



UNIVERSITY OF MINES AND TECHNOLOGY, TARKWA
SECOND SEMESTER EXAMINATIONS, MAY 2018

COURSE NO: CE 276
COURSE NAME: SOFTWARE ENGINEERING
CLASS: CE II **TIME:** 3 hrs

Name: _____ Index Number: _____

Answer all questions in sections A and B and any one question in the section C

Section A (Answer all the question. Each question carries 0.5 mark)

1. As part of the software process activities preceding the development of the software product, which of the following activities authorizes and justifies the progress status of the software project.
 - a. Feasibility Studies
 - b. Requirement Validation
 - c. Project Charter
 - d. Requirement Validation

2. The organized process or set of steps that needs to be followed to develop an information system is known as the
 - a. Analytic cycle
 - b. Program Specification
 - c. Design cycle
 - d. Software development Lifecycle

3. The XYZ oil firm has come up with an expectation to develop embedded system software to monitor oil rig pressure levels. The software engineering team working on this software project does not get the expectation of the client into much detail and have decided to interleave the specification, development and validation to come up with subsequent version to meet the client's expectations. However, the client insists the project should be a document driven one. What Software Process Model best suits this project.
 - a. Incremental Development Process Model
 - b. Waterfall Development Process Model
 - c. Evolutionary Development Process Model
 - d. Spiral Development Process Model

4. The CE 2 class desires to develop a restaurant android application to enable lecturers order food from the UMaT senior club house. In addition they want to add a map service direct the courier to their respective department after ordering. CE 2 software engineering team does not want to code the map functionality from scratch and have decided to integrate google map API into their application. What Software engineering development process model best suit this project.
 - a. Re-use oriented development process model
 - b. Document driven approach development process model
 - c. Waterfall development process mode
 - d. Spiral development process model
5. The implementation of generalization in object-oriented language are possible because of which of the following properties of class diagrams
 - a. Encapsulation
 - b. Inheritance
 - c. Association
 - d. Aggregation
6. Which of the following is not considered as a software process activity except
 - a. Management
 - b. Validation
 - c. Evolution
 - d. Design
7. In UML class diagram when an object is part of another object such that the dependent object cannot exist without the existence of the independent object. This concept is known as
 - a. Aggregation
 - b. Composition
 - c. Encapsulation
 - d. Inheritance
8. The process that helps to visualize your software design and check it against requirements before coding
 - a. System Specification
 - b. Requirement Documentation
 - c. Development

- d. Modelling
9. The design team of the Life Hope Groups software project wants to model diverse perspective of the system to facilitate discussion about the system they want to propose and existing systems to top management. Which of the following system modelling representation would help them depict the boundaries of the software project?
- a. Sequence Diagram
 - b. State Diagram
 - c. Activity Diagram
 - d. Context Diagram
10. The company developing the procurement management system for Life Hope Groups is clearly aware that their requirement engineering processes are inevitable to changes if they perform it using the agile approach. To control rework cost as a result of unnecessary changes, managements needs a strategy. Give the name of the strategy to control such iterations
- a. Scope Creeping
 - b. Requirement Management
 - c. Gold plating
 - d. Change Control Process system
11. The ability of software to adapt to changing customer and market requirements is referred to as?
- a. Evolution
 - b. Validation
 - c. Adaptation
 - d. Remark
12. After the requirement elicitation, which of the following is not part of the techniques that could be useful to validate the gathered requirements?
- a. Requirement Reviews
 - b. Path Analysis
 - c. Prototyping
 - d. Test-case Generations
13. As part of the software development lifecycle, changes are inevitable. Any change done to the software product incurs extra cost for rework. Which of the following is the best approach to reduce rework cost?

