



International University, HCMC National University  
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# FINAL REPORT

## Cinema Booking System project

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Course name: Principles of Database Management

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# **1. Introduction**

Millions of people all over the world enjoy watching movies. Seeing stories told through spectacular sound and pictures has become a popular pastime for most people of all ages. People who watch movies in theaters can fully immerse themselves in the story from beginning to end, empathize with the characters, and pick up on the majority of the details. However, the quality of the experience may be decreased as a result of hours spent in line trying to purchase tickets a lack of knowledge about customer movie preferences.

With the development in technology, there has been lots of advancement in the online booking system. The movie booking system is one such trending system nowadays. It allows users to browse the internet and purchase cinema tickets.

The Cinema booking Management System is an Internet application that can be used from anywhere on the Internet by anybody with an Internet connection. It is the method through which customers can buy cinema tickets directly over the Internet and pay using their bank accounts. Following that, the data will be entered into the cinema database for analysis and management by the administration.

## **2. Project Background**

### **2.1. Project Background**

The manual ticketing system, which is practically as old as it gets, involves pre-printing tickets with serial numbers and selling them at the box office or at specified shops in advance. Aside from the difficulty in tracking ticket sales, the requirement that customers wait in long queues to acquire a movie ticket reduces the number of moviegoers.

An automated ticketing system is the next generation of the booking system. Through this system, tickets are printed at the time of the purchase. The sales are automatically recorded by the computer, and the ticket inventories are updated automatically. The demand for a wide area network is a drawback of this system. Customers can only order tickets and acquire printed tickets from machines located within the cinemas, and they must still wait in long lines to purchase tickets.

The online ticket booking mechanism comes into play to solve these issues. This is an excellent example of Internet commerce, as it simplifies the process of purchasing or reserving online tickets and makes it more accessible and convenient. Tickets can be purchased from any place at any time with this service, which eliminates the long-line custom when purchasing movie tickets. Moreover, this system improves the method of keeping track of sales and stimulates ticket sales.

## **2.2. Project Objectives**

The main goal of the system is to develop a technique that not only allows customers to order movie tickets online at any time and from any location but also allows administrators to manage and update the information in the system. The system will handle the complete order once the data is entered into the database, therefore the admin will only need to view and maintain the data.

The Movie Ticket Booking System will be an application that displays the number of screens (theaters), seats, and movies that are currently playing on each screen. It also includes details on the runtime, the shows in which movies will be featured, and their ratings. The system also gives admins access to information about customers, tickets bought, and the ability to edit the system's data.

In this project, we only demonstrated the database management system as a basic Java application owing to a lack of time to construct a fully working application. The administrator can select, retrieve, change, and manage the data stored in the cinema database.

Following are some of the project's other major objectives:

- To provide 24/7 available customer assistance.
- To reduce the waiting time for customers in comparison to the direct ticket booking mechanism.
- To increase revenues by utilizing the Internet for marketing strategies..
- To provide a short preview of the movie on the website such as a genre and a plot summary.
- To manage and analyze the customer preferences through their selection and data.

## 3. Project Approach

The project approach defines the project management methodology, tools, and governance for the project. In other words, it shows how the project is planned, implemented, and controlled.

### 3.1. Features

Following are the features of the Cinema Booking Management System.

- The system provides information on the number of screens (or theaters) in the cinema, as well as the number of seats available in each screen.
- The system offers the customers comprehensive information on the running movie with its schedule and ratings, so that he or she can easily purchase and reserve a ticket for one of their favorite films.
- Customers can watch the contents of any movie show at any time and purchase as many movie tickets as they need. The subtotal and grand total are calculated automatically by the application. When the customer decides to finally book the ticket, the order information, including the customer's name, address, and billing information, is securely stored in the database, and payment is processed.
- Admins can utilize the Cinema Booking Management System to add, delete, and alter data as movie descriptions and timetables, which will update the relevant application that is accessible to customers. Admins can change the content based on the data in the database, as well as monitor the system's statistics.
- By having access to critical data in a centralized and systematic view, cinema managers can improve profitability and better manage their businesses. They can also improve customer satisfaction by operating their businesses more efficiently with automated reservation and ticketing processes.

### 3.2. System's Workflow

- The customer first creates an account and then logs in to the application before using the booking function.
- Customers should be asked to choose the number of tickets they want to book.

