The Open University of Sri Lanka
B. Sc. Degree Programme – Level 05
Department of Mathematics and Computer Science
Final Examination - 2009/2010
CSU 3277: Software Engineering – Paper II

Duration: Two and half hours

Date 03.01.2010 Time: 1.00 p.m. to 3.30 p.m.

Answer FOUR Questions ONLY.

1.

i. State and discuss the responsibilities of a project manager.

ii. State the components of a project cost.

iii. Give a brief account on each of the following cost estimation techniques:

a. Estimate by analogy

b. Expert judgments

c. Algorithmic

iv. Do you think that the use of one technique is adequate in estimating the cost of a project? Justify your answer.

2.

i. What is the objective of software testing?

ii. Explain the following:

a. Stress testing b. Acceptance testing

c. Unit testing d. Integrated testing

iii. State and discuss the types of software maintenance.

iv. What are the major problems associated with software maintenance?

v. What does software reuse mean?

3.

A narrative of a user's requirements in an organization is given below:

"We, a company, receive a number of items from many vendors and we receive at the receiving office. As we receive over 1000 items a day it is now virtually impossible for the receiving office to check whether the vendor has supplied items against an order, or sent a wrong item and informs the purchase office. We are also not able to find out if there are excesses or deficiencies in delivery and whether the vendor adhered to the delivery schedule as per the order. The items received at the receiving office are sent for physical inspection.

The physical inspection consists of checking whether the quantities stated in the delivery note agree with the physical count, whether the item is the correct one as ordered, and a check on the quality of the item. We would like to keep a record of rejections due to bad quality, incorrect items, excess/deficient supply etc., determined during inspection. This will enable us to assess vendors' reliability to guide us in placing orders in the future, besides keeping track of supplies.

Items cleared by the inspection office are taken into the inventory by the stores office which keeps a ledger of items stocked and quantity available of each item. Customers send requisitions to the stores. The stores fulfill the requests based on the availability and update the ledger. Currently, we are not able to meet some of our customers' requests. We would like to incorporate automatic reordering by our purchase office, if the inventory level of an item is low. We would also like to keep track of unfulfilled requests due to unavailability and meet them when items reach the store. Currently, we are not able to pay our vendors promptly due to delays in payment order reaching our accounts office. We would like to rectify this. We would also like to bill our customers promptly and keep track of customers' payments"

Develop the processing rules in structured English for the inspection process of the user requirements stated above.

4.

i. Explain the relationship between ERD method and the other main methods, such as DFD, structure charts, etc.., built during the system development.

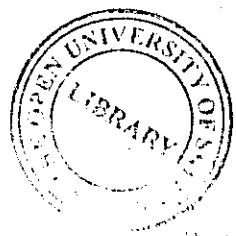
ii. A company that rents plants to other firms to decorate their offices needs an information system to support its operations.

The system needs to keep track of what plants the company owns (each one is bar-coded), what species and how valuable each one is, its monthly rental rate, and how much it weighs and what size pot it is in (for transport purposes) as well as when it next needs to be watered.

The firm that rents each plant, the plant's location and when it was installed at that location, are also to be recorded, together with the rental contract ID number, start date and period of the contract (in months).

Note that a firm does not have a separate rental contract for each plant. Rather, *all* the plants it rents are specified on a single contract with the plant rental company. There are two kinds of contracts; long term and short term. Long term contracts attract a discount (which is negotiated separately for each one) and are automatically renewed unless the renting firm tells the rental company, before the existing contract expires, that it is to be terminated.

Develop an entity-relationship data model for this system.



5. A program has to process a single input file and produce a report. The input file is sorted by customer-id. Each record contains a product identifier and a quantity field, which indicates how much of the product that a customer has ordered. There are two types of customers; discount customers and normal customers, distinguished by a code of "D" or "N" in a record respectively. A database can be directly accessed to give the cost per unit of a product based on the product identifier code and the outstanding debt of a customer, based on the customer-id code. "D" type records also have a discount field that represents the percentage discount the customer gets on all items. The summary report consists of one line for each normal customer, two lines for each discount customer, and two overall summary lines. The normal customer summary line has the total value of the transactions, the old and the new debt. The first line of a discount summary has the total value of the transactions, the discount level, and the discounted value. The second line has the old debt and the new debt. The overall summary totals the debts and values.

Develop the Program Structure diagram for the problem given above using the Jackson-Structured Design methodology.

6. According to an interview, the specific process flow for sales processes is as follows:

A customer contact is already available. Customer contact processing is initiated by this customer contact.

If the customer shows an interest in the products/services during the customer contact phase, then an inquiry is to be created from the contact. The customer contact can also be unsuccessful. Once the inquiry has been created, the customer inquiry is processed. Alternatively, the inquiry processing can also be triggered by the inquiry of a new customer (without reference) being received.

During the processing of the customer inquiry, the following events could occur, depending on the prevailing situation:

- If all the requested products/services are available, the inquiry is recorded in full.
- Given a possible partial shipment, the inquiry is partially entered. If the required items are not available, the inquiry will have to be rejected, thus terminating the process.
- In the case of complete or partial entry, the customer offer is processed. This process can lead to the following situations:
- Either a customer order is received or the customer offer is rejected. If the customer order is received, the Process customer order process is started.

The result of the customer order processing can be described as follows:

- Either the order data are incorrect or the order confirmation is sent.

Draw a structure diagram for this scenario.