2209/201
SYSTEMS ANALYSIS AND DESIGN
July 2011
Time: 3 hours

THE KENYA NATIONAL EXAMINATIONS COUNCIL

DIPLOMA IN INFORMATION TECHNOLOGY

MODULE II

SYSTEMS ANALYSIS AND DESIGN

3 hours

INSTRUCTION TO CANDIDATES

You should have the following for this examination:

  Answer booklet.

*Answer any **FIVE** of the following **EIGHT** questions.*

This paper consists of 5 printed pages.
Candidates should check the question paper to ascertain that all the
pages are printed as indicated and that no questions are missing

1.   (a)   Outline **four** responsibilities of a systems architect.   (4 marks)

     (b)   Explain **three** system controls as applied in system development.   (6 marks)

     (c)   The following statements relate to system theory. In each case, state the concept of the system theory being described:

         (i)   a system element, which is itself a system and a component of a larger system;

         (ii)   a system that differentiates between the environment and the system;

         (iii)   a system exhibiting order and disorder within itself;

         (iv)   a system which can be viewed solely in terms of its input and output without any knowledge of its internal workings.

                                                        (4 marks)

     (d)   A company intends to develop a new information system. Give **three** reasons for designing the system explaining your answer.   (6 marks)

2.   (a)   (i)   Explain the term *information system*.   (2 marks)

         (ii)   Differentiate between *formal* and *informal* information systems.

                                                        (4 marks)

     (b)   A sales director would like to decide whether to implement a new computer-based sales processing system. The system, on aggregate, will accrue a benefit of Ksh 50,000 p.a. for six years. However the system would involve a capital outlay of Ksh 240,000. Using NPV and discounting rate of 12% determine the project worthiness.   (6 marks)

     (c)   Many organizations today use computer-based information systems. Explain **two** factors that would influence the recommendation for upgrading an existing information system.   (4 marks)

     (d)   Distinguish between *preliminary study* and *terms of reference* as used in system development.   (4 marks)

3.   (a)   Define each of the following terms as used in systems analysis:
         (i)   operation research methods;
         (ii)   statistical methods;
         (iii)   conceptual models.   (3 marks)

     (b)   Explain an approach that would be used to reduce bias when conducting system investigation.   (2 marks)

     (c)   State **three** types of *system security procedures* that may be carried out in an organization to ensure safety of data.   (3 marks)

(d) Maria was given the task of developing a user manual for a recently completed system.

   (i) Outline **four** items that she should include in the manual. (4 marks)

   (ii) Outline **four** qualities expected of the manual. (4 marks)

   (iii) Explain **two** possible uses of the manual. (4 marks)

4. (a) Define the term *audit trail* as used in system analysis. (2 marks)

   (b) A student would like to design the output for his information system project. Explain **two** types of output that the student could consider (4 marks)

   (c) Outline **three** characteristics of an efficient system. (3 marks)

   (d) A supplier operates through several hundred local agents. An agent receives a new catalogue every quarter of the year. Customers select goods from the current catalogue and then pay the agent appropriate amount of money, receiving in return receipts detailing goods ordered and money paid. The agent puts together customer's orders in a report form and prepares a payment advice for the money deposited in business account.

   At the end of every week, the agent posts the report form containing items ordered by a number of customers together with a single cheque drawn on the business account. The agent retains the copy of the report form.

   The supplier sends items ordered together with a delivery note. The agent checks the items received against both the delivery note and the copy of the report form. If all is satisfactory the agent retains the delivery note in a folder and throws the copy of report form to a bin.

   At the end of every quarter the agent receives the new season's catalogue statement of all items ordered in the quarter together with the commission cheque for 10% of their total value. The agent then checks the details against the delivery notes in the folder and puts the commission into their own personal account.

   Draw a level 1 *data flow diagram* depicting the procedure. (11 marks)

5. (a) A user is experiencing a malfunction with a newly installed system and would like some modifications made. Outline **four** typical steps that would be followed when maintaining the system. (4 marks)

   (b) In a certain college, regular courses are offered to students'. Students report to the college and enroll for courses of their choice. During enrolment the students apply for course of their choice and pay the corresponding fees upon admission. Regular attendance and active participation is emphasized in all aspects of the course. The course is deemed complete upon satisfactory assessment and certification.
   Model this information using a *functional decomposition* diagram.

   (8 marks)

easytvet.com

(c) Assuming that you have been given a task to develop a certain company's system.

    (i) Describe a methodology that you would use to emphasize the logical design of the system without showing implementation details.

                                      (1 mark)

    (ii) State **two** advantages of the methodology identified in (i).   (1 mark)

(d) XYZ Company Limited intends to install a system in order to improve its service.

    (i) State the type of *information system* that the company would install for analytical data processing.

    (ii) Explain **two** types of decisions that the information systems in (i) would generate.

    (iii) State **two** advantages of the information system stated in (i).

                                        (6 marks)

6. (a) State **four** components to be considered when designing an information system.   (4 marks)

   (b) (i) Describe the circumstance that would influence an organization to adopt *practical system thinking*.   (2 marks)

      (ii) Explain **three** challenges likely to be faced by system designers when describing a soft system.   (6 marks)

   (c) In a certain company an employee is registered upon recruitment and a notification issued. The calculation of salary starts immediately and continues until the employee resigns. Upon termination of employment a delete notification is issued. The payment depends on employees work cycle where all the present and absent days are computed.

      Draw a *state transition* diagram to represent the procedure.   (8 marks)

7. (a) State **two** types of walkthroughs that may be used during system development process.   (2 marks)

   (b) Outline **three** methods that could be used for data collection during systems analysis.   (3 marks)

   (c) (i) State **two** uses of a *system specification document* as used in system development.   (2 marks)

      (ii) Outline **four** factors that should be considered when designing an input form.   (4 marks)

      (iii) Differentiate between *verification* and *validation* as used in system design.

                                      (4 marks)

(d) Mary, a programmer, wrote several application programs within a short period. With the help of a data user, they checked the programs to ascertain that they meet the basic needs. One of the programs was found to match the requirements but a few amendments were required.

    (i)   Identify the system methodology used by Mary.

    (ii)   Outline **two** merits and **two** demerits of the methodology identified in (i).

                     (5 marks)

8.   (a)   Differentiate between *sequential* and *random access* file designs.   (4 marks)

    (b)   State **two** examples for each of the following threats to data as used in system security:

       (i)   human error;

       (ii)   technical error.   (4 marks)

    (c)   (i)   Outline **three** common characteristics of *deterministic* and *probabilistic* systems.   (3 marks)

       (ii)   Describe **three** attributes that should be considered when designing a cybernetic system.   (3 marks)

    (d)   John was among the team of system designers contracted to design a system for an organization. He was assigned the part of the system that would serve a number of other applications within the organization without its structure being dictated by any of those applications.

       (i)   Identify the part of the system that he was assigned.

       (ii)   Outline **three** advantages of the part identified in (i).

       (iii)   State **two** problems faced when implementing the part identified in (i).

                     (6 marks)