University of Swaziland

Department of Computer Science

Final Examination

2015/16

Title of Paper: Software Engineering I

Course Number: CS451

Time Allowed: Three (3) hours

Instructions: **ANSWER ALL QUESTIONS**

Question 1

a) When designing software, one may use a top-down (de-compositional) approach or a bottom-up (compositional) approach. Discuss the difference between the two. [3]

b) Discuss six (6) properties of a well written SRS. [12]

c) Name and discuss the two (2) types of requirements that are found in the SRS. [4]

d) A software system is said to have three (3) views, name and discuss them. [6]

Question 2

a) With the help of a well labeled diagram, discuss symmetric modeling. [8]

b) Draw a physical DFD for the scenario below. [4]

4REAL TRAVELS

Mxolisi receives customer travel request. If rail travel is requested, he forwards it to Melusi and Air travel request are forwarded to Mlungisi. Melusi and Mlungisi process request by consulting the rail and airline operators and looking at the time-table and fares tables. These tables are written on paper. For travel request that can be met a travel ticket is produced.

c) Draw a logical DFD for the scenario below. [13]

PIZZA SUPREME

A large pizza business makes pizzas and sells them. The pizzas are manufactured and kept in cold storage for not more than two weeks.

The business is split into a number of functional units. There is Production Control, Manufacturing, Stores, Accounts, Sales, Shipping and Purchasing. Production Control are responsible for organising which pizzas to produce in what order and in what quantity. They need to schedule the production of the pizzas according to the current and expected sales orders together with the number of pizzas already in Stores. Manufacturing take the raw materials from the Stores and manufacture pizzas returning the completed goods to the Stores. Accounts deal with the payments for the pizzas when delivered to the customer and the payment to the suppliers of the raw materials. Sales deal with customer orders whilst Purchasing

organise the buying of raw material from suppliers. Shipping manage the packing and delivery of the goods to the customer with a delivery note.

When a sales order is received by sales they record what is being ordered and by whom. They also record the details of the expected date of delivery. Production Control accesses this information and makes sure that, if required, pizzas are produced by Manufacturing and are ready in Stores for when the delivery needs to be made.

After the delivery is made Accounts make sure that the customer receives an invoice and that payment for the invoice is received at which time a receipt is issued. Purchasing looks at the current stock of raw materials and by using current stock levels, supplier turnaround times and quantity to be ordered decide what needs to be ordered on a daily basis. Their aim is never to run out of an ingredient but to minimise the amount of raw material kept in stock.

Question 3

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 THEN commute 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 4

a) Draw ER diagrams for the case studies below:

Case 1:

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 2:

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]

b) Draw a PERT diagram for the following project. [8]

Activity	Duration	Predecessor
A	12	-
B	9	-
C	10	A
D	10	B
E	24	B
F	10	A
G	35	C
H	40	D
I	15	A
J	4	E, G, H
K	6	F, I, J

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