SULIT

SECP2523 DATABASE

SESSION 2024/2025 - SEMESTER 1

ALTERNATIVE ASSESSMENT REPORT: PHASE 1

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Section	Section 01
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Case Study	Improvement of KKK Online System
System Name	Koperasi Kakitangan KADA (KKK) Online System
Group Name	Tech Hi-Five

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1.0 System's Overview

This section shows an overview of KKK Online System, including its weaknesses and constraints, and the proposed improvements to the system.

1.1 Overall Description

The KKK online system is replaced manual processes with an online platform, the system is designed to improve efficiency, reduce administrative burden, and provide real-time access to data for both members and administrators.

Loan Module and Admin Reporting Module Overview

This system includes the following:

1. **Online Loan Application:** Moving the loan application process online to increase accessibility, decrease errors, and speed up processing.
2. **Loan Dashboard:** A customized dashboard where members may monitor their loan applications, loan statuses, repayment schedules, and outstanding balances.
3. **Dynamic Loan Interest Calculation**: Loan interest is computed automatically based on loan type.
4. **Report Generation**: Reports can be generated in PDF format and include the ability to filter data according to time periods such as monthly and annually.

Current Issues:

1. **Manual Process**: Financial records and loan applications are still processed by hand, which causes delays and raises the possibility of mistakes.
2. **Inconsistent Reporting**: Since financial reports are produced by hand, the data frequently contains errors and inconsistencies.
3. **Limited Communication**: It is challenging to efficiently manage member information and check loan statuses due to ineffective communication between administrators and members.

Group Members' Name	Matic No	Module
Tan Yi Ya	A23CS0187	User Module
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Teh Ru Qian	A23CS0191	Loan Module
Goe Jie Ying	A23CS0224	Admin Approval Module
Lam Yoke Yu	A23CS0233	Admin Updating Module
Teh Ru Qian	A23CS0191	Admin Reporting Module

1.2 Project Weaknesses or Improvement

There are some weaknesses and improvements for this system.

Weaknesses

1. **Limited Loan Repayment Features**: The system currently only supports loan application and tracking, with limited repayment features. Features like automated schedules and payment reminders are not available for managing repayments.

2. **Lack of Integration with External Financial Systems**: The system is used to manage loans and member data internally, but it is not connected to any payment gateways or external financial systems. As a result, payment statuses won't be updated automatically.
3. **No Security for Sensitive Data:** While members will upload personal and financial documents, there's no clear mention of encryption or security measures to protect sensitive data like personal details or financial records.

Improvements

1. **Integrate with External Financial Systems**: Connect the system to third-party banking or financial platforms to automatically update loan statuses and payback information, streamlining and improving the process.
2. **Add Loan Repayment Management Features**: Include options for creating automatic repayment schedules, interest calculations, and sending reminders to ensure timely payments.
3. **Enhance Data Security**: Use encryption and other security measures to safeguard sensitive member and financial data from unwanted access or breaches.

