



PAN AFRICA CHRISTIAN UNIVERSITY

DIPLOMA IN INFORMATION AND COMMUNICATION TECHNOLOGY

END OF TERM EXAMINATION

DEPARTMENT: COMPUTING & INFORMATION TECHNOLOGY

COURSE CODE: DICT0212

CAMPUS: ROYSAMBU

COURSE TITLE: SOFTWARE ENGINEERING

EXAM DATE: TUESDAY, 4th APRIL 2017

TIME: 14:00 - 17:00 HRS

INSTRUCTIONS

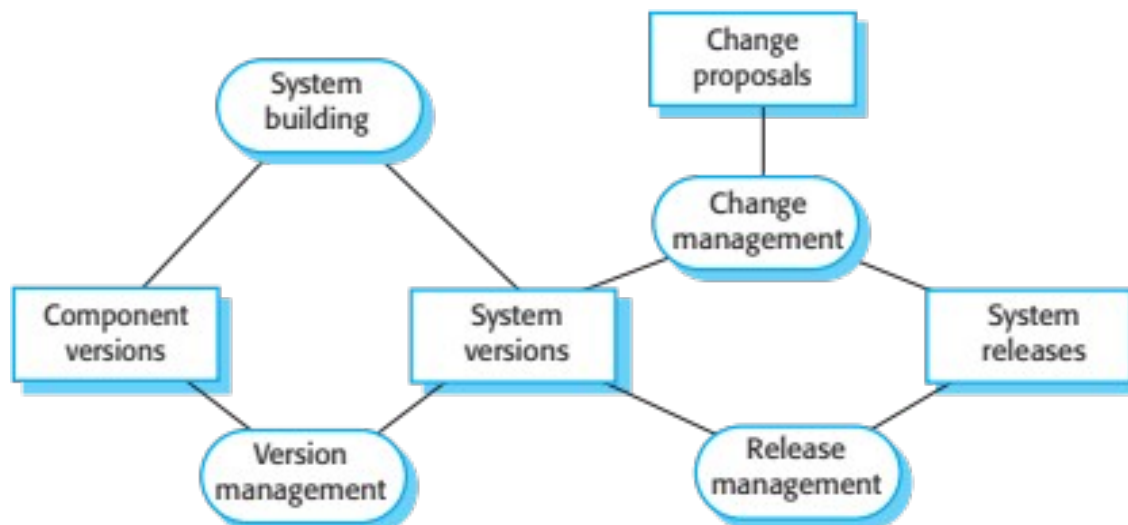
- This exam script has **TWO (2)** sections.
- Read all questions carefully before attempting.
- Answer ALL questions in Section **A** and any other FOUR questions in Section **B**.
- Write only your **student number** on the answer booklet provided.
- None programmable calculator permitted
- Calculators on phones, tablets and computers are NOT permitted in Theory Papers

SECTION A

(Answer ALL questions in this section)

Question 1:

- I. Explain the term Software Engineering as a discipline of software production (2 Marks)
- II. Define four characteristics of professional responsibility in Software Engineering ethics. (4 Marks)
- III. Explain the terms 'Verification' and 'Validation' in software testing (2 Marks)
- IV. List the three (3) main activities carried through-out the development testing by the team developing the software system. (3 Marks)
- V. Identify the universal project management activities for any software engineering project (5 Marks)
- VI. Using the figure below, explain the four facets of Configuration Management (4 Marks)



SECTION B

(Answer any FOUR (4) questions in this section)

Question 2:

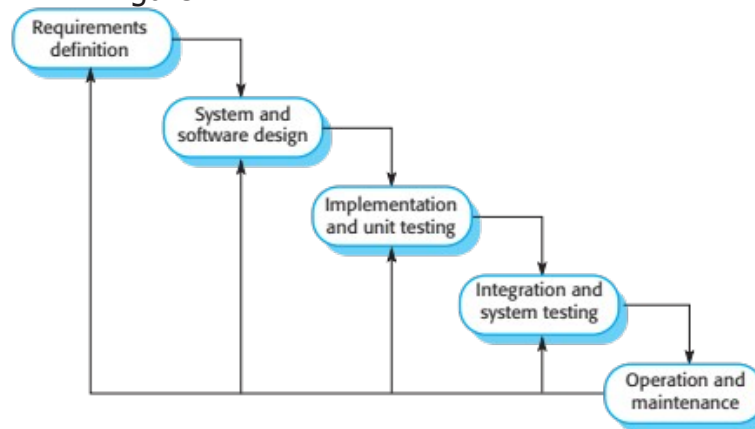
I. Identify four fundamental activities of software engineering process

