

University of Eswatini

Department of Computer Science

Final Examination

2020/21

Title of Paper: Practices in Software Engineering II

Course Number: CS491

Time Allowed: Three (3) hours

Instructions: 1) This paper has five (5) questions and each carries 25 marks.

*2) Section A is **COMPULSORY**.*

3) Answer any two (2) questions in Section B.

You are not allowed to open this paper until you have been told to do so by the invigilator.

SECTION A (COMPULSORY)

Question 1

a) Define the following:

- Data Coupling [4 marks]
- Stamp Coupling [4 marks]
- Control Coupling [4 marks]
- Common Coupling [4 marks]
- Content Coupling [4 marks]

b) Name any five types of cohesion. [5 marks]

Question 2

(Use the description below to answer question 2 and 3)

Good People Video Library Club (GVLC)

The Good People Video Library Club (GVLC) specializes in obscure videos that are not readily available from other sources. GVLC lends only to members of the Video Society, part of an exclusive and very desirable Good People's Club. Any member of the club is automatically a member of the library club. Club membership is for one year; a few new members are admitted on 1 January each year. New members are not admitted during the year. A club membership secretary is responsible for admitting new members and corresponding with the membership in general.

The library is set up along conventional lines, though members are not restricted as to the number of videos they may borrow at any one time. Videos are requested for return only if required by another member. Most active users of the library club regularly change their videos. Two (2) or three (3) copies of popular titles are available.

In order to borrow a video, a member selects it, takes it to the issue desk and gives the video and his club membership card to the librarian. The librarian takes the video card, from the video sleeve, and adds the membership number to the card. The librarian then places the video card into the loans file and the member leaves with the video.

When a member returns a video, he or she presents the video to the librarian. The librarian finds the video card in the loans file and places the card in the video sleeve before returning the video to the library shelves.

To reserve a video that is on loan, a member asks the librarian and leaves his/her membership number. The librarian finds the relevant video card in the loans files and adds the member's number on the reservation column on the video card. The librarian also makes a note of the member who has the video on loan and completes a return request card addressed to that member. The address is taken from the library copy of the club membership book. When the reserved video is returned, the librarian puts the video on the reservations shelf and completes a reservation ready card addressed to the first member who requested the reservation, again taking the address from the membership book.

Members make many inquiries of the librarian. Typical questions include: Is the video entitled The Gods must be crazy available? Which videos did actor Tom Cruise appear in? Do we have a video entitled Dead man walking? Do we have any videos on the subject of Human rights?

The librarian is able to answer these queries by inspecting the loans file, the actor index, the title index and subject index. In addition to the above duties, the librarian receives new videos from the social committee of the club whose chairperson is the club membership secretary. On receipt of a new video, the librarian has to make out a video card for insertion into the video sleeve and make the relevant entries into the indexes. The librarians are also responsible for house keeping: Like amending the library copy of the club membership with changes of address and, at the end of each year, collecting the new membership book from the Club membership secretary. Occasionally the librarian also takes out damaged videos and sells off very old videos to interested members or non-members.

a) Using UML notation, draw an object-oriented (OOA) model for Good People Video Library Club (GVLC). Show suitable classes, structures, attributes, services, instance and message connections. [25 marks]

SECTION B

Question 3

- a) Using UML notation, draw a USE CASE diagram for GVLC. [15 marks]
- b) Draw a sequence diagram for the scenario described in paragraph 5, describing the procedure for reserving a video. [10 marks]

Question 4

- a) What is a test objective? What uses does it have? [2 marks]
- b) What is a test adequacy criteria? [2 marks]
- c) Distinguish between the following:
- i) An error [2 marks]
 - ii) A fault [2 marks]
 - iii) A failure [2 marks]
- d) What is the difference between fault detection and fault prevention? [3 marks]
- e) Describe the following test techniques:
- i. Correctness proof [4 marks]
 - ii. Control-flow coverage [4 marks]
 - iii. Mutation testing [4 marks]

Question 5

- a) Explain the importance of having a well-designed user interface [5 marks]
- b) Define the following:
- I. User Profiling [1 mark]
 - II. Task Profiling [1 mark]

c) Discuss the general weaknesses of traditional software development methods.

[9 marks]

d) Explain how object-oriented methods address the general weaknesses of traditional software development methods.

[9 marks]

End!!!