1.3 Proposed Module

Loan Repayment Module

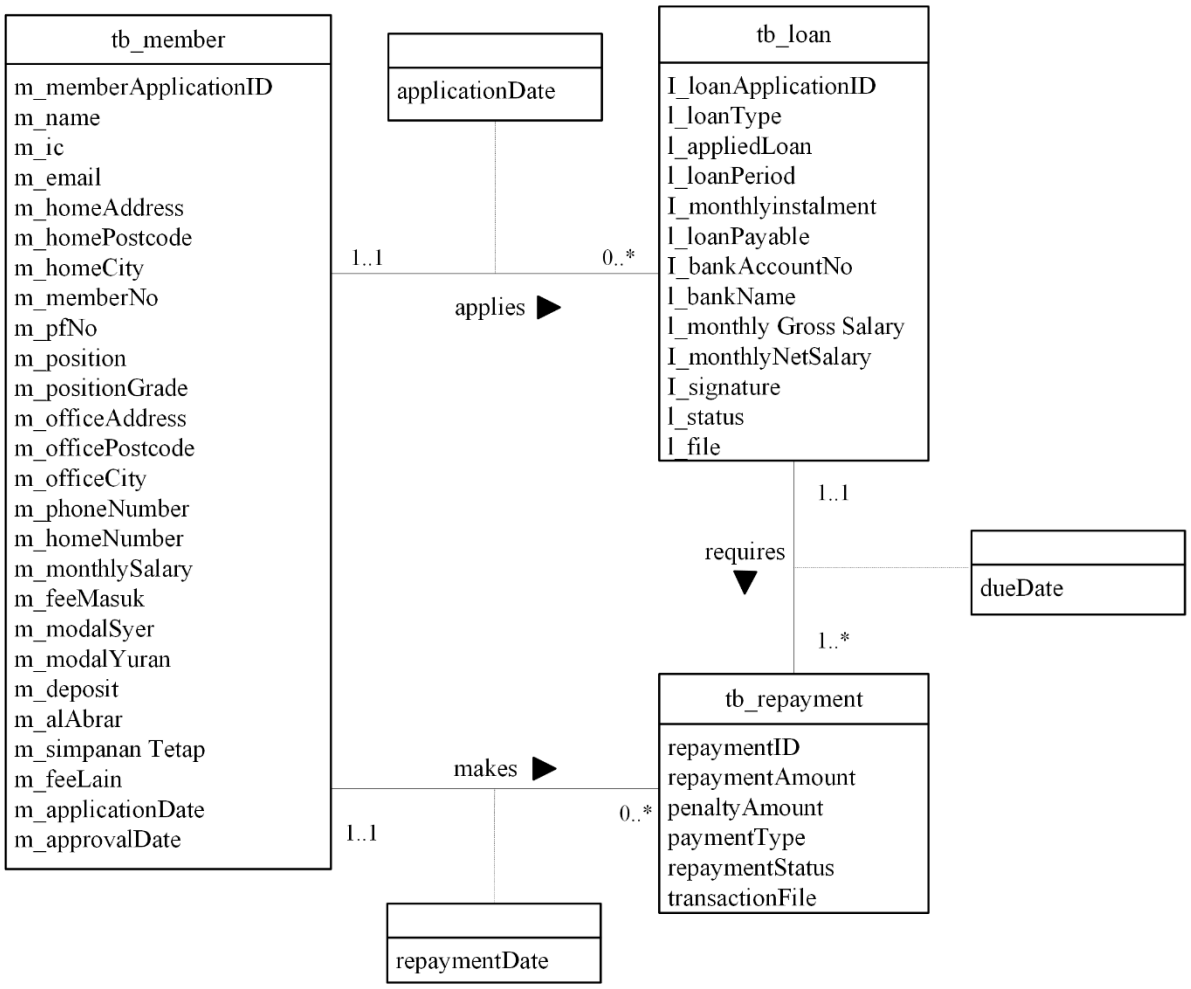
This module is designed to provide an easy way for members to manage their loan repayments. The functionality are as follows:

1. **Loan Repayment History**: View record of their loan repayments, including loan details, repayment status and any penalties.
2. **Make Repayment by Uploading Transaction File**: Upload file in PDF format rather than manually entering payment details.