- a. Developing the software product incrementally.
 - b. Developing the software product using the waterfall software development process model.
 - c. Setting a concrete change management process system
 - d. None of the above
14. After the development of a Procurement Management software product for Life Hope Groups, the acceptance testing is not going as planned. The company is of the view that, the development team did not develop the system they need. On the other hand the development team claims they developed the software as per the content within the requirement documentation. Which of the following best describes the cause of this challenge
- a. The requirements in the requirement documentation are not traceable.
 - b. The requirement documentation was not validated before the design and development
 - c. The design and development team did not verify the development of the software product against the requirement documentation
 - d. None of the above
15. Which of the following does not model the structure of the software system i.e. specifying the relationship between the components making up the system?
- a. Monolithic Architecture
 - b. Class Diagram
 - c. Object Diagram
 - d. Sequence Diagram
16. The CE 2 students have agreed to follow rigorous Software engineering processes for the upcoming *CampusAdeton Website* for UMaT during their 3 months break. Performing such an endeavor as professional Software Engineers, they are bound within a legal and social framework within which they can operate freely. Which of the following is not a professional liability the team must comply to although not necessarily bound by law?
- a. Respecting the confidentiality of all stakeholders
 - b. Rightful representation of their competency levels
 - c. Adhering to all intellectual property rules
 - d. Using UMaT's internet facility to download video tutorials for the team

17. The IT department of the XYZ mining company would like to outsource their Human Resource Management systems to CE2 as a terminal project. During the project initiation stage the CE2 team leader inquire from the IT manager about their proprietary software processes. The IT department seems not to have any idea about that and asks the leader to furnish them with the types of software processes. Which of the following should not be included in their presentation
- Software Development Process
 - Software development Process Management
 - Software development project Management
 - Software development change and configuration management
18. The IT department of the XYZ mining company would like to outsource their Human Resource Management systems to CE2 as a terminal project. During the project initiation stage, the IT manager asks the CE2 team leader what four fundamental process activities should the process that yields the software include:
- Waterfall, Iterative, Evolutionary and Spiral Process Models
 - Scope, Cost, Schedule and Quality activities
 - Initiating, Executing, Monitoring and controlling and closing the project
 - Specification, Development, Validation and Evolution of the software
19. Which of the following deliverables acts as inputs to the requirement gathering and analysis process activity of the Linear Software development Process Model
- Requirement Document
 - Project Plan and Feasibility Reports
 - System design and detailed design document
 - Software requirement specification
20. The Prototyping software development process model starts with Requirement Gathering activity followed by the Quick Design, Refining Prototype, Customer Evaluation, Building Prototype activities and ends with the Engineering product activity. Which of the activities iterate and in what sequence?
- Quick Design, Building Prototype, Customer Evaluation, Refining Prototype activities
 - Quick Design, Refining Prototype, Customer Evaluation, Building Prototype
 - Refining Prototype, Customer Evaluation, Building Prototype and Engineering product activity
 - Requirement Gathering, Refining Prototype, Customer Evaluation, Building Prototype
21. The CE2 Software Engineering team is developing a complex clinical management system for Goldfields Ghana limited. The complexity of the system is new to both the client and

development party making the project highly risky. The IT department of Goldfields follows strict document driven software development approach. However, CE2 is well aware that this development approach is not ideal. What development process model should CE2 recommend which is closely related document driven software development process model.

- a. Water Fall Process Model
 - b. Spiral Process Model
 - c. Prototyping Process Model
 - d. Evolutionary Process Model
22. The CE2 Software Engineering team is developing an embed system to remotely control AngloGold Ashanti underground mine conveyor belt system. This would be the first of such project in Ghana underground mines. The team believes the Prototyping Software development process model best suites this project. However, the AngloGold Ashanti IT department project manager needs a justification for the chosen process model. Which of the following should not be used by the CE2 Software Engineering team as a justification?
- a. Increased user involvement in the product even before its implementation.
 - b. Reduces time and cost as the defects can be detected much earlier.
 - c. The increase the complexity of the system as scope of the system may expand beyond original plans.
 - d. Quicker user feedback is available leading to better solutions.
23. The CE2 Software Engineering team is developing an embed system to remotely control AngloGold Ashanti underground mine conveyor belt system. This would be the first of such project in Ghana underground mines. The team believes the Prototyping Software development process model best suites this project. Which of the following is not a software prototype CE2 Software Engineering team should consider?
- a. Throwaway Prototyping
 - b. Breadboard Prototyping
 - c. Incremental Prototyping
 - d. Gingerboard Prototyping
24. The CE2 Software Engineering team is developing an embed system to remotely control AngloGold Ashanti underground mine gold processing automation system. The Mining Company follows strict waterfall development process models for their projects. CE2 Software Engineering agile development is accustomed to the evolutionary development

