



Machakos University College

(A Constituent College of Kenyatta University)

UNIVERSITY EXAMINATIONS 2013/2014

SCHOOL OF COMPUTING AND APPLIED SCIENCES

FIRST SEMESTER EXAMINATION FOR THE DEGREE OF BACHELOR OF
SCIENCE

SCO 101: SYSTEMS ANALYSIS AND DESIGN

DATE: 1ST APRIL, 2014

TIME: 8.30 a.m. – 10.30 a.m.

INSTRUCTIONS:

This paper has Section A & B

*Answer question **ONE** which is Compulsory and any other **TWO***

SECTION A

QUESTION 1 30 MARKS (COMPULSORY)

- State three factors considered when drawing a flowchart (3mks)
- (i) Differentiate between multiple relationship and Exclusive relationship as used in an Entity Relationship Diagram (ERD) (2mks)
(ii) Illustrate the relationships in b (i) above in a diagram (2mks)
- State four advantages of a decision tree over a decision table. (4mks)
- Name the symbols below and state their significance in a DFD (8mks)

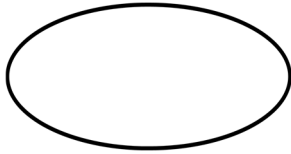
(i)



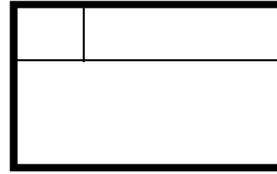
(ii)



(iii)



(iv)



- e. A use case documents typical interactions between a user and a system. Describe how to capture a use cases (5 mks)
- f. State three benefits of User involvement in the system development (3mks)
- g. State three factors considered in improving users' interactions with a system so that the system matches users' activities. (3mks)

SECTION B: ANSWER ANY TWO QUESTIONS FROM THIS SECTION

QUESTION 2 (20 MARKS)

The following information is for the country bus company

"A country bus company owns a number of buses. Each bus is allocated to a particular route, although some routes may have several buses. Each route has a number of stages. Each stage goes through some of the towns. One or more drivers are allocated to each stage. Further analysis has revealed that some of the towns have a garage where buses are kept and each of the buses has one 'home' garage. Each bus is maintained in one of the company's garages (only some of the garages do maintenance). However, the garage that maintains a specific bus is not necessarily the home garage for that bus. For each garage that does maintain buses there are a number of maintenance engineers that work there"

- (i) model the country bus company from the above information using an ERD (10 mks)
- (ii) for each of the entities on this model identify
- (a) An appropriate key
- (b) Allocate any attributes that are explicitly mentioned (10 mks)

N.B When answering this question, state all assumptions made

QUESTION 3 (20 MARKS)

Go through the case study below and use it to answer the questions that follow

Case study

“The International Bank of Java has decided to build a new application to offer their customers an on-line bill payment service. They have decided that the analysis and design of this new service is to be carried out using an object -oriented approach. The following high level requirements have been established:

- Customers should be able to directly authorize payments from particular accounts to companies. Priority payments (which have some additional processing) take precedence over “normal” payments. However, all types of payment can only be made from savings/ deposit accounts; no others
- As part of authorizing payments and/ or separately, customers will be able to maintain details of the companies they wish to pay in this way. Company information includes company name, address and contact name
- Customers can request “online” statements for all types of account
- Customers can transfer money between all types of account; details of each transfer being retained
- Additionally, the bank will:
 - Credit interest to savings/ deposit accounts’ balances; informing the customer concerned
 - Charge interest on mortgage accounts from time-to-time”

Question

Assuming that “Customer”, “Java Bank” and “Company” are the actors of the Bill Payment Service draw a Use Case Diagram for the system.

Where applicable your answer should use the “uses” (or “includes”) and “extends” notations.

N.B When answering this question, state all assumptions made

QUESTION 4 (20 MARKS)

Structured Design is a technique that deals with the size and complexity of a program by breaking up a program into a hierarchy of modules that result in a computer program that is easier to implement and maintain. Discuss this pointing out clearly

- (a) Structured design stages in system development
- (b) Guidelines for Modular Programming
- (c) Advantages of modularity in design