



ZIMBABWE EZEKIEL GUTI UNIVERSITY

FACULTY OF HEALTH, SCIENCE AND TECHNOLOGY

DEPARTMENT OF DIGITAL TECHNOLOGY

EXAMINATION PAPER

COURSE CODE : CDT 200
COURSE TITLE : Software Engineering
SPECIAL REQUIREMENTS : None
DURATION : 3 Hours
LEVEL : 2.1
DATE : August 2021

ZIMBABWE EZEKIEL GUTI UNIVERSITY

EXAMINATIONS August 2021

20 AUG 2021

1901 BARRAS ROAD, HARARE
P.O. BOX 320 HARARE 11 B AM

INSTRUCTIONS TO CANDIDATES:

1. Answer **ALL** Questions in Section A.
2. Answer any **THREE** Questions from Section B.
3. The marks allocation for each question are indicated in **BOLD** font.

Section A [40 marks]

Answer ALL the questions from this section.

Question 1

Sonak runs a DVD rental company located in Harare. Currently Sonak relies on a manual system where members can reserve DVDs either over the phone or they come to the shop to do their reservations. For one to reserve a DVD they need to be members, if someone wants to join the DVD rental shop they need to pay a joining fee of \$100.

The proposed system will allow new members to register online and wait for their account to be activated by the receptionist. When joining new members need to provide their personal details together with proof of residence. The member need to come up with their username and password and the system will check for the availability of the username in the system. If the username is available, the member will be assigned that username otherwise the member is asked to provide another username. Once their account is activated by the receptionist they need to pay \$100 using their Debit cards so that they can start borrowing DVDs.

Unregistered members can only view a selected portion of available DVDs using the system but they cannot make any reservations. To borrow a DVD, a registered member can log into the system using their username and password and browse all the available DVDs in the shop and reserve the ones they want. A registered member can only borrow a maximum of 6 DVDs at a time. Once the registered members have reserved their DVDs, they will come to the shop to collect them where the receptionist log into the system to check if they have any outstanding DVDs on their account, if they have they need to bring the DVDs before they can be issued with a new loan. A new loan for DVDs will be for 10 days and failure to return the DVDs the system will charge a \$10 per day fine. A registered member can request for an extension of their DVD loan provided they do that 24 hours before the due date, failure to do that, they will have to return the DVDs on the due date.

- i) Identify the stakeholders for the new system. **[4 marks]**
- ii) Identify the business rules for Sonak company. **[4 marks]**
- iii) Come up with **five** functional requirements for the new system. **[10 marks]**
- iv) Invent **two** non functional requirements together with their fit criteria. **[4 marks]**

v) Come up with a use case diagram for the new system proposed above. [10 marks]

vi) Come up with an activity diagram to show a new member registering using the new system. [8 marks]

Section B [60 marks]

Answer any THREE questions from this section.

Question 2

i) Explain the uses of use cases [6 marks]

ii) Explain the difference between abstraction and decomposition with the aid of an example. [6 marks]

iii) Explain why a software life cycle model is needed during software development using an example. [8 marks]

Question 3

A customer named Rickson walks into a fast food restaurant termed Hot foods. Rickson ordered food, 2 piercer and a drink. The Hot foods restaurant has three payment methods for the food ordered by the customer which are namely; Cash, Debit using Bank cards and Eco cash, however, Rickson paid using cash.

i) Using the above scenario, come up with a class diagram to model the above description. [20 marks]

Question 4

Mitchell a fourth year student doing Software engineering is struggling to come up with a state chart diagram to represent the scenario below. Assist the student by coming up with the required state chart diagram.

The ZEGU hotel is empty when they are 60 empty rooms. Each time when a guest needs to check in the available rooms should be greater than or equal to 1 for the guest to be checked.

in otherwise the hotel is full. The hotel is deemed full when checking in a guest and the available room is 1. Checking out a guest should only be successful when the available rooms in the hotel should be greater than or equal to 1 so as to avoid a situation when the guest check out but the hotel is still full.

- i) Show the above scenario using a state chart and also use guards in your diagram [10 marks]
- ii) Explain the advantages and disadvantages of using a standard modelling language such as UML in software engineering. [10 marks]

Question 5

- i) Explain what is meant by the term Cyclomatic complexity metric. [4 marks]

ii) Study the below code

```
1. public String response (String text) {
2.   if (text.endsWith("?"))
3.     return "This Exam is easy..";
4.   Vector words = new Vector();
5.   StringTokenizer breaker = new StringTokenizer(text.toLowerCase(), ".,?!");
6.   While (breaker.hasMoreElements())
7.     Words.addElement(breaker.nextElement());
8.   If (words.size() > 1 &&
9.     Words.elementAt(0).equals("i") &&
10.    words.elementAt(1).equals("feel"))
11.    return "So you feel " + words.elementAt(2);
12.   for (int i=0; i<words.size(); i++) {
13.     String relative = (String) words.elementAt(i);
14.     if (isRelative (relative))
15.       return "Tell me how the Exam is treating you" + relative;
16.   }
17.   return "Tell me more..";
```

18.;

Calculate the Cyclomatic complexity metric of the above code. Note: Indicate the line number and the Cyclomatic complexity.

[16 marks]