

2209/201  
SYSTEMS ANALYSIS AND DESIGN  
Oct./Nov. 2008  
Time: 3 hours

Not done

Done

THE KENYA NATIONAL EXAMINATIONS COUNCIL  
DIPLOMA IN INFORMATION TECHNOLOGY  
MODULE II

SYSTEMS ANALYSIS AND DESIGN

3 hours

**INSTRUCTIONS TO CANDIDATES**

*You should have the following for this examination:*

*Answer booklet.*

*Non programmable calculator.*

*Answer any FIVE of the following EIGHT questions.  
All questions carry equal marks.*

**This paper consists of 7 printed pages.**

**Candidates should check the question paper to ascertain that all the pages are printed as indicated and no questions are missing.**

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**Turn over**

1 ✓

- (a) Explain the following terms as applied in system theory:
    - (i) Entropy;
    - (ii) Feedback. *⇒ Results* (4 marks)
  - (b) Outline four objectives of system analysis. *laya (system design) objectives*  
*- feedback*  
*- feedback*  
*- feedback*  
*- feedback* (4 marks)
  - (c) Differentiate between *cybernetic* and *deterministic* systems stating an example in each case. *cybernetic ⇒ output new known*  
*deterministic ⇒ outcome known* (4 marks)
  - (d) With the aid of a flowchart, describe the process of developing a system using *type I prototype*. *pub recognize implement*  
*feasibility*  
*study*  
*study* (8 marks)
- (2)
- (a) (i) State three components of a data dictionary citing an appropriate example for each. *Name*  
*id no*  
*sex* (3 marks)
  - (ii) Distinguish between *feasibility study* and *system study*. (4 marks)
  - (b) Explain the term *soft system thinking*. (2 marks)
  - (c) Figure 1 shows the relationship of modules in a particular system.

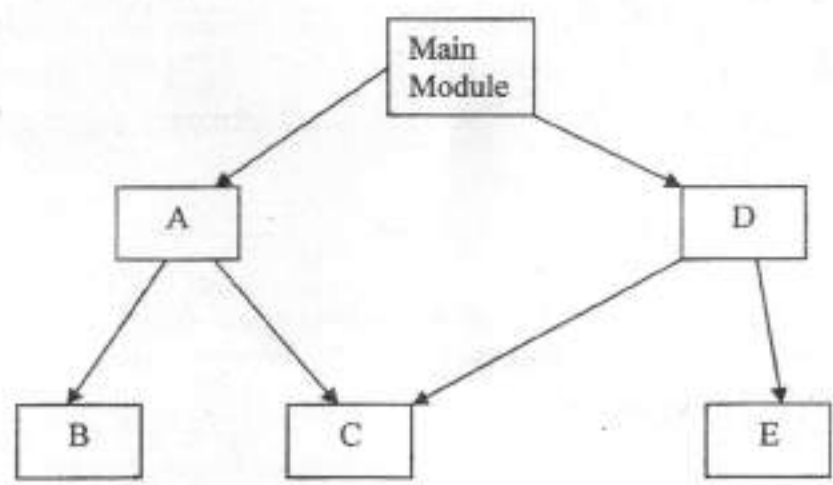


Figure 1

- (i) Identify the *span of control* for module A. (2 marks)
- (ii) Explain the term *fan-in* in relation to module B. (3 marks)
- (d) Describe the application of the following types of coupling in a system stating **one** disadvantage in each case:
  - (i) Content;
  - (ii) Control. (6 marks)

$$P = P \left( \frac{1+R}{100} \right)^n$$

3. ✓ (a) (i) Outline **four** qualities of a good system documentation. (2 marks)
- (ii) Explain **two** uses of documentation. (2 marks)

(b) Distinguish between *operational* level and *tactical* level information. (4 marks)

*operational → used by end user*

*tactical → used by managers*

(c) Judith would like to collect the following data about a system she intends to Develop:

- live data which will be used to test the system; *→ trial*
- the end users opinion about the introduction of the new system; *→ questionnaires*
- details of the operations in the organization. *interview*

For each of the above cases, identify the most appropriate fact finding technique she would apply justifying your answer. (6 marks)

(d) Table 1 shows cost benefit analysis data obtained during system analysis. Use it to answer the question that follows.

