



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 :

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

ZEGU runs a boat club in Victoria Falls. Currently the boat cruise relies on a manual system where they book members over the phone to do boat lessons but the challenge they are having with the manual system is that it is very difficult for the instructor to view members who booked to do lessons with them so the university decided to come up with a computerized system.

The new system will allow the club employee to enrol a member who wants to join the boat club. However, when a member wants to join the boat club, they can join as a standard member who wants to attend boating lessons or they can join as an instructor and in both cases they need to provide their credit card details so that the joining fee of \$30 can be deducted from their account and if they join as an instructor they need also to provide their qualifications.

Each time the club acquires a new boat the details of the new boat will be recorded by the club employee. The new system will allow the club employee to view all current reservations done by all members and also to view all current lesson bookings. Once a member has been registered in the system, they can now reservations for a boat, they can also book for a lesson but in order to book for a lesson they need to reserve a boat first. The member also can view their own current reservations, view own current lesson bookings. The new system will allow an instructor to view current lessons booked for. Members can access the new system anywhere by using web browsers and they can also access the system using PCs at the club premises.

- i) Identify the rules for the new system. **[4 marks]**
- ii) Explain the scope of the new system **[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 boat system proposed above **[10**

marks]

Read the following passage and answer the question that follows.

- vi) A standard member arrives at the club to book for a lesson, they are greeted by the receptionist who will ask them to provide their details. The receptionist will use the system to check if there is a free instructor and if there is no instructor available the member is informed and the process ends. But however, if there is a free instructor, the receptionist will check if there is a free boat, if the boat is not available the member is informed and the process ends, but however if the boat is available the receptionist will reserve a boat and book the lesson and then a booking number is generated by the system and is issued to the member and the process ends

Come up with an activity diagram to represent the booking process above, you are supposed to come up with two swimlanes, one for the member and the other for the receptionist.

[8 marks]

Section B [60 marks]

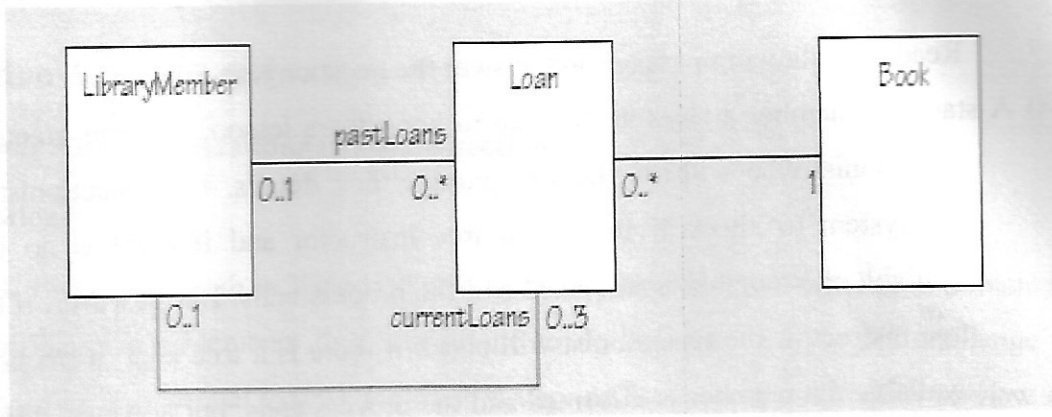
Answer any THREE questions from this section.

Question 2

- i) What are the characteristics of a good software system **[6 marks]**
- ii) Explain the following terms and also explain the testing techniques that are used for each term
- Verification **[6 marks]**
- Validation **[8 marks]**
- iii) Explain the agile manifesto **[8 marks]**

Question 3

- a) Explain the difference between a GRASP Expert and the GRASP Creator using examples **[8 marks]**
- b) The following class diagram depicts three classes.



Come up with a sequence diagram that sends the message borrow(b) to an instance of LibraryMember from aUserInterface, where b is a reference to the object representing the book that the library member m wants to borrow. **[12 marks]**

Question 4

- a) 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 100 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 **[12 marks]**
- b) Explain the advantages of CASE tools. **[8 marks]**

Question 5

- a) Calculate the Cyclomatic-complexity for the two codes and explain which code is more complex than the other. Show how you calculate each metric

[12 marks]

Code A

```
int i = 1;
while (i <= 5 ) {
    playACard(i);
    if (playerHasWon(i))
        break;
    i++
}
```

Code B

```
int j = 0;
int i = 2;
j = i;
j = j + i;
j++;
System.out.println (j);
System.out.println (i);
```

- b) Explain the steps to be followed when doing a Black box test.

[8 marks]