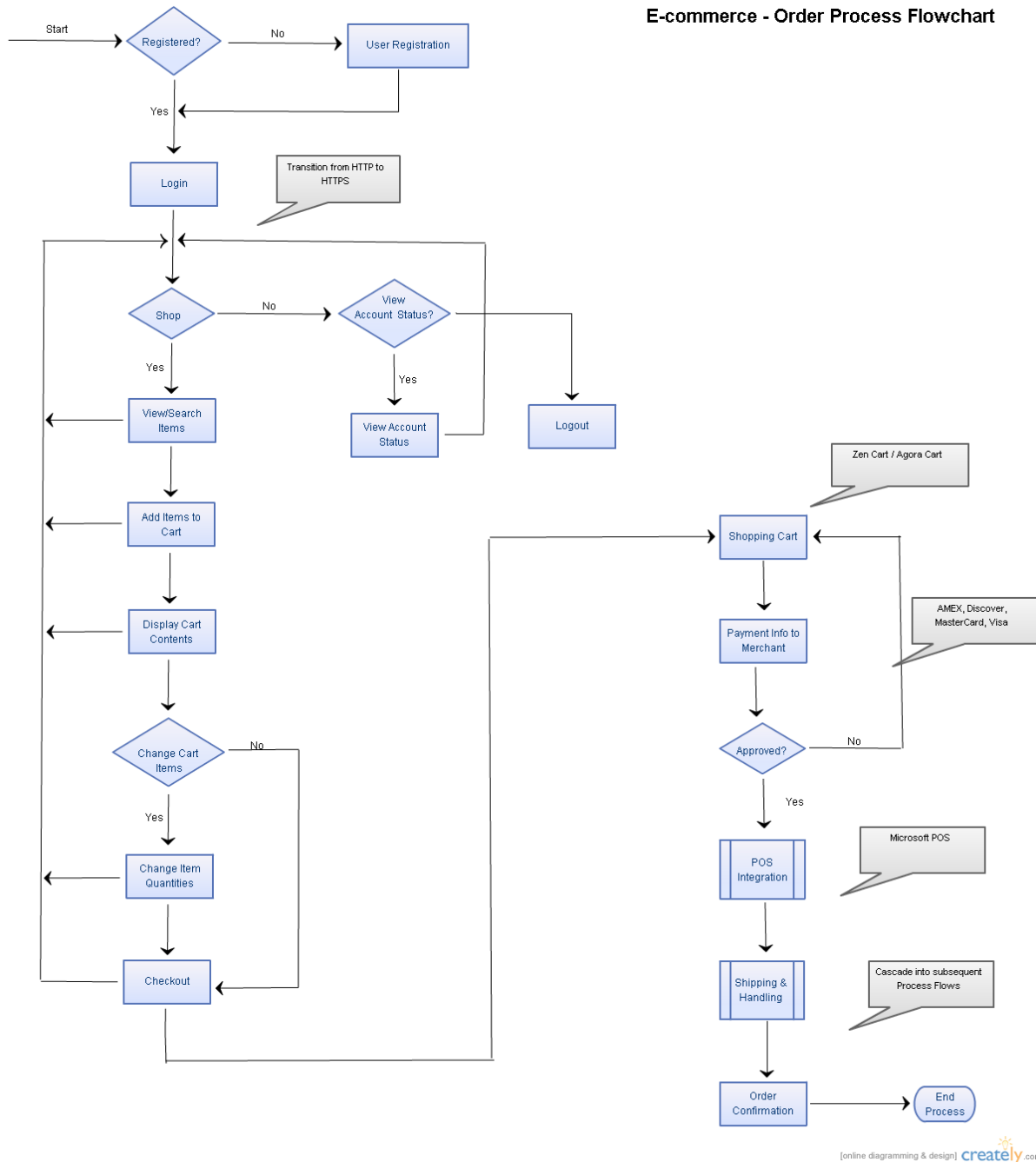
(iii) There is a gap between the business requirements and the actual software, that is for end-users, their needs are expressed in normal terms and explanations, while for programmers and actual software, they speak in programming languages (java,..) Hence, to overcome this gap, there is a systematic approach to translate user requirements via modelling.

By using models, new or existing systems can be visualized, hence decisions to project stakeholders can be communicated and documented. In this way, both Business and IT team can speak on the same term and voice out any changes or problems arising without any confusion. End-users can also see the progress of the work and make any special requirements or changes in time. In the software development life cycle, the model is transparent and can be testified at any time, boosting the continuous availability and optimize the work load on system.

2. a. Diagram below illustrate the registration process, for the rest part can check picture 2



E-commerce - Order Process Flowchart



(b) Four technological areas:

- + Software: Firstly before starting development, we have to decide on the software development lifecycle model to be used (waterfall, v model, agile,...) Secondly make effort to understand the user stories about requirements from Business team. After deciding, adopt UML as a tool for analysis, design and implementation of software development (probably using activity diagram)
- + Data Application: Selecting what is the best language to code and programme (XML/JSON – which is readable by humans and machines)
- + Hardware: Because the platform can be accessed by both web browsers and phone app, the IT team can consider using PaaS to start improving from the infrastructure. One consideration is the screen size limitations of mobile phones, how to arrange the shopping page to suit the customer's eyes,...

