



**COLLEGE OF BUSINESS, PEACE, LEADERSHIP AND GOVERNANCE  
DEPARTMENT OF COMPUTER SCIENCE & INFORMATION SYSTEMS**

**COURSE TITLE: SOFTWARE ENGINEERING I**

**COURSE CODE: CSC401**

**FINAL EXAMINATION**

**SESSION: NOVEMBER/DECEMBER 2019**

**LECTURER: MUKHALELA B.U**

**TIME: 3 HOURS**

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**Instructions to Candidate**

1. This paper carries 6 questions
  2. Section A is compulsory, use allocated computer.
  3. Answer any 3 questions from Section B.
  4. Each question carries 25 marks.
  5. The marks for each question are indicated in square [] brackets.
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## Section A

[25 marks]

### Question 1

- a) Using Argo UML draw or model UML class diagrams to illustrate the following concepts used in Software engineering; use any meaningful example in your illustration.
- i) Generalization [3]
  - ii) Composition [3]
  - iii) Multiplicity [3]
  - iv) Aggregation [3]
- b) Imagine AU's academic affairs has approached for a system to assist productivity by automating their task. As a team member of the Software project, you have been tasked to come up with a Use-Case diagram to mimic the proposed systems. Be creative to include all necessary actors and their use cases for the system. You are hinted by a senior OO Analyst that the system will definitely show both <<include>> and <<extend>> relationships. [13]

## Section B

[75 marks]

### Question 2

- a) According to Goodenough [1979], execution based testing is a process of inferring certain behavioral properties of a product based, in part, on the results of executing the product in an known environment with selected inputs. Identify and briefly discuss the three troubling implication of this definition. Provide real-life examples where possible. [9]
- b) You are the SQA manager at Vusumuzi Softsystems, a regional chain of 754 software stores. Your organization is considering buying a stock-control package for use throughout the organization. Before authorizing the purchase of the package you have decide to test it thoroughly. What properties of the packages do you investigate? [10]
- c) After a presentation by a senior SQA expert on: fault, failure, defect and error in software products, a colleagues asked for an elaboration and similarities and or differences if any on these terms. [6]

### Question 3.

- a) Citing real-life examples, elaborate briefly three reasons for making changes to a software product, i.e. why post-delivery maintenance is necessary. [9]
- b) 'One of the more annoying aspects of post-delivery maintenance is that the maintainer is responsible for fixing other peoples mistakes.' With respect to this citation, narrate some of the duties of a maintenance programmer. [5]
- c) Software teams can be headed either as 'chief programmer' or 'democratic' styles. Which style of leadership do so see fit in today's software projects. [6]
- d) You are the manager in charge of post-delivery maintenance in a large software organization. What qualities do you look for when hiring new employees? [5]

### Question 4



- a) 'During the design of the iPod, Steve Jobs and his team had to hire an expert engineer, and work began on pulling together a software, screen and computer chips that a music player would need. Initially, Jobs had to meet with the Rapid prototype team every two or three weeks, but once the prototype(s) were built, he checked in every day. And every day there were things to fix.' Extract from the book; Steve jobs the man who thought different by Karen Blumenthal, Page 214.

**Required:**

- i) From the extract, it is suggested that Steve Jobs had to look at prototypes not only a prototype. What then does this brings to light about the two classifications of prototypes. **Hint:** Define them and marry to the extract. [4]
  - ii) Cite some of the reasons why Steve Jobs would have chosen to use prototyping other than other means. [4]
  - iii) Prototyping is not a 'silver bullet,' meaning it also has some draw backs, which ones do you think Jobs could have met? [4]
  - iv) From the extract, what exactly do you think Jobs could have prototyped and to what extend? [6]
  - v) It is suggested that every time Jobs met the team there was something to change, suggesting there was Incremental and iterative development. Define this and forge a link between Rapid prototyping and Incremental plus iterative development. [2]
- b) Differentiate software validation and verification, give examples of each. [5]

**Question 5**

- a) Identify and briefly explain any four principles in agile development. [8]
- b) XP is one of the widely used methodology under Agile, what is it all about, again is it possible to harness it on complex software projects? [4]
- c) 'Pair –programming is advantageous when it comes to testing', said an expert Software engineer. What is it all about? Again refute or support his claim. [4]
- d) JAD and RAD are all wonderful methodologies being adopted by software professional, shed more light on each of them and cite examples in your mini explanation. [9]

**Question 6**

During a Software design workflow you were tasked to do an ERM for a Hospital client who wanted a system to be used across their health centers in the region. You were told that the system should allow Doctors to issue Prescriptions to Patients. Again Doctors should be able to do an Examination on a Patient with the aid of a Nurse(s). A Patient can be admitted in any one of the heath centers' Wards at a Hospital. One patient can take one or more Drugs at a given moment.

**Required:**

Draw a detailed ERD either using Crow's Foot notation or Chen's notation to depict the systems entities, their cardinality, multiplicity and associations etc. **NB:** Creativity will earn you more marks on imaginary Business Rules, please indicate such underneath your ERD. [25]