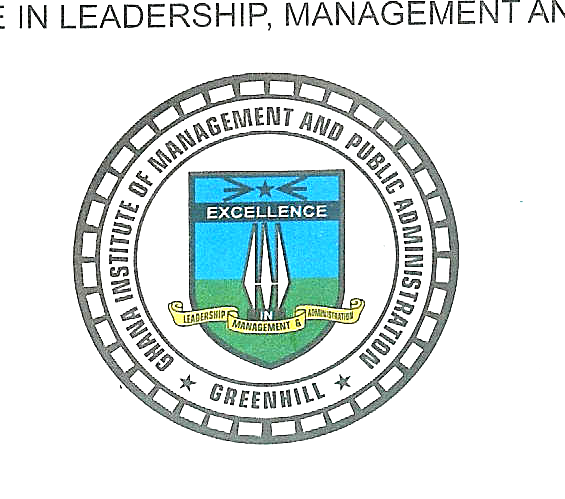
**GHANA INSTITUTE OF MANAGEMENT AND PUBLIC ADMINISTRATION**

**(GIMPA)**



**SCHOOL OF TECHNOLOGY**

**MID-SEMESTER EXAMINATION**

**DATABASE AND PROGRAMMING CONCEPTS**

**ANSWER ALL QUESTIONS**

**Question 1 [Database concepts]**

Steve Microfinance and Loans Limited is a small loans company which is beginning to gain popularity especially among borrowers in Ghana. The idea is to bring venture lenders together using information technology. Typically, the loans will be used to finance startup or development of the borrower’s company, so that there is a realistic chance for repayment. The money in a loan can, unlike traditional loans, come from many lenders. In this problem, you must **create an E-R model** that describes the information necessary to manage Steve Microfinance and Loans Limited.

The following information form the basis for creating the model:

1. Each borrower and lender must be registered with information about name and ad-dress.
2. A loan starts with a loan request, which contains information about when the loan should at latest be granted, the total amount being discussed (GHS), and how long the payback period is. Also, a description is included of how the money will be used. The rent on the payment is calculated in the loan amount, which is to say, the full amount is not paid.
3. Lenders can commit to an optional portion of the total amount of a loan request.
4. When the commitments for the loan request covers the requested amount, the request is converted to a loan. If not enough commitments can be reached, the loan request is cancelled. A borrower can have more than one request, and more than one loan at a time, but can at most make one request per day.
5. The loan is paid through an “intermediary”, typically a local department of a charity, who has a name and an address.
6. The borrower chooses when he or she will make a payment. Every payment must be registered in the database with an amount and a date (at most one payment per loan per day). The lenders share the repayment based on how large a part of the loan they are responsible for.
7. If the loan is not repaid before the agreed upon deadline, a new date is agreed. The database must not delete the old deadline, but save the history (the deadline can be overridden multiple times).
8. Each lender can for each burrower save a “trust”, which is a number between 0 and 100 that determines the lender’s evaluation of the risk of lending money to that person.
9. The number must only be saved for the borrowers, for whom there has been made such an evaluation.

**Questions**

a) Make an **E-R model** for the data described above. If you make any assumptions about data that doesn’t show from the problem, they must be described. Use the E-R notation from discussed in class and you may make reference from the text book. Put an emphasis on having the model express as many properties about the data as possible, for instance participation constraints.

b) Make a relational data model for Steve Microfinance and Loans Limited:

1. Describe at least about data types), and two of the relations using SQL DDL (make reasonable assumptions
2. State the relation schemas for the other relations.
3. Create the database for the ER model designed in (a) and populate the database with at least 20 different records.
4. Use the select statement to perform queries of your choice.

NOTE: The emphasis is if there is a correlation between the relational model and the E-R diagram from a), along with primary key and foreign key constraints being stated for all relation.

**Question 2 [Java Programming concepts]**

You work with National Investigation Bureau (NIB), Ghana and as the senior programmer you have been task to write a program to compute the gross salary and total savings of workers at NIB. Use the following to write the program. Use the gross salary and total saving as inputs and use a method named taxCalculator() to calculate the tax of each worker. The taxCalculator() method takes as parameters the gross salary as well as the total savings amount. Your program should be able to accept the name of the Worker, the Staff ID, Department, Date of Birth and Telephone number, the gross salary and the total savings from the Worker and then display the information together with the tax amount to the user.

The tax is calculated as follows:

1. The savings is deducted from the gross income to calculate the taxable income. Maximum deduction of savings can be Rs. 100,000, even though the amount can be more than this.
2. For up to 100,000 as taxable income the tax is 0 (Slab 0); beyond 100,000 to 200,000 tax is 10% of the difference above 100,000 (Slab 1); beyond 200,000 up to 500,000 the net tax is the tax calculated from Slab 0 and Slab 1 and then 20% of the taxable income exceeding 200,000 (Slab 2); if its more than 500,000, then the tax is tax from Slab 0, Slab 1, Slab 2 and 30% of the amount exceeding 500,000.
3. The program should allow for several workers to check their tax until a ‘No’ is selected, then you will exit application.