- Our ticket booking service should be able to provide a list of theater names.
- When a user picks a theater, the system should display a list of movies that have just been released and currently shown at that cinema, along with complete information on the film, namely its ratings, the showtimes, genres, and countries.
- After the user selects a movie, the user should be able to select a show. The system should be able to show the user the cinema hall's seating layout. The user should be able to choose from a variety of chairs based on their preferences and the availability of the seats.
- The user should be able to distinguish available and booked seats.
- After selecting seats, the user selects a payment method and completes the booking.
- Users should be able to get complete information about their reserved tickets, which they can utilize at the cinema hall's entrance.
- When the customer decides to finally book the ticket, the order information, including the customer's name, address, and billing information, is securely stored in the database, and payment is processed.
- Admins should be able to add, delete, and alter data such as movie descriptions and timetables, as well as change the homescreen content based on the data in the database.

### 3.3. Development Tools

This project creates a database with MySQL and SQLServer, then connects to it with Java to establish a simple framework for the administrator to manage and manipulate the data.

### 3.4. Project timeline

Week no.	Date	Task name	Member
1	14/02/2022 - 20/02/2022	Choose the project topic	All
2	21/02/2022 -	- Project background	All

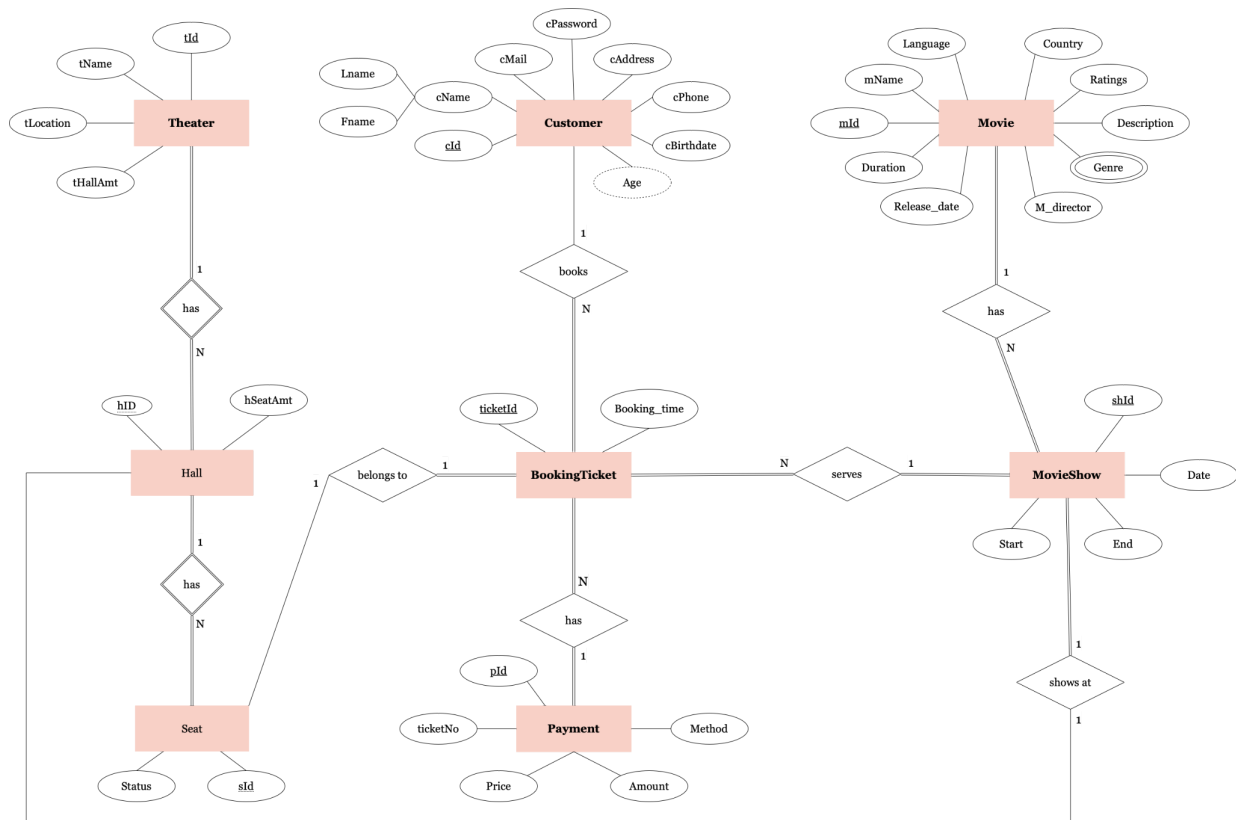
	27/02/2022	- Topic specification description (features)	
3	28/02/2022 - 06/03/2022	- Project timeline - Proposal	All
4	07/03/2022 - 13/03/2022	- Specification description of the entities and attributes	- Thinh, Uyen, Khanh
5	14/03/2022 - 20/03/2022	- Design Entity-Relationship Diagram (ERD)	- Duy, Phuong
6	21/03/2022 - 27/03/2022	- Convert ERD into Relational Model - Explain the ERD	- Phuong, Uyen - Thinh, Duy, Khanh
7	28/03/2022 - 03/04/2022	- Set up SQL database (in MySQL) - Edit the ERD and Relational Model	- Phuong
8	18/04/2022 - 24/04/2022	<b>Midterm Report</b>	All
9	25/04/2022 - 01/05/2022	- Update SQL database - Design the better E/R Model - Import data - Connect the database to Java	- Phuong  - Uyen, Duy, Khanh - Thinh
10	02/05/2022 - 08/05/2022	- Create a basic Java system to retrieve data - Presentation slides - <b>Final Report</b> - <b>Presentation</b>	- Thinh - Khanh - All

