1280

University of Swaziland

Department of Computer Science

Supplementary Examination

2015/16

Title of Paper: Software Engineering I

Course Number: CS451

Time Allowed: Three (3) hours

Instructions: ***ANSWER ALL QUESTIONS***

You are not allowed to open this paper until you have been told to do so by the invigilator.

Question 1

a) Convert the following program into a decision tree. [7]

IF hour == 8am THEN commute time = long

IF hour == 9am AND accident == yes THEN commute time = long

IF hour == 9am AND accident == no THENcommute time = medium

IF hour == 10am and stall == yes

THEN commute time = long

IF hour == 10am and stall == no

THEN commute time = short

b) A marketing company wishes to construct a decision table to decide how to treat clients according to three characteristics: [18]

- Gender
- City Dweller
- Age group: A (under 30), B (between 30 and 60), C (over 60)

The company has four products (W, X, Y and Z) to test market.

- Product W will appeal to male city dwellers.
- Product X will appeal to young males.
- Product Y will appeal to female middle aged shoppers who do not live in cities.
- Product Z will appeal to all but older males.

Question 2

a) Draw a physical DFD for the case study below. [10]

PEACE UNIVERSITY

A college offers correspondence courses to students. Each course lasts 20 weeks and is based on a weekly study module and progress test. At the end of the course students sit an invigilated examination.

The college Registrar deals with enquiries and applications, and students applying who have sufficient qualifications are asked to register by completing and submitting an application form.

After approval by the Academic Director, the application form is returned to the Registrar who creates a student file. The Accounts department receives the application form and using information from the student file creates an invoice that is sent to the student. Payments made are registered on the invoice file. The first batch of student material and tests is issued from the library only to students who have paid fees (this information is taken from the invoice file).

Progress tests are marked by academic staff and the results, together with comments, are sent out with next week's study block. The library will only issue study material/progress tests when a student has returned test answers from the previous week.

b) Draw a logical DFD for the case study below. [15]

PIGG'S PEAK ANIMAL PARK

The keepers in an animal park look after the feeding of the animals. Each animal is located in a different area of the park. Each area has its own keeper who reports to the head keeper.

The head-keeper maintains a record of the sorts of food that each animal species or type in the park should be fed, and in what quantities. There is no distinction made between different animals of the same species. The keepers access the information so they know what to feed each animal type. Each animal type may be given more than one type of food, and each type of food may be fed to a number of animal types. Each day the keepers will take out the food needed for the animals in their care and record this on the information system. These food types can be perishable or non-perishable according to their shelf life. For example, fresh fruit and vegetables would be perishable where tinned produce or cereals would be considered to be non-perishable.

The office staff keep a track of the food supplies. They monitor which foods are running low every two or three days and draw up a list of that which needs to be ordered. In order to help them, the information system contains details about re-order quantities and re-order levels. Sometimes they may need to readjust their re-order levels.

A number of suppliers are used, and their names, addresses and telephone numbers are kept in the system. Because of the large quantities required and the difficulty of

obtaining some foods at certain times of the year, there is more than one possible supplier for each type of food. Most of the ordering is done via the telephone. A standard order form is then created. The order form usually contains details of more than one food type to be ordered from a particular supplier. The order also contains details of the date of the order and what quantities are required for each food type.

When deliveries are received, the keepers check the delivery note against the goods received, amend it if necessary and pass it on to the office. Here it is checked against the orders placed. It they agree, this is recorded in the system. The office staff check the received orders against an invoice sent by the supplier. If they agree, payment is be made. Any discrepancies are taken up with the supplier, and the supplier's response is noted in the system. Most suppliers send an invoice each month.

Question 3

Draw ER diagrams for the case studies below:

Case 1:

The registrar at a small college wants an application that will help their department keep track of the schedule of classes, the courses and lecturers appearing in the schedule, and the students registering for courses according to the schedule.

Courses are scheduled every semester and this is documented in the schedule of classes, which also documents the lecturers assigned to each schedule of a class. Students register for courses according to the schedule of classes.

Users (students, lecturers, and other college staff) must login to the application to gain access, and the application must keep track of user logins/logouts. In addition, users must have different levels of access, which will determine their access to different parts of the application. [8]

Case 2:

A small accounting firm wants a simple HR application that will help it to keep track of its employees, their positions, allowances, salary scales, and which company vehicles their employees drive.

The application must keep track of all the positions at the firm, the employees filling

these positions, the allowances for these positions, the salary scales for these positions, and the company vehicles assigned to these positions. [6]

Case 3:

The owners of a small computer repair shop would like to keep track of the repair jobs for computers they repair, the items used for each repair job, the labor costs for each repair job, the repairmen performing each repair job, and the total cost of each repair job.

When customers bring their computers in to be repaired, they make a deposit on the repair job and are given a date to return and uplift their computer. Repairmen then perform repairs on the customers' computers based on the repair job, and detail the labor costs and the items used for each repair job.

When customers return they pay the total cost of the repair job less the deposit, collect a receipt for their payment, and uplift the repaired computer using this payment receipt. [11]

Question 4

a) State and describe the six (6) required properties of a software system. [6]

b) The Requirements Analysis (RA) phase consists of two main activities --- Analysis and Specification. Clearly describe these two activities, making the distinction between them clear. [4]

c) Describe eight (8) activities that may be included in the design phase. [8]

d) A project plan has thirteen (13) important constituents. Name and describe any seven (7). [7]

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