ALUPE UNIVERSITY COLLEGE

...*Bastion of Knowledge*....

OFFICE OF THE DEPUTY PRINCIPAL
ACADEMICS, STUDENT AFFAIRS AND RESEARCH

UNIVERSITY EXAMINATIONS

2019 /2020 ACADEMIC YEAR

THIRD YEAR FIRST SEMESTER REGULAR EXAMINATION

FOR THE DEGREE OF BACHELOR OF COMPUTER SCIENCE

COURSE CODE: COM 326

COURSE TITLE: SOFTWARE DEVELOPMENT

DATE: 5ᵀᴴ NOVEMBER, 2020   TIME: 0900 – 1200 HRS

INSTRUCTION TO CANDIDATES

- **SEE INSIDE**

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COM 326: SOFTWARE DEVELOPMENT

STREAM: BSc (Computer Science)   **DURATION: 3 Hours**

INSTRUCTIONS TO CANDIDATES

    i.   *Answer **ALL** questions from section A and any **THREE** from section B.*

    ii.   *Maps and diagrams should be used whenever they serve to illustrate the answer.*

    iii.   *Do not write on the question paper.*

SECTION A (24 MARKS) COMPULSORY

QUESTION ONE (12 Marks)

Consider the following scenario where consider how a Medical Health Care –Patient Management System may be used to enter data for a new patient. When a new patient attends a clinic, a new record is created by a medical receptionist and personal information (name, age, etc.) is added to it. A nurse then interviews the patient and collects medical history. The patient then has an initial consultation with a doctor who makes a diagnosis and, if appropriate, recommends a course of treatment.

INITIAL ASSUMPTION:
The patient has seen a medical receptionist who has created a record in the system and collected the patient's personal information (name, address, age, etc.).
A nurse is logged on to the system and is collecting medical history.
NORMAL:
The nurse searches for the patient by family name. If there is more than one patient with the same surname, the given name (first name in English) and date of birth are used to identify the patient.
The nurse chooses the menu option to add medical history. The nurse then follows a series of prompts from the system to enter information about consultations elsewhere on mental health problems (free text input), existing medical conditions (nurse selects conditions from menu), medication currently taken (selected from menu), allergies (free text), and home life (form).
WHAT CAN GO WRONG:
The patient's record does not exist or cannot be found. The nurse should create a new record and record personal information.
Patient conditions or medication are not entered in the menu. The nurse should choose the 'other' option and enter free text describing the condition/medication.
Patient cannot/will not provide information on medical history. The nurse should enter free text recording the patient's inability/unwillingness to provide information. The system should print the standard exclusion form stating that the lack of information may mean that treatment will be limited or delayed. This should be signed and handed to the patient.
OTHER ACTIVITIES:
Record may be consulted but not edited by other staff while information is being entered.
SYSTEM STATE ON COMPLETION:

User is logged on. The patient record including medical history is entered in the database, a record is added to the system log showing the start and end time of the session and the nurse involved.

    a) In this scenario the system designer will have to identify the user and system requirements. Provide a brief distinction of the two   (4 Marks)

    b) Describe four (4) process activities that will need to be undertaken in order for elicitation and analysis of the requirements in the scenario above   (4 Marks)

    c) Provide a use case diagram for the above scenario   (4 marks)

QUESTION TWO (12 Marks)

a) Outline situations where a systems designer may deem the adoption of the waterfall model to be highly appropriate   (6 Marks)

b) Differentiate among white box, black box and grey box testing   (6 Marks)

SECTION B (36 Marks)

QUESTION THREE (12 Marks)

    a) During the requirements validation process, different types of checks should be carried out on the requirements in the requirements document. Describe five such checks

                                          (5 marks)

    b) UML systems have the ability to provide different perspectives of a system. Outline the four different perspectives of a system that can be provided by the use of UML diagrams

                                          (4 Marks)

    c) Identify the three principles that a systems designer need to rely on in order for him/her to be able to adequately choose the optimal software metrics to measure a software development project   (3 marks)

QUESTION FOUR (12 Marks)

    a) Outline the five sequential steps associated with validation   (5 Marks)

    b) List three disadvantages associated with formal messages   (3 Marks)

    c) The engineering of distributed systems has a great deal in common with the engineering of any other software. However, there are specific issues that have to be taken into account when designing this type of system. These arise because the system components may be running on independently managed computers and they communicate across a network. Therefore a distributed approach to system engineering has to be adopted. Describe the advantages of using a distributed

approach to systems development (4 Marks)

QUESTION FIVE (12 Marks)

a) Differentiate between logical data modelling, data flow modelling and entity behaviour modelling techniques as used in SSADM. (6 marks)

b) Point out the differences between application frameworks and software product lines

(6 Marks)

QUESTION SIX (12 Marks)

a) Explain the sequential steps associated with software prototyping approach (8 Marks)

b) List four main characteristics of a software productivity metrics (4 Marks)

QUESTION SEVEN (12 Marks)

a) The Spiral Model is widely used in the software industry as it is in sync with the natural development process of any product, i.e. learning with maturity which involves minimum risk for the customer as well as the development firms. Outline 7 pointers that a software developer needs to look out for while considering the implementation of the Spiral model in their designs. (8 Marks)

b) Detail the Key Metrics used to Measure Software Maintainability (4 Marks)

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