2.0 Database Planning and Design

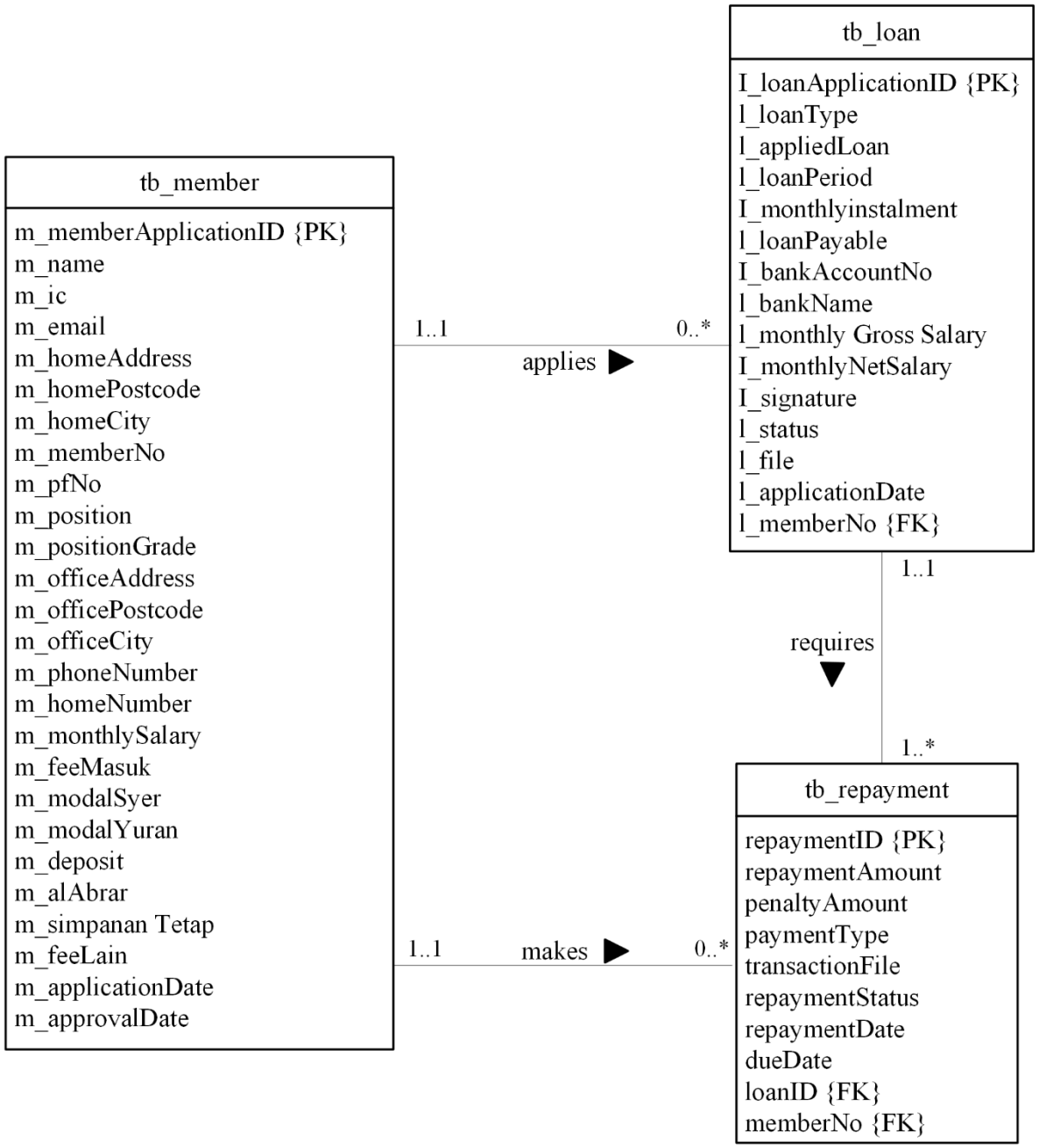
This section shows database planning and design for Loan Repayment and Payment Integration Module.

2.1 Conceptual ERD



Link for Conceptual ERD
DB_AA_ConceptualERD.vsdx

2.2 Logical ERD



Link for Logical ERD
DB_AA_LogicalERD.vsdx

2.3 Data Dictionary for Logical ERD

Identifying Entity

Entity Name	Description	Aliases	Occurrence
tb_member	General term describing all user logged in as member using KKK Online System	KKK Member	Each member can apply for multiple loans.
tb_loan	General term describing all loans of the cooperative	Loan Record	Each loan is linked to one member
tb_repayment	Tracks each repayment made for a loan.	Repayment Record	Each loan can have multiple repayments.

Attributes Description

Entity Name	Attributes	Data Type & Length	Description	Nulls	Multi-valued	Example
tb_member	memberApplicationID (PK)	int (11)	Uniquely identifies each member application	No	No	1001
	m_name	varchar(50)	User's full name	No	No	Ali bin Abu
	m_ic	varchar(14)	User's identification number	No	No	850101-08-1033
	m_homeAddress	varchar(255)	User's home address	No	No	1, Taman Bahagia, Jalan Bahagia,
	m_homePostcode	int (11)	User's home postcode	No	No	57000
	m_homeCity	varchar (50)	User's home city	No	No	Kuala Lumpur
	m_memberNo	int	Uniquely identifies each member	No	No	1
	m_pfNo	int	User's PF number	No	No	1001
	m_position	varchar(50)	User's position	No	No	Pengurus
	m_positionGrade	varchar(11)	User's position grade	No	No	G41
	m_officeAddress	varchar(255)	User's office address	No	No	25, Jalan Makmur
	m_officePostcode	int (11)	User's office postcode	No	No	57000

