University of Swaziland

Department of Computer Science

Final Examination

2014/15

Title of Paper: Software Engineering II

Course Number: CS452

Time Allowed: Three (3) hours

Instruction: ***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) What is Software Testing? What does it normally provide? [2]

b) State the difference between an error, a fault and a failure. [3]

c) What is the difference between functional and non-functional testing? [2]

d) A Brazilian software development company called Double X developed a very large software system for selling the 2014 FIFA World Cup Tickets. Few months before completion they discovered that they were behind schedule and they approached a prominent Portuguese software development company called MINIT, to help them develop some of the remaining modules.

MINIT is known for developing applications for some Portuguese speaking countries like Brazil. Thanks to MINIT, in a few months the project was back on schedule and it was complete. The Local Organizing Committee (LOC) that was the organizer of the World Cup in Brazil instructed Double X to move to the next level before the release of the software, testing. Double X knowing how complicated it is to test a software system this big, decided to rope in an American software development and testing company called DDT, to do the testing.

Develop a full test plan for DDT, outlining (clearly) all the appropriate modes of testing that will be used, the test cycle and all the test artifacts. Terms not accompanied by proper definitions and proper reasons will not be awarded any marks. [18]

Question 2

a) Discuss the difference between coupling and cohesion. [3]

b) Why is a high degree of coupling not desirable? [1]

c) Discuss in detail 3 forms of coupling that are not desirable. [9]

d) Discuss in detail 2 forms of cohesion that are not very desirable and 2 that are highly desirable. [12]

Question 3

a) Define a use case diagram and also state the components that make up a use case diagram. [4]

b) Define a sequence diagram and also state any three components that make up a sequence diagram. [4]

c)

Manzini hospital x-ray management system.

Patients present X-ray request forms, obtained from their doctors, to the receptionist. The receptionist receives each form and produces an appointment card which is given to the patient. This card contains information such as patient particulars and the time and date on which the patient may come for the X-ray. The X-ray request forms are filed for later reference. The receptionist also keeps a diary of all the appointments.

When patients arrive for X-rays on the appointed date and time, they produce their appointment cards. A nurse checks the validity of the card and passes the appointment card to the clerk. The clerk generates an x-ray film-and-report request form for the filing section. The X-ray request form is retrieved from the file and given to the radiographer. The X-ray film-and-report requests are placed in a temporary file for collection by the filing section.

On receipt of the X-ray request form, the radiographer takes the appropriate photographs (called films) and places them on a temporary file for collection by the filing section. Each appointment results in a set of films.

The filing clerks collect the X-ray film-and-report requests. A patient may have many X-ray films and reports, the new films are attached and placed on a temporary file for the attention of the radiologist who will make out a report for the appointment.

The radiologist examines all the X-ray films and reports which the patient has and produces a final report which is sent to the patients' doctor. A copy of this report is also sent to the filing section. When the filing section receives this report all corresponding films and reports are returned to the permanent files.

i. Using UML notation, draw a USE CASE diagram for the X-ray management system. [10]

ii. Draw a sequence diagram for the scenario described in paragraph 2 of the description of the X-ray management system. [7]

Question 4

a) Name four constructs of an object-oriented (OOA) model. [4]

b) Draw an object-oriented (OOA) model for the VIP cosmetics company described below. [20]

VIP cosmetics

VIP cosmetics is a successful network sales company. The company sells a variety of health and beauty products through selected distributors. A distributor is a person who has committed himself to selling the products of the company. The distributors then sell to the general public. VIP keeps a list of all its distributors. This list details the distributor name, postal address and other essential details.

Distributors buy products by placing orders with VIP head office. The order contains a list of items that the distributor wants to buy. This list details the product identity code and the quantity being ordered. The total cost for each order item may also be computed by multiplying the quantity by the product price. The product price may be obtained from a list of all the products. This list details the product code, name, description and price. The total cost of each order may be computed by summing the cost of each item on the order.

Distributors receive a discount depending on how many points they have accumulated since joining VIP as a distributor. The number of points is proportional to the accumulated total cost of their orders. For example, if they place an order costing E200 they receive an extra 200 points. Distributors who have just joined VIP receive 30% discount. Distributors who have accumulated 2 500 points receive 35% discount, 10 000 points receive 40% discount, 20 000 points receive 44% discount, 40 000 points receive 48% discount and 80 000 points receives 52% discount.

VIP requires a software system that will help their head office personnel in processing the orders. On receiving an order they want to be able to quickly calculate the item cost, the gross total cost for each order and the discounted cost for each order. They also want a system that will keep track of the accumulated points for each distributor and hence making it easy to calculate the discount.

Sometimes they want to view the list of distributors, orders and products. This listing must be selectable such that when a distributor is selected, the order list for the distributor is also visible. In turn this order list must be selectable such that when an item is selected on the order list the product details are also visible.

c) Define a Graphical User Interface (GUI). [1]

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