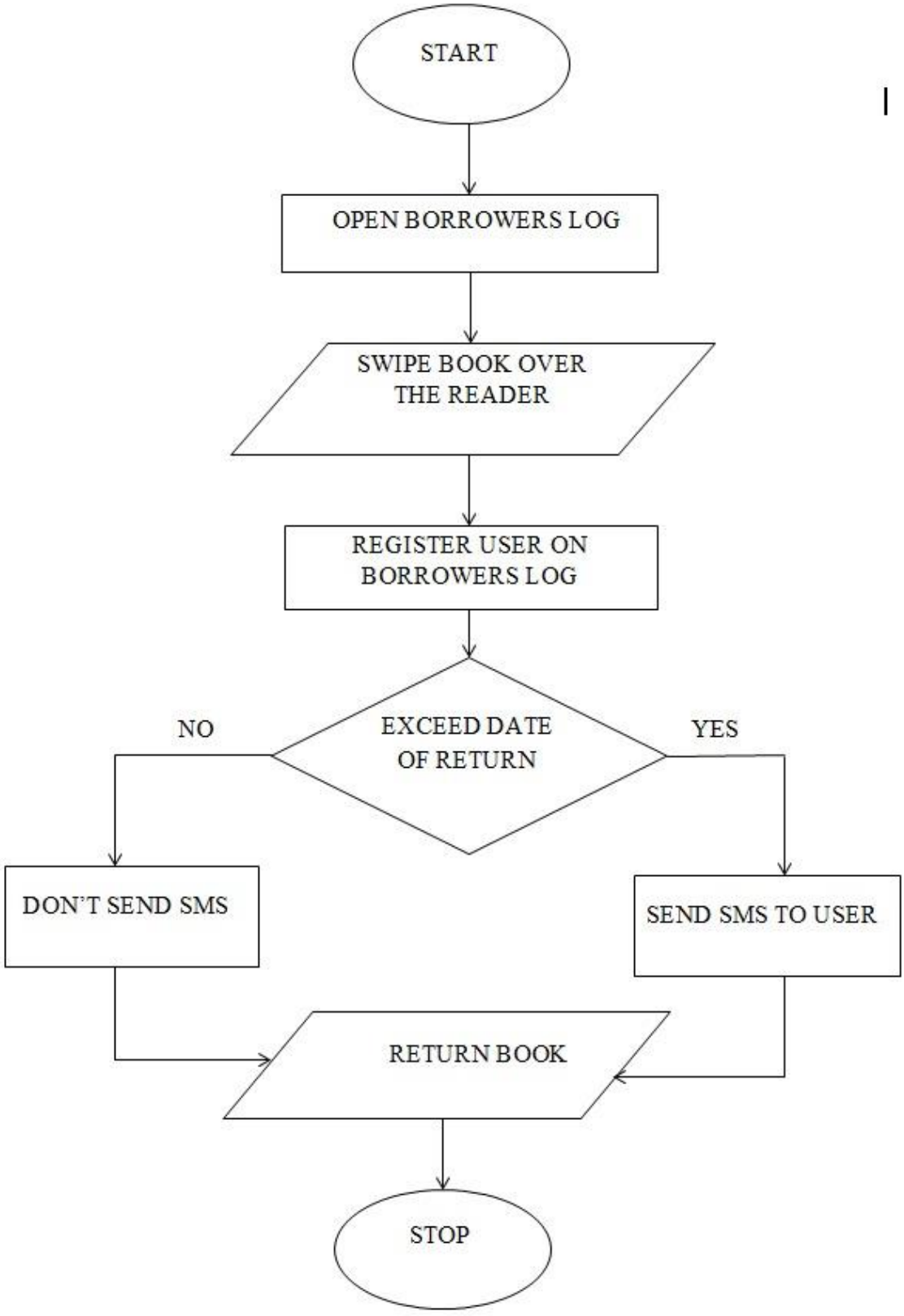
Assignment 1:

Analyse a given business scenario and create an ER diagram that includes entities, relationships, attributes, and cardinality. Ensure that the diagram reflects proper normalization up to the third normal form.

Scenario -: Online Book Library

ER Diagram-:


START
OPEN BORROWERS LOG
SWIPE BOOK OVER THE READER
REGISTER USER ON BORROWERS LOG
EXCEED DATE OF RETURN
NO
YES
DON'T SEND SMS
SEND SMS TO USER
RETURN BOOK
STOP

Entities:

Book

Attributes:

book_id (primary key)

title

author (can be multiple authors)

ISBN

publication_date

genre (optional)

edition (optional)

Author

Attributes:

author_id (primary key)

name

Customer

Attributes:

customer_id (primary key)

name

email

address

Loan

Attributes:

loan_id (primary key)

book_id (foreign key references Book.book_id)

customer_id (foreign key references Customer.customer_id)

loan_date

due_date

returned_date (optional)

Relationships:

Book (written by) Author (Many-to-Many):

A Book can be written by many Authors (and vice versa).

This relationship is implemented using an associative entity named Book_Author.

Book_Author

Attributes:

book_id (foreign key references Book.book_id)

author_id (foreign key references Author.author_id)

primary key (composite key: book_id, author_id)

Book (borrowed by) Customer (One-to-Many):

A Book can be borrowed by many Customers (one at a time).

A Customer can borrow many Books.

Customer (has) Loan (One-to-Many):

A Customer can have many Loans.

A Loan belongs to one Customer.

Cardinality:

One Book can be written by many Authors (1:N).

One Author can write many Books (N:1).

One Book can be borrowed by many Customers (1:N).

One Customer can borrow many Books (1:N).

One Customer can have many Loans (1:N).

One Loan belongs to one Customer (N:1).

One Loan is for one Book (N:1).

Normalization:

This ER diagram is in Third Normal Form (3NF) because:

There are no partial dependencies. Every non-key attribute depends only on the entire primary key of its entity.

There are no transitive dependencies. No non-key attribute depends on another non-key attribute.