process. Before the project commences the two parties have agreed to merge the two process models. Which software development process model is a sandwich of the evolutionary and waterfall development processes

- a. Spiral Software Development Process Model
- b. Ginerboard Software Development Process Model
- c. Incremental Software Development Process Model
- d. Prototyping Software Development Process Model

25. The Spiral Software process activities are organized in a spiral (coil) constituting of many cycles. Four quadrant in each cycle includes

- a. Planning, Engineering, Evolution and Evaluation
- b. Planning, Risk Analysis, Engineering and Evolution
- c. Planning, Risk Analysis, Engineering and Evaluation
- d. Planning, Engineering, Risk Analysis, Development

26. The IT department of Goldfields Ghana limited is working on an Enterprise Resource Management system. It is a large project and they are outsourcing the requirement collection to the CE2 Software engineering team. The team acknowledges there are quite a handful of requirement to gather; hence they plan to classify the requirement to allow further refinement and details elaboration. Which of the following would not be considered as requirement classification?

- a. Business Requirement,
- b. Solution Requirement
- c. Project Requirement
- d. Project Requirement

27. The IT department of Goldfields Ghana limited is working on an Enterprise Resource Management system. It is a large project and they are outsourcing the requirement collection to the CE2 Software engineering team. The team's requirement elicitation would focus on temporary capabilities including training, data conversion, morphing of current software system into future software; and also the features, functions, and characteristics of the software product that would meet the business and stakeholder requirements. The requirements to be gathered can be classified as

- a. Solution Requirement and Business Requirement
- b. Transition Requirement and Solution Requirement
- c. Quality Requirement and Transition Requirement

- d. Solution Requirement and Process Requirement
28. The IT department of Goldfields Ghana limited is working on a Human Resource Management system. While discussing the project with stakeholders, the project manager realizes she would need to document and trace the source the source of requirement from stakeholders. Which two documents would help facilitate this objective
- a. Requirement specification document and Stakeholder Register
 - b. Stakeholder Register and Work Breakdown Structure document
 - c. Requirement Identification Matric and Stakeholder Register
 - d. Stakeholder Register and Requirement Traceability Matric
29. The requirements engineering process is a structured set of activities that is done to develop, validate and maintain a system requirements document. The activities involved in this process are domain-specific; however, there are four activities which are fundamental to all requirements engineering process. The activities include?
- a. Requirement Elicitation, Requirement Analysis, Requirement Validation and Requirement Optimization
 - b. Requirement Management, Requirement Analysis, Requirement Validation and Requirement Quality
 - c. Requirement Gathering, Requirement Analysis, Requirement Validation and Requirement Management
 - d. Requirement Elicitation, Requirement Analysis, Requirement Validation and Requirement Traceability
30. The Software Project Statement of Work is a narrative description of the software products/ services or result to be delivered by the project. Which of the following is not referenced in the Software Project Statement of Work
- a. Product Description which describes and document the characteristics of the software product the software project would create
 - b. Strategic Plan which documents the organization's strategic vision, mission, goal and objectives
 - c. The Business Need of the Software product
 - d. The Project Description
31. The CE2 Software Engineering team is developing a staff welfare management system for the computer science and engineering department of UMaT. How can the project manager track the requirement throughout the life-cycle of the software project?
- a. Project Statement of Work
 - b. Stakeholder Requirements
 - c. Stakeholder Register