	m_officeCity	varchar (50)	User’s office city	No	No	Kuala Lumpur
	m_phoneNumber	varchar(13)	User’s phone number	No	No	0123456789
	m_homeNumber	varchar(13)	User’s home number	Yes	No	051234567
	m_monthlySalary	double	User’s monthly salary	No	No	3500.00
	m_feeMasuk	double	User’s entry fee	No	No	45.00
	m_modalSyer	double	User’s shares	No	No	300.00
	m_modalYuran	double	User’s share fee	No	No	50.00
	m_deposit	double	User’s deposit	No	No	50.00
	m_alAbrar	double	A kind of user’s fund	No	No	5.00
	m_feeLain	doube	User’s other fee	No	No	0.00
	m_applicationDate	datetime	The date when user submit his/her member application	No	No	2025-01-03 16:00:00
	m_approvalDate	timestamp	The date when the member application being approved by admin	Yes	No	2025-01-15 06:40:00
tb_loan	l_loanApplicationID (PK)	int	Uniquely identifies each loan application	No	No	1
	l_loanType	int	Type of loan	No	No	1
	l_appliedLoan	double	Amount of loan applied	No	No	10000.00
	l_loanPeriod	int	Loan period	No	No	4
	l_monthlyInstalment	double	Monthly instalment for loan	No	No	90.33
	l_loanPayable	double	The total loan that need to be paid by the member	No	No	1897.01
	l_bankAccountNo	int	Loan borrower’s bank account number	No	No	214748364
	l_bankName	int	Name of bank	No	No	1

	l_monthlyGrossSalary	double	Loan borrower's monthly gross salary	No	No	10000.00
	l_monthlyNetSalary	double	Loan borrower's monthly net salary	No	No	8000.00
	l_signature	varchar(50)	Loan borrower's signature	No	No	gambar_pemohon_11.jpg
	l_file	varchar(50)	Loan borrower's employer confirmation	No	No	pengesahan_majikan_19_1737463803.pdf
	l_status	int	Status of loan	No	No	1
	l_applicationDate	datetime	The date where loan application is made by a member	No	No	2025-01-05 12:51:36
tb_repayment	repaymentID	int	Unique identifier for the repayment	No	No	1
	repaymentAmount	double	Amount to be repaid	No	No	120.00
	penaltyAmount	double	Penalty charged for late repayment	Yes	No	5.00
	repaymentStatus	enum('Tertunda','Dibayar','Terlewat')	Status of the repayment (Tertunda = Pending, Dibayar = Paid, Terlewat = Overdue)	No	No	Dibayar
	repaymentDate	timestamp	Date of the repayment	No	No	2024-05-28 18:26:39
	dueDate	timestamp	Due date for the repayment	No	No	2024-05-28 18:26:39
	paymentType	enum('Kad Kredit','Tunai','Touch n Go')	Type of payment (Credit Card, Cash, Touch n Go)	Yes	No	Tunai
	transactionFile	varchar(255)	File path of the transaction receipt	Yes	No	butir_pembayaran_1.pdf

Identifying Relation Types

Entity Name	Multiplicity	Relationship	Entity Name	Multiplicity
tb_member	1..1	applies	tb_loan	0..*
tb_loan	1..1	requires	tb_repayment	1..*
tb_member	1..1	makes	tb_repayment	0..*

2.4 Relational Database Schema

tb_member (m_memberApplicationID, m_name, m_ ic, m_email, m_gender, m_religion, m_race, m_maritalStatus, m_homeAddress, m_homePostcode, m_homeCity, m_homeState, m_memberNo, m_pfNo, m_position, m_positionGrade, m_officeAddress, m_officePostcode, m_officeCity, m_officeState, m_phoneNumber, m_homeNumber, m_monthlySalary, m_feeMasuk, m_modalSyer, m_modalYuran, m_deposit, m_alAbrar, m_simpananTetap, m_feeLain, m_status, m_applicationDate, m_approvalDate)
PK: m_memberApplicationID

tb_loan (l_loanApplicationID, l_memberNo, l_loanType, l_appliedLoan, l_loanPeriod, l_monthlyInstalment, l_loanPayable, l_bankAccountNo, l_bankName, l_monthlyNetSalary, l_signature, l_file, l_status, l_applicationDate)
PK: l_loanApplicationID
FK: l_memberNo references tb_member (m_memberNo)

tb_repayment (repaymentID, repaymentAmount, penaltyAmount, paymentType, transactionFile, repaymentDate, dueDate, loanID, memberNo)
PK: repaymentID
FK: loanID references tb_loan (l_loanApplicationID)
FK: memberNo references tb_member (m_ memberNo)

