University of Swaziland

Department of Computer Science

Final Examination

2017/18

Title of Paper: Software Engineering I/Practices in Software Engineering I

Course Number: CS451/CSC392

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) With the aid of a detailed diagram discuss the symmetric model.   [13]

b) How is the symmetric model different from waterfall and sequential models?
     [6]

c) State six (6) benefits of prototyping.   [6].

Question 2

a) A Data Flow Diagram (DFD) is made up of four (4) components, name and define them. Use diagrams in your definitions.   [8]

b) What is the difference between a physical DFD and a logical DFD?   [2]

c) Below are two scenarios – one is for a Sales Order Company and the other for the Institute of Distance Education (IDE). Draw Level 1 DFDs for both of them.

i)   SALES ORDER COMPANY

Consider a book sales company. The company receives orders from customers and processes them accordingly. Orders for books that are available on stock are prepared and dispatched immediately. For books that are not available on stock, the company prepares purchase orders and sends them to the publishers of the respective books. The company keeps records of the books available on the market, not necessarily on stock and the publishers of those books. The company receives updated information from the publishers, from time to time. The company keeps records of all its customers.   [6]

ii)   INSTITUTE OF DISTANCE EDUCATION (IDE)

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.   [9]

Question 3

a) A typical Software Requirements Specification (SRS) contains two (2) types of requirements, name and define them.   [4]

b) Discuss the difference between the de-compositional and compositional approaches. [4]

c) Define the following:

   i)   EST   [1]

   ii)   LST   [1]

   iii)   ECT   [1]

   iv)   Slack Time   [1]

   v)   Critical Path   [1]

d) Draw an ER diagram for the scenario below:

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.   [12]

Question 4

a) Draw a decision tree and table for the case below:

Product decision. To absorb some short-term excess production capacity at its plant, Special Instrument Products is considering a short manufacturing run for either of two new products, a temperature sensor or a pressure sensor. The market for each product is known if the products can be successfully developed. However, there is some chance that it will not be possible to successfully develop them. Revenue of E1,000,000 would be realized from selling the temperature