## 4. Entity - Relationship Diagram (ERD)

### 4.1. Cardinality

- One Customer can book one or more Tickets, while one Ticket can belong to only one Customer.
- One Movie can be shown at many MovieShow, while one MovieShow can only show one Movie at a time.
- One Theater can have many Halls, while one Hall can belong to one Theater.
- One Hall can have many Seats, while one Seat can belong to one Hall.
- One Seat can be related to one Ticket at a time.
- One Ticket can have one Payment, while one Payment can be the bill for many Tickets that a Customer books.
- One MovieShow can take place in one Hall, and one Hall can have one MovieShow at a time.
- One MovieShow can serve many Tickets, while one Ticket can belong to one MovieShow.





H4.1. Entity - Relationship Diagram (ERD)

## 4.2. Database Design - Explanation for the attributes

### 4.2.1. Customer

Customers are those who purchase movie tickets. They are the primary entity of the booking system because they are the people that utilize it to book movie tickets. This entity stores information on all users beginning with the creation of a new account and the purchase of movie tickets in that theater. It provides real-time information on the customers as well as the ability to update and modify the information as needed. Customers can get access to their information by logging in to their accounts. Following are the attributes of this entity.

**Table 4.1. Customer**

Index	Field	Description	Type	Size
1	cId (PK)	Customer ID number	varchar	11
2	cName	Customer full name	varchar	50

3	Fname	Customer first name	varchar	20
4	Lname	Customer last name	varchar	20
5	cMail	Customers mail address	varchar	30
6	cPassword	Customers sign in password	varchar	20
7	cAddress	Customer living address	varchar	30
8	cPhone	Customer phone number	varchar	11
9	cBirthdate	Customer date of birth	Date	
10	CAge	Customer age (derived from date of birth)	int	2

#### 4.2.2. Movie

The Movie entity keeps track of all the movies that are on within the cinema system at the current time of purchase. The information in this entity not only assists customers in selecting the appropriate movie to watch based on its contents, but it also provides the administrator with a method for updating the movie to be played and its advertising after analyzing customer preferences.

**Table 4.2. Movie**

Index	Field	Description	Type	Size
1	mId (PK)	Movie ID	varchar	11
2	mName	Movie name	varchar	50
3	Release_date	Movie release date	date	
4	Duration	Movie duration time (minute)	int	10
5	Language	Movie in Different Languages	varchar	50
6	Country	Movie Country	varchar	30
7	Ratings	Movie Ratings (stars)	decimal	8,1
8	Description	Movie Description	varchar	500
9	Genre	Movie genre	varchar	50

10	M_Director	Director of the movie	varchar	50
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### 4.2.3. Theater

Theater is the list of the system's cinemas where movies are shown. Each theater has a unique id, name and location.

**Table 4.3. Theater**

Index	Field	Description	Type	Size
1	tId (PK)	Theater ID	varchar	11
2	tName	Theater name	varchar	30
3	tLocation	Theater location	varchar	50
4	tHallAmt	The amount of halls in a theater	int	10

### 4.2.4. Hall

Hall is the list of halls according to theater. There are two types of hall: big and small. The types of hall are distinguished by the first letter of the hall id: big hall's id starts with G, whereas small hall's id starts with D.

**Table 4.4. Hall**

Index	Field	Description	Type	Size
1	hID (PK)	Hall ID	varchar	11
2	hSeatAmt	The amount of seats in a hall	int	10

### 4.2.5. Seat

This entity maintains the list of seats in each hall of the theaters. Each seat has its own status, whether available or unavailable at the time customers book their ticket. A seat id is unique in a specific hall of a theater.

