



# MANICALAND STATE UNIVERSITY OF APPLIED SCIENCES

## FACULTY OF ENGINEERING, APPLIED SCIENCES AND TECHNOLOGY

DEPARTMENT: COMPUTER SCIENCE AND INFORMATION SYSTEMS

MODULE: SYSTEMS ANALYSIS AND DESIGN

CODE: INSY123

SESSIONAL EXAMINATIONS  
APRIL 2024

DURATION: 3 HOURS

EXAMINER: MR S. MARIME

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### INSTRUCTIONS

- 1. Answer **All** in Section A*
- 2. Answer any **three** questions in Section B.*
- 3. Start a new question on a fresh page*
- 4. Total marks 100*

*Additional material(s): None*

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## Section A

### Question 1

a) Identify two purposes of Data Flow Diagrams. [2]

b) More than 2000 patients are registered with a local health centre. The centre employs a number of general practitioners (i.e. doctors) and a few receptionists. Patients are officially registered with one doctor but can arrange appointments with any available one. These appointments may subsequently be cancelled. Some appointments result in one or more prescriptions, identifying a medicine to be taken. New patients are registered by a receptionist. When a patient is registered he/she provides his/her details such as name, date of birth, address, etc., and receives a unique patient number. To book an appointment a patient should contact a receptionist. The patient provides his/her number (or date of birth) and the receptionist provides a list of available time slots for appointments. The appointment is booked with the patient's doctor or if the patient's doctor is not available with any available doctor. The date and time of the booked appointment are given to the patient as a confirmation. Patients can cancel booked appointments by contacting a receptionist who will cancel appointments on behalf of patients. A patient who attends an appointment should check in first using a special terminal located in the waiting area of the health centre. The patient inputs his/her number (or date of birth). The system checks the details and confirms that the patient has been checked in. Doctors record appointment outcomes and details of prescriptions (if any) during the appointments i.e. all prescriptions issued by doctors are recorded on the patient's record. Patients who leave the area where the health centre is located are de-registered by a receptionist.

- i. List the processes, external entities and data stores that you would include on a data flow diagram (DFD) of the health centre system. [5]
- ii. Produce a context diagram of the health centre system described above. [4]
- iii. Produce a data flow diagram (DFD) of the health centre system. [7]
- iv. Produce a list of requirements for a system to support the health centre system business processes shown in the scenario. [7]

## Section B

### Question 2

- a) A customer wants to draw money from his bank account. He enters his card into an ATM. The automated teller machine prompts enter PIN. The customer enters his PIN. The ATM internally retrieves the bank account number from the card.

The ATM encrypts the PIN and the account number and sends it over to the bank. The bank verifies the encrypted account and PIN number. If the PIN number is correct, the ATM displays –enter amount, draws money.

Illustrate this sequence of events using the

- (i) use case [8]
  - (ii) sequence diagram [9]
- b) Describe the relationship and differences between logical and physical models. [8]

### Question 3

You have been appointed as Project Manager for a large hotel company which is opening a new hotel at a new holiday destination resort. Although they have an existing system used in their other hotels, a completely new system will be required to deal with room reservations and bookings for customers. It will need to provide an on-line (web based) enquiry system as well as handling guests' reservations, guests checking in/out and payments.

- a) Outline the advantages and disadvantages of conducting face to face interviews to identify problems of the existing hotel system. [8]
- b) Do you consider questionnaires to be an effective fact finding technique? Give reasons for your answer. [6]
- c) A feasibility study for the hotel system needs to be provided to management. Describe the different types of feasibility you would expect to include in the feasibility report. [8]

d) Describe a suitable method of system conversion that could be used if the system were to be used in all the other hotels in the hotel group mentioned in the scenario above. [3]

**Question 4**

a) Match the purpose of elements of a flowchart to their use in the following table.

Purpose	Use
Calculate total of A,B,C	Loop
Indicate that the problem has been solved	start
Find if the number is greater than the other	Process
Read a number and calculate the factorial of the number	Input
Read three numbers	Stop
Print the total	Decision
Indicate the beginning of a problem solving flow	Output

[7]

b) A town contains 5000 houses. Each house owner must pay tax based on the value of the house. Houses over \$200 000 pay 2% of their value in tax. All others pay no tax. Draw a flowchart showing the above process.

[7]

c) In each of the following cases suggest a suitable system conversion strategy and justify your choice.

- i. The processing of student identification cards at MSUAS from the use of traditional cameras to the use of digital cameras.
- ii. A new water billing system for Mutare city council
- iii. A new meteorological system to assist new farmers to prepare for the new season.

[6]

d) It is important to involve users in the development and implementation of information systems. Describe how the project might benefit from this involvement. [5]

### Question 5

a) What is meant by a stakeholder? [1]

b) Manicaland State University of Applied Sciences is embarking on a new examination processing system and has employed you as a fresh graduate trainee programmer. You have been tasked to post an advertisement in the Herald, for a systems analyst you are going to work with in developing the system.

i) Identify and clearly describe four major skills that the appropriate candidate should possess [8]

ii) Identify the stages of the system development life cycle that a systems analyst would typically be involved in. [4]

c) Identify three other types of stakeholders in the systems development process describing their roles and responsibilities. [9]

d) Some project scenarios are described below.

Based on the brief (and incomplete) descriptions, name the development methodology you think is being used. Each scenario may or may not have two possible answers.

i) There are two programmers sitting at one workstation discussing the next segment they will code together at that workstation. [1]

ii) A team of systems analysts are negotiating with users about what features to include in the next version of an installed system. [1]

iii) Internal auditors have asked for documented validation of requirements and an up-to-date risk analysis before recommending the next system features to be considered. [1]

**END OF EXAMINATION**