NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY
FACULTY OF APPLIED SCIENCE
COMPUTER SCIENCE DEPARTMENT
DECEMBER EXAMINATIONS 2004

SUBJECT: ADVANCED SOFTWARE DESIGN
CODE: SCS5206

INSTRUCTION TO CANDIDATES

Answer any 3 questions from Section A, and any 2 from Section B.
Total marks 100

Time: 3 hours

SECTION A

QUESTION ONE

a) Given the narrative description, come up with the Data Flow Diagram in this problem.

The pharmacy at Mpilo Hospital fills medical prescriptions for all patients and administers these medications to the nurse stations responsible for the patients' care. Clinical prescriptions are written by doctors and sent to the pharmacy. A pharmaceutical Technician reviews the prescription and sends them to the appropriate pharmacy station. Prescriptions for drugs that must be formulated (made-on-site) are sent to the lab station, prescriptions for off-the-shelf drugs are sent to the sharing station, and prescriptions for narcotics are sent to the secure station. At each of the stations a pharmacist reviews the order, checks the patient's file to determine the appropriateness of the prescriptions, and fills the order if the dosage is at the right level and will not interact negatively with the other medications indicated in a patient's file. If the pharmacist does not fill the order, the prescribing doctor is contacted to discuss the situation. In this case, the order will ultimately be filled or the doctor may write another prescription depending on the outcome of the discussion. Once filled, a prescription is generated listing the patient's name, drug type and dosage and any special instruction. The label is placed on the drug container and the drugs are sent to the appropriate nurses stations. The patient's admission number, the drug type and amount dispensed, and the cost of the prescription are sent to the billing department.   [20]

QUESTION TWO

a) What is normalization.   [1]

b) What are the advantages of normalisation   [3]

c) Define the rules for:

    i)   First Normal Form   [2]
    ii)   Second Normal Form   [2]
    iii)   Third Normal Form   [2]

d) Normalise the following data for an Electives Class List

    Class code
    Class name
    Tutor code
    Tutor First Name
    Tutor Last Name
    Tutor Phone Extension
    Class max size
    Space available
    Student id
    Student Last Name
    Student First Name   [10]

QUESTION THREE

a) Given the narrative description come up with:

    i)   A decision tree   [12]
    ii)   a decision table   [8]
           to the problem

A student may receive a final course grade of A,B,C,D, or F. In deriving the student's final course grade, the instructor first determines an initial or tentative grade for the student, which is determined in the following manner:

A student who has scored a total of no lower than 90% on the first three assignments and exams and received a score no lower than 70% on the

fourth assignment will receive an initial grade of A for the course. A student who has scored a total lower that 90% but no lower than 80% on the first three assignments and exams and received a score no lower than 70% on the fourth assignment will receive an initial grade of B for the course. A student who has scored a total lower than 80% but no lower that 70% on the first three assignments and exams and received a score no lower than 70% on the fourth assignment will receive an initial grade of C for the course. A student who has scored a total lower than 70% but no lower than 60% for the first three assignments and exams and received a score no lower than 70% on the fourth assignment will receive an initial grade of D for the course. A student who has scored a total lower than 60% of the first three assignments and exams or received a score lower than 70% on the fourth assignment, will receive an initial and final grade of F for the course. Once the instructor has determined the initial course grade for the student, the final course grade will be determined. The student's final course grade will be the same as his/her initial course grade if no more than three class periods during the semester were missed. Otherwise, the student's final course grade will be one letter grade lower than his/her initial course grade (for example, an A will become a B). [20]

QUESTION FOUR

A project has been defined to contain the following list of activities along with their required times for completion

	ACTIVITITY	TIME (WEEKS)	IMMEDIATE PREDECESSOR
1	Collect requirements	2	-
2	Analyse processes	2	1
3	Analyse data	3	2
4	Design processes	8	2
5	Design data	5	2
6	Design screens	1	3.4
7	Design reports	4	4.5
8	Program coding	5	6.7
9	Test and document	7	7
10	Install	3	8.9

a) Draw a Pert chart for the activities. [10]
b) Determine the critical path. [10]

SECTION B

QUESTION FIVE

a) In a feasibility study the preparation of the cost/benefit element leads to the identification of financial viability of the project. What costs and benefits go into this document and what items are locked at in the calculation of each? [12]

b) What are the advantages and disadvantages of in-house development of software over purchasing? [8]

QUESTION SIX

a) What frameworks of fact gathering are you familiar with, and what are the advantages and disadvantages of each. [12]

b) What are the duties and responsibilities of a system's analyst? [8]

QUESTION SEVEN

a) Given an example and explain 5 reasons for initiating systems analysis and the advantages of analyzing an existing system. [12]

b) What Data Processing Strategies are in existence today? [8]

END OF QUESTION PAPER