**Table 4.5. Seat**

Index	Field	Description	Type	Size
1	Status	Seat Availability 0: Available 1: Unavailable (Booked)	tinyint (boolean)	2
2	sId (PK)	Seat ID	varchar	11

#### 4.2.6. MovieShow

MovieShow entity contains the details of each show in a cinema.

**Table 4.6. MovieShow**

Index	Field	Description	Type	Size
1	shId (PK)	Show ID	varchar	11
2	Date	Show date	date	
3	Start	Time when the show start	time	
4	End	Time when the show end	time	

#### 4.2.7. BookingTicket

BookingTicket contains all of the details for each ticket that customers have purchased. Besides ticketId and Booking\_time, the ticket also has the information about the movie name, hall, seat, and show time. Customers can use this information to check in to the cinema at the time of the movie screening.

**Table 4.7. BookingTicket**

Index	Field	Description	Type	Size
1	ticketId (PK)	Ticket ID	varchar	11
2	Booking_time	Time when the ticket is created	timestamp	

#### 4.2.8. Payment

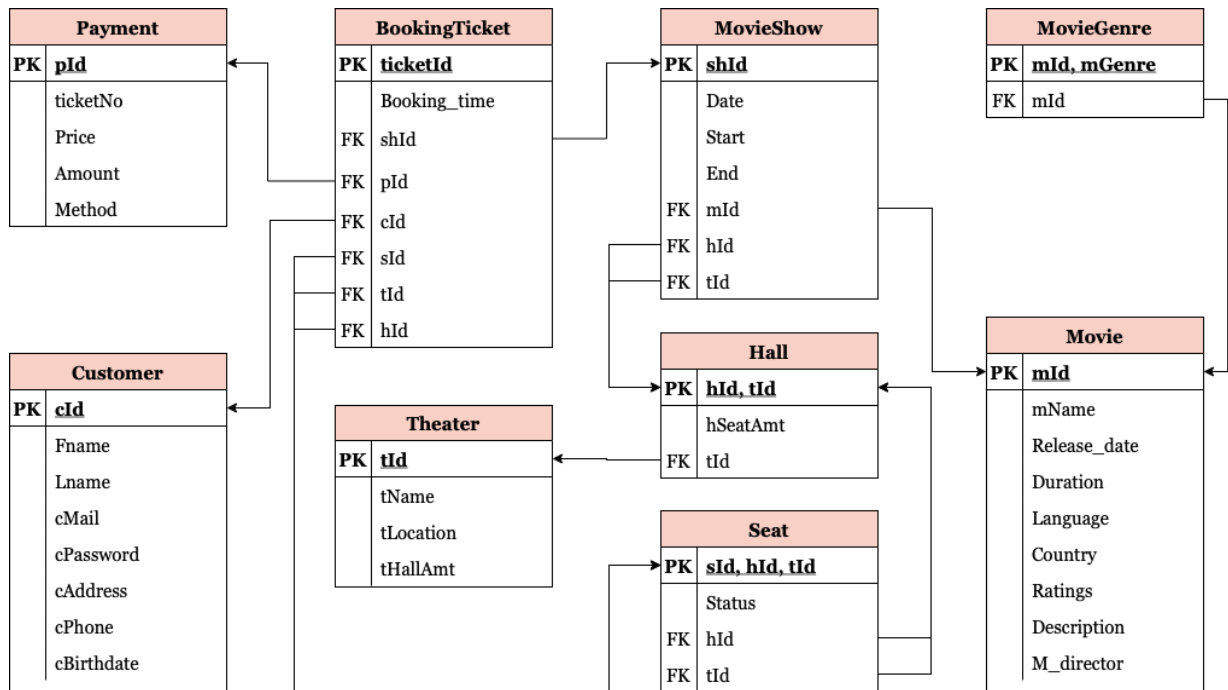
Payment entity contains the information for processing the ticket purchase.

**Table 4.8. Payment**

Index	Field	Description	Type	Size
1	pId (PK)	Payment ID	varchar	11
2	ticketNo	Total number of tickets in each bill	int	2
3	Price	Unit price of the ticket	decimal	9, 2
4	Amount	Total amount of cash the customer have to pay	decimal	9, 2
5	Method	Payment method	varchar	10

## 5. Translation from ERD to Relational Model

1. **Customer** (cId, FName, LName, cMail, cPassword, cAddress, cPhone, cBirthdate)
2. **Movie** (mId, mName, Release\_date, Duration, Language, Country, Ratings, Description, M\_director)
3. **Theater** (tId, tName, tLocation, tHallAmt)
4. **Hall** (hId, tId, hSeatAmt)
5. **Seat** (sId, hId, tId, Status)
6. **MovieShow** (shId, Date, Start, End, mId, hId, tId)
7. **BookingTicket** (ticketId, Booking\_time, cId, shId, sId, tId, hId, pId)
8. **Payment** (pId, ticketNo, Price, Amount, Method)
9. **MovieGenre** (mId, mGenre)



