NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY

FACULTY OF APPLIED SCIENCES

DEPARTMENT OF COMPUTER SCIENCE

Final Examinations December 2002

Subject: Structured Systems Analysis and Design
Code: SCS2104

Instructions to Candidates

1. Answer any **FIVE** questions
2. Start each question on a fresh page
3. All questions carry equal marks

Duration: 3 Hours

Question 1

a). Use Anthony's Hierarchical Model of organisational structure to describe how IT is modelled in organisations. Be sure to describe the different kinds of systems found in each level of the hierarchy. [6]

b). With the aid of diagrams, define and describe the Systems Development Life Cycle and each of its stages. [10]

c). The Systems Development Life Cycle is to be used as a blueprint with every properly-developed system closely following each of its stages. Discuss this statement [4]

Question 2

a). Describe the factors that are critical to the success of the development of the project [5]

b). Describe the roles of the following people in the development of a new system:

i. The Systems Analyst
ii. Software and Network Specialists
iii. The Business Analyst
iv. The System Sponsor
v. End Users [10]

c). Briefly describe the five problem-solving approaches generally used by systems analysts [5]

Question 3

a). What kinds of questions must be avoided during a fact-finding interview and why? [2]

b). Describe the diary technique of fact-finding and give its advantages and disadvantages. [2]

c). What is JAD? [1]

d). Describe a typical JAD process. [10]

e). Describe systems feasibility in terms of the five different kinds of feasibility. [5]

Question 4

a). What are the four models that we use in systems analysis? [2]

b). What is the threefold purpose of modelling a new system? [3]

c). In a bank, enquiries will handle the opening and closing of savings, current (cheque) and student accounts. Each of these accounts automatically get an ATM card when they are opened. The Personal Banker issues loans to customers that are passed to receive a loan. Each customer receives a statement at the end of every month and can collect an interim statement from Enquiries at any time. And, of course, at any time, a customer can use ATM and teller facilities.

i. Draw the Context Diagram for the system [3]
ii. Draw the High-Level DFD, showing data stores. [4]
iii. Draw the Entity-Relationship diagram. [4]
iv. Draw the CRUD diagram that will help validate the model [4]

Question 5

a). Describe, in detail, the evidence / output of a successful preliminary investigation phase of the systems development life cycle. [6]

b). Describe the steps involved in the data modelling process. [7]

c).

i. What is data normalisation? [1]
ii. What are the advantages and disadvantages of the relational data model? [3]
iii. Briefly describe the normalisation process. [3]

Question 6

a). An inexperienced systems analyst has come up with the following two entities. You realise that the entities are not normalised and you offer to help him normalise them. Show how you would accomplish this, stage by stage, to come up with several normalised entities. Explain what you are doing at each stage and show the results of each stage. [6]

Entity: CUSTOMER
CUSTOMER CODE
CUSTOMER NAME
CUSTOMER ADDRESS
    CUSTOMER STREET
    CUSTOMER SUBURB
    CUSTOMER CITY
    CUSTOMER POSTCODE
CUSTOMER PHONE
AGENT CODE
AGENT NAME

Entity: ORDER
ORDER NUMBER
ORDER DATE
ORDER ITEM (repeats n times)
    ITEM CODE
    ITEM DESCRIPTION
    ORDER QUANTITY
    PURCHASE PRICE
ORDER SUBTOTAL
ORDER VAT
ORDER TOTAL AMOUNT

b). Give five categories that are normally documented in a project dictionary. For each category, show what is documented and the tools used to do so. [5]

c). Discuss the problems of Ordinary English that lead to the necessity of Structured English, Decision Tables and Decision Trees. [5]

d). Write the Structured English for the following operation to give discounts to customers, depending on their age and on how long they have been a customer with the organisation:
If the customer is over 75 years old, they automatically get a discount of 10%. Customers that have been with the organisation for between 1 and 3 years get a 5% discount and those that have been with the organisation for at least 3 years get a discount of 10%. [4]

Question 7

a). Give six components that need to be designed during the systems design phase of a system. [3]

b). Explain five different types of modules in a system. [5]

c). What is a Function-Entity Matrix? Explain the term CRUD. [3]

d). Discuss 6 principles to follow when designing a Graphic User Interface. [6]

e). Name six objectives of prototyping. [3]

END OF EXAM PAPER