+ Security: How to build up security – which is the security management methods to be used (encryption, authentication...) to safeguard customer's information and most important: security of payment.

(c). Encryption:

Encryption is a security management technique to protect against security threats. It transforms data into cypher text readable by only sender and receiver, hence securing stored information and information transmission.

It provides message integrity, non-repudiation, confidentiality and authentication.

*Securing the communication channel: By using encryption, the client can be assured that the server sending the information (The company) is in fact the genuine party, thereby eliminating the chance of someone between intercepting and changing the data en route. The users' credentials can also be protected in the same way.

Q3. If you study MT4002 Project Management, you can apply what you have learnt into this question. The answer below only serves as a guideline.

a. What I would discuss with them:

- What is the company's goal and vision?
- What is the objective and requirements of the project? How clear is the object? Has the object aligned with company's goal and strategy?
- How is the senior management support and who will be involved in the project?
- How users would be involved in this project?
- How much technical expertise is needed?
- Who is the sponsor for the project and how is their profile? (In case the sponsor doesn't want to pour money in)
- How detailed can estimations be?
- How is different corporate functions and teams (Business and IT) going to cooperate in the project? (can mention project management structure and PJ teams,...)

b. How would I assist to evaluate the project's viability: I would help to develop a project plan, with estimation on the time, budget and performance. Benchmarking ratios would also be developed to measure the factors against. Also, a risk assessment has to be carried out to identify any risks associated with the project and have corresponding risk response.

For financial viability, I would use NPV (Net Present Value). Net Present Value discounts all past cash flows and takes time 0 as the basis for working out the returns. It calculates present value of net cash inflow based on minimum rate of return. Another method can be used is Payback model, measuring the time taken to recover the project investment.

c. What to do to ensure successful project:

1. Employ proper project management practices with suitably qualified project manager
2. Set clear objectives at the outset and review constantly at short intervals – **some changes may be necessary.**
3. Clarify requirements clearly and don't jump in and get into a technology rush
4. Keep requirement changes to a minimum by managing the users
5. Get users involved from the start of the project
 - success is only if the users want and use the system
 - Use JAD (Joint Application Design) and/or Agile methodology
6. Design with flexibility and durability in mind
 - technology changes very fast and so adapt
 - once project is implemented, the life span must justify the development
 - keep deliverables short and measure returns continuously
7. Avoid "bleeding edge" technology as much as possible. Leading edge technology is more proven
8. Have suitable technical expertise on board
9. Have business domain member(s) on board
10. Make sure the project sponsor is strong with relevant authority and responsibility
11. Keep vendors in the project to a minimum
 - vendor management is a major issue
 - each vendor involvement is a mini-project
 - if multiple vendors are involved, variables increase and hence the exponential increase in the complexity of the project

If problems regarding scope, budget or time happen,

1. Re-draw the project plan taking into account the changes
2. Sponsors and users must be involved
3. Check if the project can still attain some success albeit not entirely the same as the original charter
4. Check if the incremental costs justify the new returns

How I would deem the project to be successful:

1. Meets objectives: It must have clearly defined and measurable objectives
2. On time: It must have a clearly defined time schedule
3. On budget: It must work within established budgets.

Q4.

a. Four main causes of increased globalisation

1. Improvements in transportation

- Economies of scale mean the cost per item reduces
- Transport improvements also mean that goods and people can travel more quickly

2. Freedom of trade

- free trade between countries, e.g. AEC 2015

3. Improvements of communications

- the internet and mobile technology enable cross border communication

4. Labour availability and skills

- Tapping on global resources for complimentary skills. e.g. Labour-intensive industries such as clothing can take advantage of cheaper labour costs and exchange of technological knowhow with the advance nations

b. Challenges of globalisation and how IT can solve

- Increased Competition
- Price Challenges
- Manpower Challenges
- Rising Costs both locally and globally

IT is utilized to provide accurate, timely and reliable information, which is the key to automation and optimisation, hence increase productivity. With this, they can increase their competitiveness and deal with price and labour challenges.

c. 3 critical types of flow in SCM

- Material flow is the transportation of raw materials, parts, components, integrated objects and final products from the supplier downstream to the customer in the supply chain.
- Information flow is the movement of information between various parties engaged in the Supply Chain, including shipper and consignees, banks,...
- Financial flow consists of credit terms, payment schedules, and consignment and title ownership arrangements.

d. How relevant technologies can facilitate

+ Physical Flow:

- GPS tracking of vehicles and containers

- Continuous tracking and tracing
- mapping of vehicles and containers against planned flow
- detect unauthorized diversion and re-routing

- prevent tampering and replacement of goods
 - **RFID on cargo or pallets**
- Accurate information on scanning
- Real-Time tracking
- Temperature detection and movement sensors
- Tamper detect/evident and even tamper proof
- + Financial Flow:
 - Telegraphic Transfer
 - Open Account online
 - Letter of Credit
 - Credit / Debit Card to pay freight /hire
- + Information flow:
 - Using emails, information exchange platforms to pass LC, Invoice and supporting documents to different parties
 - Using platforms (websites, apps,..) to check order processing and current status of orders.