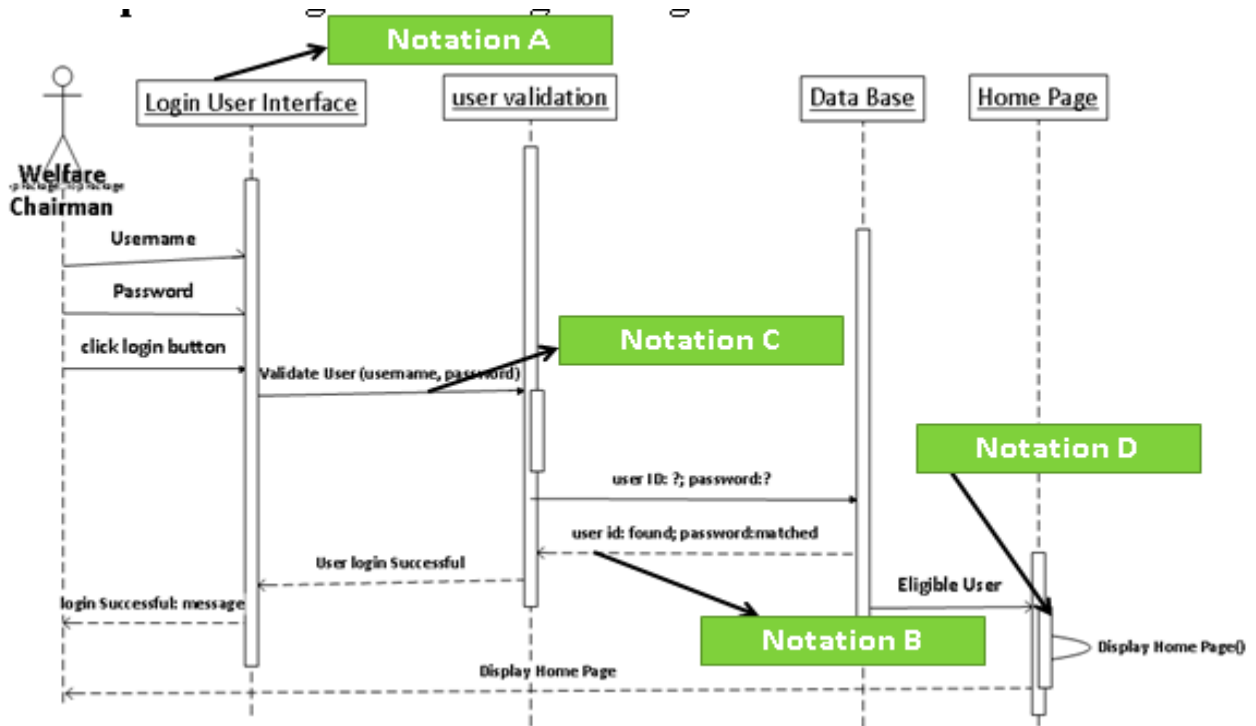
- d. Requirement Traceability Matrix
32. The University of Mines and Technology can initiate any software project which management believe is rightly in line with the organization strategic objectives. The business cases for such projects can be created as a result of all the following except
- a. Organizational Need
 - b. Student Requests
 - c. Technological Advancement
 - d. Litigation Requirement
33. Feasibility Studies is defined as the practical extent to which a project can be performed successfully. The objectives for which an organization would perform feasibility before commencing software projects includes all the following except:
- a. To analyze whether the software will meet organizational requirements
 - b. To determine whether the software can be implemented using the current technology and within the specified budget and schedule
 - c. To determine duration, cost and quality of the software project.
 - d. To determine whether the software can be integrated with other existing software.
34. Stakeholder analysis is a technique of systematically gathering and analyzing quantitative and qualitative information to determine whose interests should be taken into account throughout the software project. The classification models used for stakeholder analysis includes all the following except
- a. Power/ Influence Grid
 - b. Salience Model
 - c. Involvement/ Impact Grid
 - d. Power/ Impact Grid
35. The CE2 Software Engineering team is developing an embed system to remotely control AngloGold Ashanti underground mine conveyor belt system. The underground Manager is one stakeholder the CE2 team would be working with. The manger is aware of the project and its potential impact and actively engaged to ensure the project is a success. The engagement level of this stakeholder could be classified as
- a. Neutral
 - b. Unaware
 - c. Leading
 - d. Supportive
36. The CE2 Software Engineering team is developing an embed system to remotely control AngloGold Ashanti underground mine conveyor belt system. The underground Manager is one of the stakeholders the CE2 team would be working with. The Manager is unaware of