2.5 Normalization

First Normal Form (1NF)

tb_member (m_memberApplicationID, m_name, m_ ic, m_email, m_gender, m_religion, m_race, m_maritalStatus, m_homeAddress, m_homePostcode, m_homeCity, m_homeState, m_memberNo, m_pfNo, m_position, m_positionGrade, m_officeAddress, m_officePostcode, m_officeCity, m_officeState, m_phoneNumber, m_homeNumber, m_monthlySalary, m_feeMasuk, m_modalSyer, m_modalYuran, m_deposit, m_alAbrar, m_simpananTetap, m_feeLain, m_status, m_applicationDate, m_approvalDate)
PK: m_memberApplicationID

FD1: m_memberApplicationID -> m_name, m_ic, m_email, m_gender, m_religion, m_race, m_maritalStatus, m_homeAddress, m_homePostcode, m_homeCity, m_homeState, m_memberNo, m_pfNo, m_position, m_positionGrade, m_officeAddress, m_officePostcode, m_officeCity, m_officeState, m_faxNumber, m_phoneNumber, m_homeNumber, m_monthlySalary, m_feeMasuk, m_modalSyer, m_modalYuran, m_deposit, m_alAbrar, m_simpananTetap, m_feeLain, m_status, m_applicationDate, m_approvalDate (Primary Key)

FD2: m_ic -> m_memberApplicationID, m_name, m_email, m_gender, m_religion, m_race, m_maritalStatus, m_homeAddress, m_homePostcode, m_homeCity, m_homeState, m_memberNo, m_pfNo, m_position, m_positionGrade, m_officeAddress, m_officePostcode, m_officeCity, m_officeState, m_faxNumber, m_phoneNumber, m_homeNumber, m_monthlySalary, m_feeMasuk, m_modalSyer, 17 m_modalYuran, m_deposit, m_alAbrar, m_simpananTetap, m_feeLain, m_status, m_applicationDate, m_approvalDate (Candidate Key)

FD3: m_email -> m_memberApplicationID, m_name, m_ic, m_gender, m_religion, m_race, m_maritalStatus, m_homeAddress, m_homePostcode, m_homeCity, m_homeState,

m_memberNo, m_pfNo, m_position, m_positionGrade, m_officeAddress, m_officePostcode, m_officeCity, m_officeState, m_faxNumber, m_phoneNumber, m_homeNumber, m_monthlySalary, m_feeMasuk, m_modalSyer, m_modalYuran, m_deposit, m_alAbrar, m_simpananTetap, m_feeLain, m_status, m_applicationDate, m_approvalDate (Candidate Key)

FD4: m_memberNo -> m_memberApplicationID, m_name, m_ic, m_email, m_gender, m_religion, m_race, m_maritalStatus, m_homeAddress, m_homePostcode, m_homeCity, m_homeState, m_pfNo, m_position, m_positionGrade, m_officeAddress, m_officePostcode, m_officeCity, m_officeState, m_faxNumber, m_phoneNumber, m_homeNumber, m_monthlySalary, m_feeMasuk, m_modalSyer, m_modalYuran, m_deposit, m_alAbrar, m_simpananTetap, m_feeLain, m_status, m_applicationDate, m_approvalDate (Candidate Key)

FD5: m_pfNo -> m_memberApplicationID, m_name, m_ic, m_email, m_gender, m_religion, m_race, m_maritalStatus, m_homeAddress, m_homePostcode, m_homeCity, m_homeState, m_memberNo, m_position, m_positionGrade, m_officeAddress, m_officePostcode, m_officeCity, m_officeState, m_faxNumber, m_phoneNumber, m_homeNumber, m_monthlySalary, m_feeMasuk, m_modalSyer, m_modalYuran, m_deposit, m_alAbrar, m_simpananTetap, m_feeLain, m_status, m_applicationDate, m_approvalDate (Candidate Key)