YEAR	BENEFITS
1	Sh 50,000
2	Sh 20,000
3	Sh 80,000
4	Sh 40,000
5	Sh 65,000
6	Sh 70,000

Year	B	C.V
1	50	
2	20	
3	80	
4	40	
5	65	
6	70	
	330	1800

Table 1

The project is to cost Ksh 230,000. Using the payback method and a discounting rate of 10% p.a., determine whether it is worthwhile to proceed with the project (6 marks)

4. ✓ (a) Explain **two** objectives of structured walkthrough. (4 marks)

(b) (i) Outline **four** methods of fact-recording during data collection. (2 marks)

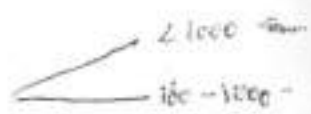
*interview, questionnaire, observation, focus groups*

(ii) Differentiate between *statistical method* and *conceptual models* as applied in system analysis. (4 marks)



(c) During development of an accounting system, a system designer documented the following information. Use it to answer the questions that follow.

- 2.1 IF invoice amount is less than 1000
  - 2.1.1 THEN (Authorize payment)
- 2.2 ELSE IF Invoice amount is between 100 to 1000
  - 2.2.1 IF Invoice age is less or equal to 10 days
    - 2.2.1.1 IF Invoice has Discount
      - 2.2.1.1.1 THEN Authorize payment
      - 2.2.1.1.2 ELSE set aside
    - 2.2.2 ELSE Authorize payment
- 2.3 ELSE (Invoice amount greater than 1000) write cash requirement report.



- (i) Identify the design tool used by the designer. *Decision tree*
- (ii) Draw a decision tree to represent the information.
- (iii) Explain **one** disadvantage of a decision tree compared to the tool identified in c (i). (10 marks)

5 (a) Explain the following terms as applied in SSM:

- (i) Rich picture;
- (ii) Root definition. (4 marks)

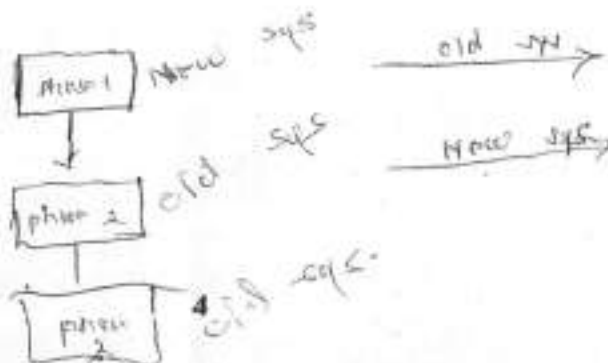
- (b) (i) With the aid of a diagram, describe the *phased approach* to system development.
- (ii) Explain **two** drawbacks of the phased approach. (10 marks)

- (c) (i) Define the term *Rapid Application Development*. (2 marks)
- (iii) Explain **two** principles of risk management during development of a new system. (4 marks)

6 (a) (i) Outline **four** causes of system obsolescence. (4 marks)

- (ii) Explain the term *system enhancement*. (2 marks)

(b) With the aid of diagrams, distinguish between *phased* and *parallel* change over techniques. (6 marks)



(c) The following are the activities that create, affect and remove an entity called student in a college management information system:

- Before admission, a student is registered by being given an admission number then proceeds to pay the fees.
- The student can then decide to reside in the college by paying boarding fees or opt for non-residence status.
- During learning, a student concurrently attends a number of lectures and examinations.
- At the end of the course, a student must be cleared by the institute.

(i) Draw ELH to exhaustively model the entity. (6 marks)

(ii) Include the state indicators on the diagram in c (i) (2 marks)

Explain the following terms as applied in software systems:

- (i) Robustness;
- (ii) Maintainability. (4 marks)

(b) During evaluation of an information system, the following factors were considered about the interface:

- Whether all the information needed by a user appears on the screen;
- Time used to carry out a task, system recovery or the failure rate of the system;
- Mental effort required by the user to use the interface;
- Ease of learning to use the interface and help incorporated.

For each factor, identify the usability metric considered by the system evaluators. (4 marks)

(c) (i) Outline **four** factors that should be considered when designing processes in a system. (2 marks)

(ii) Distinguish between *processing* and *organizational* file requirements. (2 marks)



- (d) Figure 2 shows the functional organization of the point of sale system in a manufacturing company. Use it to answer the questions that follow.