the project and its impact; however, he has high power and low interest in the project. Such a stakeholder should be.....on the project

- a. Monitored
 - b. Kept Satisfied
 - c. Managed Closely
 - d. Kept Informed
37. Which of the following is an output of the requirement engineering process
- a. Project Scope Statement
 - b. Work Breakdown Structure
 - c. Requirement Traceability Matrix
 - d. Change Request
38. Which of the following is not part of the Group Creativity activity during requirement elicitation process
- a. Focus Group
 - b. Idea Mapping
 - c. Multi-criteria decision analysis
 - d. Brainstorming
39. The CE2 Software Engineering team is developing an embed system to remotely control AngloGold Ashanti underground mine conveyor belt system. The team is actively involved in the requirement engineering process. Currently, they are performing consistency, validity, realism and completeness check on the gathered requirement thus far. Which activity of the of the requirement engineering process is the team performing?
- a. Requirements definition and specification
 - b. Domain Understanding
 - c. Conflict Resolution
 - d. Requirement Validation
40. The CE2 Software engineering team is developing Point of Sales for Kofi Ameyaw Enterprise. They have nominated two members of the team as requirement analysts with excellent communication skills and E-commerce knowledge. The analysts are considering modeling the dynamic behavior of the system and also context of the environment of the software system. The team is using the document driven software development process model. At which activity of the process is the team currently engaged in.
- a. System Design
 - b. Implementation
 - c. Customer Evaluation

- d. Requirement Gathering and analysis
41. The CE2 Software engineering team is developing a Hospital Management System for Effia Nkwanta Government hospital. The team is considering looking into various levels of the organization and how they interact via models and also demonstrate the flow of activities between stakeholder and interaction which allows outcomes to be achieved. Which of the following can best not be considered as process modeling tool for the purpose as explained above?
- a. Cross Functional Flow Diagram
 - b. Functional Flow Diagram
 - c. Sequence Diagram
 - d. Context Diagram
42. Which of the following is a process modelling tool to document the flow of activities performed by various stakeholders from initiation to termination to aid the breakdown of complex processes for further analysis
- a. Cross Functional Flow Diagram
 - b. Flow chart Diagram
 - c. Functional Flow Diagram
 - d. Use case Diagram
43. UML diagram is a visual modeling used to visualize, specify, construct and document software system. Which of the following UML does not represent the static aspect of a software system?
- a. Class Diagram
 - b. Component Diagram
 - c. Package Diagram
 - d. Communication Diagram
44. UML diagram is a visual modeling used to visualize, specify, construct and document software system. Which of the following UML does represent the dynamic aspect of a system?
- a. Class Diagram
 - b. Component
 - c. Deployment Diagram
 - d. Communication Diagram
45. In UML sequence diagram, lifelines interact with each other by sending messages or signals. The message types includes all the following except
- a. Reply Message