FD6: m_phoneNumber -> m_memberApplicationID, m_name, m_ic, m_email, m_gender, m_religion, m_race, m_maritalStatus, m_homeAddress, m_homePostcode, m_homeCity, m_homeState, m_memberNo, m_pfNo, m_position, m_positionGrade, m_officeAddress, m_officePostcode, m_officeCity, m_officeState, m_faxNumber, m_homeNumber, m_monthlySalary, m_feeMasuk, m_modalSyer, m_modalYuran, m_deposit, m_alAbrar, m_simpananTetap, m_feeLain, m_status, m_applicationDate, m_approvalDate (Candidate Key)

tb_loan (l_loanApplicationID, l_memberNo, l_loanType, l_appliedLoan, l_loanPeriod, l_monthlyInstalment, l_loanPayable, l_bankAccountNo, l_bankName, l_monthlyNetSalary, l_signature, l_file, l_status, l_applicationDate)
PK: l_loanApplicationID
FK: l_memberNo references tb_member (m_memberNo)

tb_repayment (repaymentID, repaymentAmount, penaltyAmount, paymentType, transactionFile, repaymentDate, dueDate, loanID, memberNo)
PK: repaymentID
FK: loanID references tb_loan (l_loanApplicationID)
FK: memberNo references tb_member (m_ memberNo)

Second Normal Form (2NF)
All derived relations are already in 2NF because there are no partial dependencies that exist in the relation. Therefore, all derived dependencies will stay unchanged and same as 1NF.

tb_member (m_memberApplicationID, m_name, m_ ic, m_email, m_gender, m_religion, m_race, m_maritalStatus, m_homeAddress, m_homePostcode, m_homeCity, m_homeState, m_memberNo, m_pfNo, m_position, m_positionGrade, m_officeAddress, m_officePostcode, m_officeCity, m_officeState, m_phoneNumber, m_homeNumber, m_monthlySalary,

m_feeMasuk, m_modalSyer, m_modalYuran, m_deposit, m_alAbrar, m_simpananTetap, m_feeLain, m_status, m_applicationDate, m_approvalDate)
PK: m_memberApplicationID

tb_loan (l_loanApplicationID, l_memberNo, l_loanType, l_appliedLoan, l_loanPeriod, l_monthlyInstalment, l_loanPayable, l_bankAccountNo, l_bankName, l_monthlyNetSalary, l_signature, l_file, l_status, l_applicationDate)
PK: l_loanApplicationID
FK: l_memberNo references tb_member (m_memberNo)

tb_repayment (repaymentID, repaymentAmount, penaltyAmount, paymentType, transactionFile, repaymentDate, dueDate, loanID, memberNo)
PK: repaymentID
FK: loanID references tb_loan (l_loanApplicationID)
FK: memberNo references tb_member (m_ memberNo)

Third Normal Form (3NF)
All derived relations are already in 3NF because there are no transitive dependencies exist in the relation. Therefore, all derived dependencies will stay unchanged and same as 2NF.

tb_member (m_memberApplicationID, m_name, m_ ic, m_email, m_gender, m_religion, m_race, m_maritalStatus, m_homeAddress, m_homePostcode, m_homeCity, m_homeState, m_memberNo, m_pfNo, m_position, m_positionGrade, m_officeAddress, m_officePostcode, m_officeCity, m_officeState, m_phoneNumber, m_homeNumber, m_monthlySalary, m_feeMasuk, m_modalSyer, m_modalYuran, m_deposit, m_alAbrar, m_simpananTetap, m_feeLain, m_status, m_applicationDate, m_approvalDate)
PK: m_memberApplicationID

tb_loan (l_loanApplicationID, l_memberNo, l_loanType, l_appliedLoan, l_loanPeriod, l_monthlyInstalment, l_loanPayable, l_bankAccountNo, l_bankName, l_monthlyNetSalary, l_signature, l_file, l_status, l_applicationDate)
PK: l_loanApplicationID
FK: l_memberNo references tb_member (m_memberNo)

tb_repayment (repaymentID, repaymentAmount, penaltyAmount, paymentType, transactionFile, repaymentDate, dueDate, loanID, memberNo)
PK: repaymentID
FK: loanID references tb_loan (l_loanApplicationID)
FK: memberNo references tb_member (m_ memberNo)

3.0 References

[1] T. M. Connolly and C. Begg, *Database systems : a practical approach to design, implementation and management*. Harlow: Pearson Education Limited, 2015.