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Duration:	2 Hours Marks: 100

First Examination Question Paper

Lecturer / First examiner: W.S. Torbitt

Moderator: Dorothea W esthofen- Kunz

This question paper consists of 4 pages (including the front page)

Student Name:

Student Number:

Instructions for the Students

1. Answer all questions.
2. When answering questions you should be led by the allocation of marks. Allow approximately 1 mark per minute. Answers in point form or by diagram encouraged.
3. A copy of the registration 'case study' is attached for your reference at the back of the paper.

1)

a. What are the three main aspects of systems analysis/design? [3]

b. Name three human qualities which a systems analyst ought to possess, with reasons. [6]

2)

a. Make a sketch of the waterfall models and explain its principles. [4]

b. The 'waterfall' model strictly separates analysis and design. In more modem models analy sis and design often overlap and 'iterate' with each other. Explain. [4]

3)

a. Draw a flowchart showing all the important activities of the requirements phase. [6]

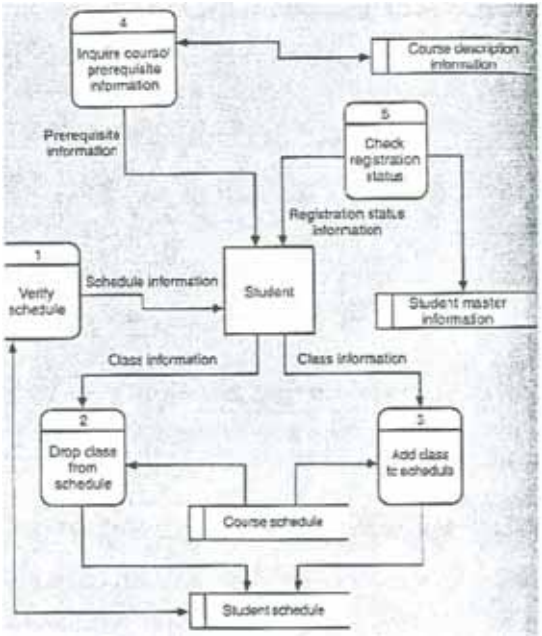
b. What are the important decisions to be made at the conclusion of the analysis phase. On what grounds should these decisions be made? [6]

4)

a. Explain the concepts of coupling and cohesion in modular design [4]

b. What is the difference between architectural and detailed design? [4]

c. Convert the following dataflow diagram to a structure chart, using the techniques of transac tion analysis: [8]



5)

a. What is meant by risk analysis? [4]

b. Name at least three risks in introducing a new system and a way of mitigating (lessening the impact) these risks. [6]

c. You are confronted by the decision on whether to write the 'registration' system or buy offthe-shelf software. The cost of developing the software will be $250 000; however there is a 60% probability that the software will not be ready in time, resulting in further costs and penalites of$ 75000. The cost of buying the software will be $150000 with all licences and

support - however, there is a 30% chance of the vendor going out of business, in which case an extra $100 000 will have to be spent on other maintenance and support. Furthermore, if the users don't like the system and refuse to use it, we will have to go back and develop our own system anyway (a 10% chance). Would you develop or buy (with reasons)? (Note this situation is highly simplified !).

[6]

6)

a. What is illustrated in a context data flow diagram? [3]

b. Draw a context and a first level dataflow diagram of a student applying to register for a course on the system and receiving acceptance or refusal. (A record of the student's applica tion must be kept in either event). [6]

c. In drawing a dataflow diagram, should we:

i. Connect one external entity directly to another?

ii. Connect one data store directly to another?

iii. Connect one process directly to another?

Explain why or why not. [6]

7)

a. In data design, why is it important to know whether entities A and B have a one-to-one, one to-many or many-to-many relationship between them? [3]

b. Draw an entity relationship diagram, showing the entities and relationships between stu dents, subjects, courses, lecturers and text books. [6]

c. What will the ERD eventually be used for, in the implementation of the system? [3]

8)

a. What should your (different) guidelines be for the design ofa user interface in the case of i) an inexperienced non-technical user ii) an experienced trained user?

[4]

b. Illustrate this by sketching a possible screen for a would-be student applying to register for a course on the Internet, and then the same but for a trained registration official.

[8]

Student registration case study.

At the beginning of the year, in a large college, students arrive to register. The college is composed of several faculties (science, the arts, law etc.) Each faculty offers several courses within its area of study. These courses are made up of several subjects. Each subject forms a module of the course for which the student obtains a credit if he/she passes it. A student will graduate from the course when he/she has obtained a sufficient number of credits. Students may be new (registering for a course for the first time) or senior students continuing with their courses. To enter a course a student must have prerequisites (eg a school certificate) and many of the subjects have prerequisites (a student must have passed some subjects before he/she can continue with others). The system will check that a student has the necessary prerequisites before registering for a subject. Each subject is taught in one or more classes as shown on the schedule (timetable). A student is not allowed to register for subjects which clash on the timetable - the registration system will check for this also. There is a fee for each subject which the student must pay on registration. There is at least one textbook prescribed for every subject - the student is told of these on registration and must acquire them. (Some texbooks can be used for one or more subjects or courses). There are one or more lecturers for every subject, and generally each lecturer teaches more than one subject.