- b. Creation Message
- c. Asynchronous Message
- d. Response Message



46. With reference to the diagram above identify the Notation A
- a. Message
 - b. Lifeline
 - c. Deletion Message
 - d. Time Sequence
47. With reference to the diagram above identify the Notation B
- a. Synchronous Message
 - b. Asynchronous Message
 - c. Reply Message
 - d. Creation Message
48. With reference to the diagram above identify the Notation C
- a. Synchronous Message
 - b. Asynchronous Message
 - c. Reply Message

- d. Creation Message
49. With reference to the diagram above identify the Notation D
- a. Execution
 - b. Signals
 - c. Lifeline
 - d. Message
50. With reference to the diagram at which process activity within the waterfall process model is it practically used?
- a. Design
 - b. Verification
 - c. Maintenance
 - d. Implementation

Section B (Answer all the question. Each question carries 1 mark)

1. For every Software development project, the project manager must identify....., determine their requirement, interest, power and involvement; and then manage and influence those requirement to ensure a successful software project.
2. Feasibility Studies is defined as the practical extent to which a project can be performed successfully. Mention any two types of feasibility that are considered. and.....
3. Requirement elicitation activities are performed by individuals who possess good interpersonal skills particularly communication skills and good industry specific knowledge. Such individuals are known as.....
4. Stakeholder analysis is a technique of systematically gathering and analyzing quantitative and qualitative information to determine whose interests should be taken into account throughout the software project. Stakeholders with high power and high interest, how should they be engaged on the project.....
5. The CE2 Software Engineering team is developing an embed system to remotely control AngloGold Ashanti underground mine conveyor belt system. The underground Manager is one of the stakeholders the CE2 team would be working with. The Manager is aware of the project and its impact and is resistant to change; however, he has low power and high interest in the project. Such a stakeholder should be.....on the project.
6. Requirements validation is concerned with demonstrating that the requirements define the system that the customer really wants. Give on validation technique.
7. A data flow diagram is a graphical depiction of flow of data through intended software system and useful as it provides overview of data as well as functionality to software

designers. The generic technical components of the data flow diagrams includes external entities, processes,..... and

9. The OsloSinki Oil firm has outsourced their undersea exploration embedded robot to KiluTech. KiluTech is developing the embedded system program. KiluTech is at the stage of converting the intangible requirement into coding; however, before that, they are investigating into how the software system is to be structured. They can divide their design phase into two which include;and
10. After coming out with the system design models, the software engineering team has decided to let three of programmers translate the models into coding dependently and later to each other's codes during the testing phase. This form testing is known as
11. The level 1 data flow diagram is also known as context diagram. (True/ False)
12. Project stakeholders are individuals, groups, or organizations who must affect, be affected by, or perceive themselves to be affected by a decision, activity, or outcome of a project. (True/ False)
13. Stakeholder engagement throughout the life cycle of the project is critical to project success. The engagement level of the stakeholders includes Unaware, Leading, Supportive, Resistant and Biased. (True/ False)
14. Level 0 data flows can have multiple processes. (True/ False)
15. Software testing can prove the absence of any defects in the software system. (True/ False)
16. Kilu Tech has decided to outsource their E-commerce Application to CE2 Team. The client develops all their projects using the waterfall process model; and insists the team uses same as part of the requirement given. The project manager is insisting they start the testing as early as possible to reduce the cost and time of rework. Is the project manager right? (True/ False)
17. Quality assurance is more of product oriented and look at correcting software defects; and Quality control is process oriented which focuses on making the processes used to yield the software product. (True/ False)
18. Testability checks forms part of the software requirements validation process. (True/ False).
19. Software development does not stop once the software system has been developed delivered to the client. (True/ False)
20. Software Projects does not stop once the software system has been delivered to the client. (True/ False).

