

University of Swaziland

Department of Computer Science

Final Examination 2005

Title of paper : Software Engineering

Course number : CS449 (II)

Time Allowed : Three(3) hours

Instructions :

- *Each question is worth 25 marks.*
- *Answer any four (4) questions from questions 1 to 6*

This paper may not be opened until permission has been granted by the invigilator

Questions 1, 2 & 3 are based on the following case study.

Manzini Sound and Video (MS&V) Store.

Samuel (Sam) Thwala is the owner of Manzini Sound and Video (MS&V) store, a small mail-order store that features video and audiocassette tapes. The store is located on Martin Street in Manzini and operates from 8a.m to 6p.m daily. He keeps an inventory of all the 100 most popular video and audio titles in his shop, he orders other titles from four South African distributors he deals with. Others that cannot be filled from these sources are returned to customers marked “unavailable item”.

All of Sam’s business is mail order. He publishes a flier of 200 titles four times a year, based on current best-selling titles reported in trade publications. In addition, he sometimes runs spot ads in the Sunday times newspapers.

When an order is received, the payment is verified before the order is filled. If payment is a cheque, Sam holds the order for fourteen days or until the cheque has been cleared by the bank. Sam deposits cheques and money orders every other day with his bank. He also accepts cash cards and credit cards such as Master cards, Visa and American Express. In order to verify whether accounts are good, he looks at weekly listing of bad account holders, as provided by credit card companies. However, on a number of occasions, he has accepted a “bad” credit card or a card being used by an unauthorized user because the information in his weekly listing was not 100% up-to-date.

Daily orders are separated into two categories: In-stock orders and special orders. In-stock orders are filled and shipped to customers on daily basis. A photocopy of the order form serves as a packing slip. If the item is for a special order, the special order file is updated and the customer’s order is placed in a pending file.

Every Monday, Sam retrieves his special orders from the file and places his weekly purchase orders to obtain sufficient inventory of these titles. He also takes this opportunity to replenish his in-house inventory. He very often reviews the 100 titles he regularly carries in stock, adding new ones and eliminating slow sellers.

Sam places his orders for inventory over the phone and by fax, sends each vendor a follow-up purchase order. For each purchase order faxed, he files a copy in his placed-orders file. When he receives these items, he fills the outstanding orders as well as the special orders. After an order has been filled, he transfers the orders form to an orders-filled file.

When an order is filled, the customer's name and address are checked against a customer card file that is used for quarterly mailings. If the customer's address has changed, the customer's card file is updated.

At the end of each month, Sam processes his accounts payable. He tries to take advantage of vendor discounts by paying bills within discount periods. At the beginning of the second week of each month, Sam's accountant comes in, collects the previous months records and provides Sam with a monthly activity report summarizing his profits and loses. At this time Sam reviews his inventory, adjusts his titles and updates his flier for mailing purposes.

Question 1 – 25 marks

Using UML notation, draw a USE CASE diagram for of Manzini Sound and Video (MS&V) store *25 marks*

Question 2- 25 Marks

- (a) Without assuming any particular implementation, draw a sequence diagram for the scenario described in paragraph 6 of the of Manzini Sound and Video (MS&V) store. *15 marks*
- (b) Assuming a windows implementation, re-draw the sequence diagram obtained above. *10 marks*

Question 3 – 25 Marks

Using UML notation, draw a class diagram for Manzini Sound and Video (MS&V) store. Show suitable classes, structures, attributes, services, instance and message connections. *25 marks*

Question 4 - 25 Marks

- (a) Briefly discuss the general weaknesses of traditional software development methods. *10 marks*
- (b) Explain how object-oriented methods address the general weaknesses of traditional software development methods. *15 marks.*

Question 5 - 25 Marks

- (a) Explain the notions of cohesion and coupling. *5 marks*
- (b) What is the essence of information hiding? *5 marks*
- (c) Explain how coupling, cohesion and information hiding are interrelated design principles? *6 marks*
- (d) Explain how object-oriented design enforces the following qualities of good design: *Information Hiding, Weak Coupling, High Cohesion.* *9 marks*

Question 6 – 25 Marks

- (a) Explain the importance of having a well-designed user interface. *5 marks*
- (b) Discuss the role of the following techniques in the design of a user interface
- (i) User profiling. *4 marks*
 - (ii) Task profiling. *3 marks*
 - (iii) Prototyping. *4 marks*
- (c) Give some advantages and disadvantages of the following interaction styles.
- (i) Menu based interface *3 marks*
 - (ii) Form Fill-in. *3 marks*
 - (iii) Natural Language *3 marks*