Q4.

a. Business process Re-engineering

Example 1: In the 1980s, the American automobile industry was in a depression, and in an attempt to cut costs, Ford decided to scrutinize some of their departments in an attempt to find inefficient processes. One of their findings was that the accounts payable department was not as efficient as it could be: their accounts payable division consisted of 500 people, as opposed to Mazda's 5.

Then, Ford launched a BPR initiative to figure out why was the department so overstaffed. So, as is the case with BPR, Ford completely recreated the process digitally. Now instead of having the purchasing department pass the purchase order copy around to relevant departments, they put everything in database:

1. Purchasing issues an order and inputs it into an online database.
2. Material control receives the goods and cross-references with the database to make sure it matches an order.
3. If there's a match, material control accepts the order on the computer.

Example 2:

One of the great problems teachers face is the student's writing, which is often unintelligible, brought on by the students' weariness to write by hand. The solution is the application of evidence through electronic forms in notebooks where students can type, as well as having access to other tools that assist in their answers, such as spreadsheets.

To prevent students from querying improperly, these devices don't have a wi-fi or internet enabled connection. They're simple (and low-cost) devices in which the students upload the tests via pen-drive and then the teacher collects them. The teacher then connects the data to a system that helps

them correct the tests (without needing to interpret the writing), share comments with students, access performance statistics, and access a database of questions that helps to develop the tests.

b. Disruptive Innovation:

+ Four examples:

- Motor cars invented in late 1800's and mass marketed by Ford (model-T) in 1900's has put an end to horse carts because of the convenience and speed.
- Mobile phones as a disruption to the fixed telephones with its convenience, mobility, size and functions
- From radio to cassettes and MP3 players
- Digital camera is a disruptive innovation to the traditional cameras because they are cheaper, easy to use hence adopted by a number of people. Its convenience is also higher that you do not have to go through so many processes from taking a picture, "wash" in the dark room, ... to get a photo anymore.

+ Lesson to be learnt:

Companies need to stay ahead and keep up with the changing technology. If you stay and do not want to change, even if there are ample evidence that a technology will soon be popular and disruptive, your products will be swept away like Kodak, Nokia,...

c. Main attributes of Blockchain :

- Open to inspection by all
- Distributed System
- Distributed Ledger
- Immutable – PKI based encryption; blocks are hashed
- Mining – No central authority but by consensus
- Transactions are blocked
- Blocks are chained

Merits of Blockchain:

- ***Decentralized System.***

The core value of blockchain is to enable a database to be directly shared without a central administrator. If any data stored in the memory and disk of a particular computer system run by a third party even if it is a trusted organization like banks and governments, it is vulnerable to access by anyone who gets into that system can easily corrupt the data within.

- ***Blockchain is Transparent.***

Any data in the blockchain can be viewable for any person if any changes were made in the blockchain those changes are publicly viewable. That's why blockchain used in cryptocurrencies because every transaction is recorded and showed to the public.

- ***Blockchain is More Secure.***

Blockchain is more secure to store data than any other 3rd party systems, because it uses cryptography.

- ***Faster and Cost Effective.***

If you used any cross-border transactions and/or between banks can take days and be quite expensive. But in the case of blockchain based cryptocurrency transactions, you are able to send money to anywhere and to anyone in the world because blockchain is decentralized and no paper works needed.

- ***It Can Record Historical and Current Records In One Place.***

Unlike regular databases, blockchains contain every single block of information, from the beginning of time until just a few minutes ago. That's why Blockchain is very helpful to store huge records and manage them.

Disadvantages Of Blockchain.

- ***Complexity.***

The blockchain is not as simple as it looks like, non-techie or old generation people cannot understand this technology easily.

- ***Size of Blockchain.***

Everyday when new transactions happen data are recorded to blockchain so blockchain grows every second.

- ***Need More Resources.***

Blockchain network requires nodes to run, old and famous network have enough nodes to run their network but new blockchain facing the problem of lack the number of nodes to facilitate widespread usage, and nodes need more reward for their participation in the network.

Also, nodes are giving their time and energy to the network to run efficiently so they expect a high return, therefore, any new blockchain network need more initial resources to facilitate nodes and take care of other security measures.

- ***Human Errors.***

As information recorded into blockchain is quite hard to change, the data going into the database needs to be 100% sure and correct if any mistake happens with data then it cannot be altered.

Also, most of the blockchain is access through Private Key if the private key is lost then it is almost impossible to access the network, so this technology needs more accuracy than any system.