(4 Marks)

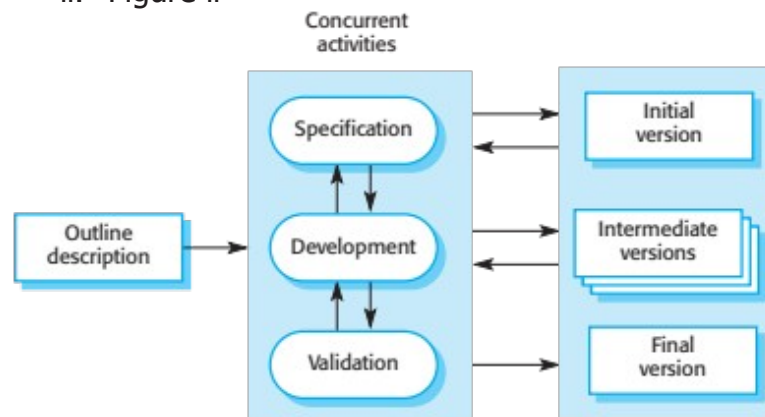
II. Study the figures below to answer the questions that follow:

a. Identify the Software Process Model represented in each of the figures (3 Marks)

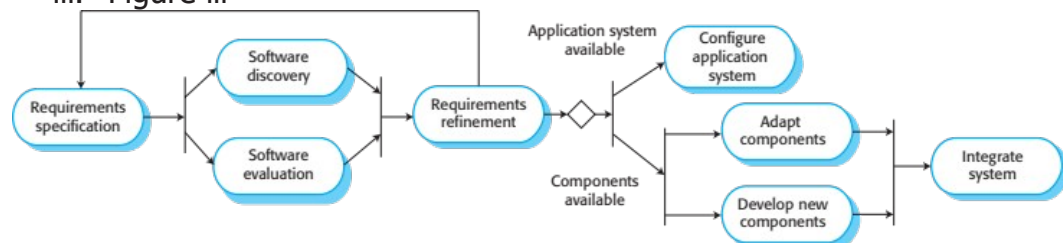
i. Figure i



ii. Figure ii



iii. Figure iii



b. Using suitable examples, expand on the application of the model depicted in figure iii. (5 Marks)

- III. Using a suitable diagram, discuss the requirements engineering process activities (8 Marks)

Question 3:

- I. Differentiate between Agile and Plan-driven software development approaches (4 Marks)
- II. Explain the following 5 principles of agile software development methods (5 Marks)
- a. Customer Involvement
 - b. Incremental Delivery
 - c. People not Process
 - d. Embrace Change
 - e. Maintain Simplicity
- III. Discuss the following terms as used in Agile Programming: (5 Marks)
- a. Extreme Programming
 - b. User Stories
 - c. Refactoring
 - d. Test-driven development
 - e. Pair-programming
- IV. You are a trusted advisor to the lead software engineer in company XYZ tendering for a Mobile integration application for a Banking System. Expand on three factors to consider in determining whether your tender proposal will consider an Agile or Plan driven approach? (6 Marks)

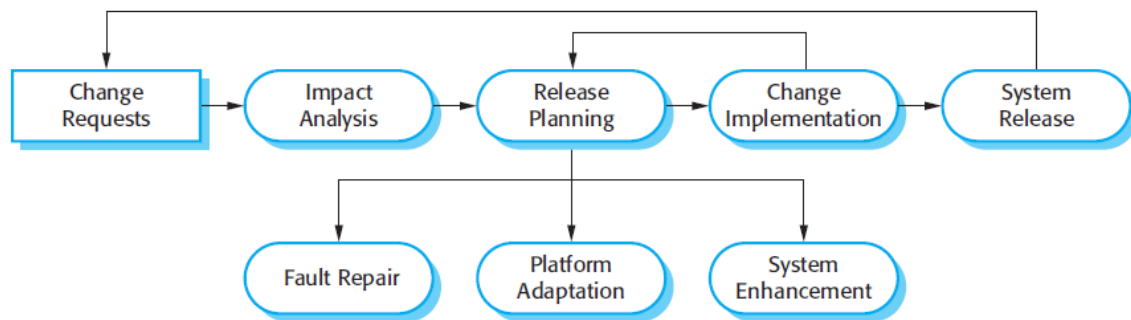
Question 4:

- I. Highlight two key points on the importance of Software Engineering (2 Marks)
- II. Define the following terms: (8 Marks)
- a. Requirements Engineering
 - b. Functional Requirements
 - c. Non-Functional Requirements
 - d. User Requirements
 - e. System Requirements
 - f. Requirements Elicitation
 - g. Requirements Validation
 - h. Requirements Change
- III. The software requirements document (also known as the software requirements specification or SRS) is an official statement of what the system developers

should implement. Elaborate on the typical structure and contents of this document. (10 Marks)

Question 5:

- I. In the evolution of software, identify any two types of software maintenance processes (2 Marks)
- II. Briefly describe the following System Models applied in software engineering: (8 Marks)
 - a. Context Models
 - b. Interaction Models
 - c. Structural Models
 - d. Behavioural Models
- III. Using appropriate drawings, represent the five (5) most commonly used UML Diagram Types: (5 Marks)
- VII. The figure below depicts a typical software evolution process:



- a. Identify three factors that motivate the evolution process (3 Marks)
- IV. Identify two key goals of software testing (2 Marks)

Question 6:

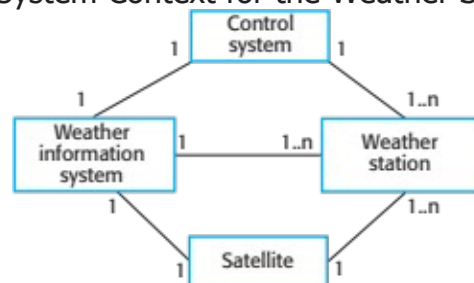
- I. Discuss the importance of architectural design in software engineering (4 Marks)
- II. Bass et al. (2012) suggests that explicitly designing and documenting software architecture has the following advantages: Discuss and expound on this reference: (6 Marks)
 - a. Stakeholder Communication
 - b. System Analysis
 - c. Large-scale Reuse
- III. Krutchen (1995) explains there are four fundamental architectural views, which can be linked through common use case or scenarios. Using a diagram, explain each of these views. (10 Marks)

Question 7:

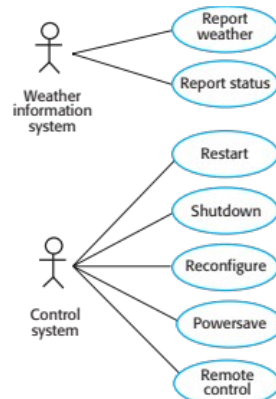
- I. Define the following terms applied in Software Design and Implementation: (3 Marks)

Marks)

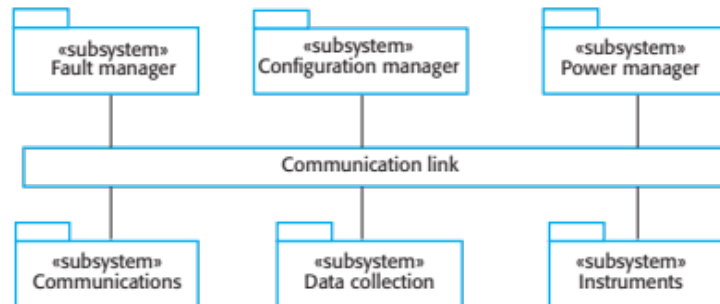
- a. Patterns
 - b. IDE
 - c. Open Source
- II. The RUP is a phased model that identifies four discrete phases in the software process. However, unlike the waterfall model where phases are equated with process activities, the phases in the RUP are more closely related to business rather than technical concerns. Explain each of the following phases: (4 Marks)
- a. Inception
 - b. Elaboration
 - c. Construction
 - d. Transition
- III. Given the following diagrams depicting a System Context, USE CASE scenario and the High-level architecture for an Automated Weather Station.
- a. Design the USE CASE Description – Report Weather (5 Marks)
 - i. System Context for the Weather Station



- ii. Weather Station Use Cases



- iii. High-level architecture of weather station



- b. Identify and justify five (5) potential Object Classes (5 Marks)
- IV. List three advantages of delivering SaaS in Software Release Management (3 Marks)