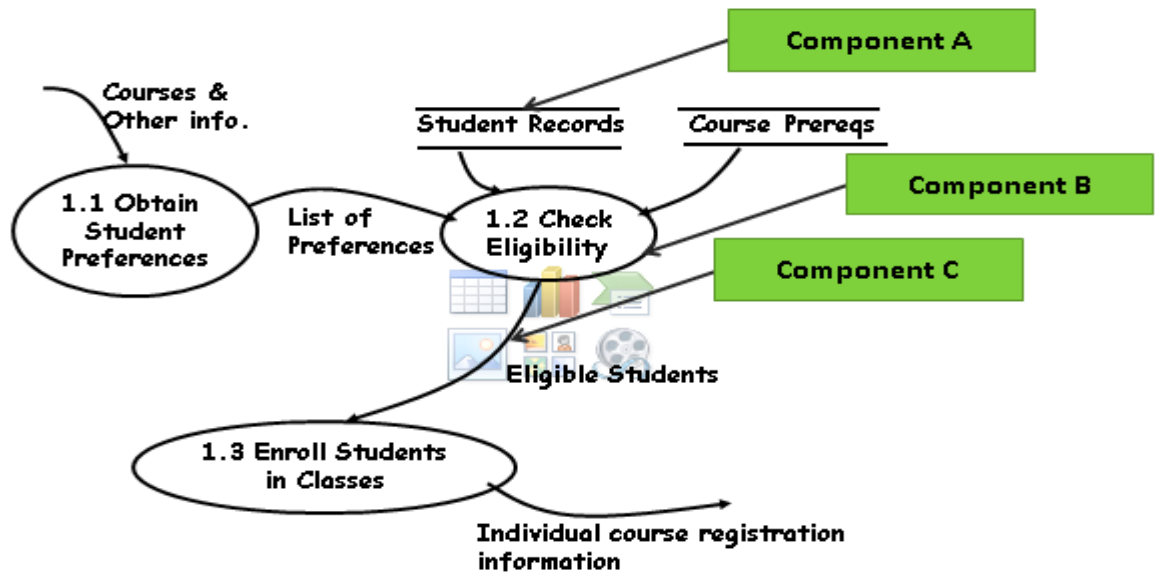
SECTION C (Answer one question. Each question carries 15 marks)

Question 1a

- (i) Briefly describe the Requirement Traceability Matrix? (1 mark)
- (ii) Provide two benefits of the RTM. (1 mark)
- (iii) Also provide two attributes which are included in the RTM. (1 marks)

Question 1b

- (i) A use case diagram is a graphic depiction of the interactions among the elements of a system. The use cases identifies the specific roles are played by the actors within and around the system. Briefly describe the generalization, include and exclude relationships between use cases of the use case diagram. (3 marks)
- (ii) With reference to the diagram below, Give the names of the components A, B and C and indicate the data flow level. (2 marks)



Question 1c

- (i) What is software architecture? (1 Mark)
- (ii) Provide 6 common items which one might want to specify in the high-level design phase. (3 Marks)
- (iii) What is the difference between monolithic architecture and one-tier architecture? (1 Mark)

- (iv) Suppose you are building a Life Hope Group procurement management system to run on only the procurement manager office laptop, which architecture would be appropriate? (1 mark)
- (v) Suppose you are building a Life Hope Group procurement management system to allow more employees other than the procurement manager alone access the system over a network connection, which architecture would be appropriate? (1 mark)

Question 2a

- (i) State and briefly describe any three categories of software maintenance you know according to the IEEE. (3 marks)
- (ii) Briefly describe static testing and mention two types of static testing (2 mark)
- (iii) Briefly explain Dynamic Testing and differentiate between black box and white box testing. (3 marks)
- (iv) Give two examples of black-box testing. (1 mark)

Question 2b

- (i) Briefly explain software maintenance. (1 Mark)
- (ii) What is regression testing? (1 mark)
- (iii) Give two aims of regression testing (1 mark)
- (iv) Mention two distinct goals of the software testing process. (2 marks)
- (v) Give one duty of an executive champion of a software project. (1 mark)

Examiners: R. K. Annan/