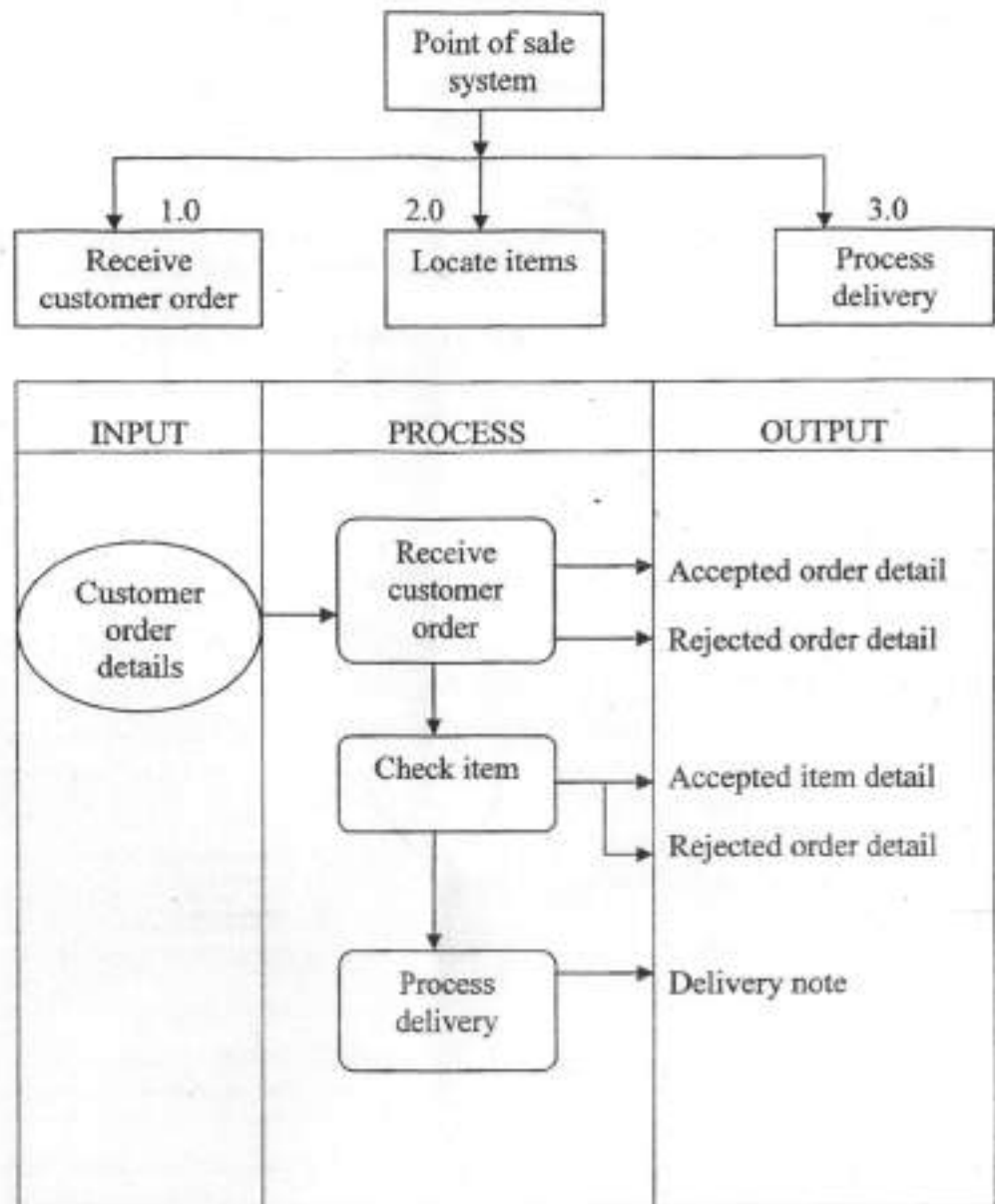


Figure 2

- (i) Identify the design tool used to represent the system (2 marks)
- (ii) Draw a level 1 DFD to represent the system. (6 marks)
8. (a) (i) State **four** guidelines of system testing. (2 marks)
- (ii) Describe **two** types of test data citing a reason for including each in a test plan. (4 marks)
- (b) With the aid of a diagram, describe an object structure as applied in system modeling. (4 marks)

- (c) State **four** roles of design during system development. (2 marks)
- (d) A bus company has several buses and drivers. The company has one garage and covers several routes. At any one time, some buses will be on routes whilst others are garaged. Individual buses are used on any route and drivers are allocated to any bus. Each route has only one bus traveling on it at any one time. Passengers may have to take more than one bus on a journey.
- (i) Identify **four** entities in the company's system with their accompanying attributes.
- (ii) Draw an E.R model to represent the system. (8 marks)