## H5.1. Relational Model

### Relation 5.1. Customer

cId	Fname	Lname	cMail	cPassword	cAddress	cPhone	cBirthdate
028466	Ton	Vu Anh Thu	anhthuton12@gmail.com	thu2912	333/12 Le Van Sy	0691357288	2000-12-12
037546	Nguyen	Ba Cuong	cuong24@gmail.com	thisiscuong	24 Wayne Street	0937123637	2001-06-13
0762896	Tran	Ba Van	vantran@gmail.com	van123	16/9 Nguyen Dinh Chieu	0705060030	2005-01-12
109102	Do	Thi Ngoc Ngan	ngocngando266@gmail.com	cobengocngech	14 Vo Nguyen Giap- Hoai Huong	0902666885	2002-06-26
167890	Dang	Van Ngu	ngutheclawn@gmail.com	dangvanngu	188 Tran Van Quang-Tan Binh	0905974992	1992-03-20
201006	Nguyen	Phi Khanh	nguyenphikhanh02@gmail.com	khanthecclawn	333/16/2 Le Van Sy	0868546202	2002-04-19
217136	Tran	Bao Duy	duytranbao@student.hcmiu.edu	tranbaoduy	12/3 Dien Bien Phu - Q1	034589112	2002-08-20
234123	Le	Ngoc Uyen Phuong	uyenphuungle224@gmail.com	upsort224	55G Tran Van Quang	0775900187	2002-04-12
267098	Vo	Le Thuan Thao	thaovole41@gmail.com	thaolevo123	23 Le Anh Xuan - Hoai Hai	0372984445	2004-04-01
378904	Dang	Chi Thinh	thinh dangchi@gmail.com	thinhkhung	21 Di An Binh Duong	0935357102	2002-08-07

### Relation 5.2. Movie

mId	mName	Release_date	Duration	Language	Country	Ratings	Description	M_Director
001	DOCTOR STRANGE IN THE MULTIVERSE OF MADNESS	2022-05-06	126	English	United States	7.5	Dr. Stephe...	Sam Raimi
002	EXTREMELY EASY JOB	2022-04-29	113	Vietnamese	Vietnam	5.1		Võ Thanh Hòa
003	FAST & FEEL LOVE	2022-04-06	131	Thai	Thailand	7.4	When a w...	Nawapol Thamrongrattanarit
004	JUJUTSU KAISEN 0: THE MOVIE	2022-03-18	105	Japanese	Japan	7.9	Yuta Okko...	Seong-Hu Park
005	FANTASTIC BEASTS: THE SECRETS OF DUMBLEDORE	2022-04-15	143	English	United Kingdom	6.5	Professor...	David Yates
006	PEE NAK 3	2022-04-15	110	Thai	Thailand	6.1	The Karm...	Phontharis Chotkijadsarso
007	MIDNIGHT	2022-04-15	103	Korean	Korea	6.5	Kyung-mi...	Kwon Oh-seung
008	THE BAD GUYS	2022-04-22	100	English	United States	6.9	Several re...	Pierre Perifel

### Relation 5.3. Theater

tId	tName	tLocation	tHallAmt
036135	SuperStar	188 Nguyen Thi Minh Khai Q1	4
086775	New Galaxy	5 Nguyen Cong Hoan P7 Phu Nhuan	6
097387	Tran Quang Dieu	14 Tran Quang Dieu P11 Tan Binh	6
156982	The Old Theater	9 Le Van Sy P1 Tan Binh	4
167345	Banh Van Tran	23/4 Mac Dinh Chi p1 Tan Phu	4

## Relation 5.4. Hall

hID	hSeatAmt	tId
D11	50	036135
D11	40	086775
D11	50	097387
D11	50	156982
D11	50	167345
D12	40	036135
D12	40	097387
G11	60	036135
G11	70	086775
G11	60	097387
G11	70	156982
G11	70	167345
G12	60	086775
G12	60	097387
G13	70	097387
G14	60	097387

## Relation 5.5. Seat

sId	Status	hId	tId
A10	0	G11	167345
A6	0	D12	036135
B2	0	D11	097387
B5	0	D11	097387
B5	1	G11	097387
B9	1	D11	097387
C5	1	D12	097387
C5	0	G12	086775
C6	0	D12	097387
C8	0	G12	097387
C9	1	G12	097387
D3	0	D11	167345
D4	0	G11	036135
D7	0	G11	036135
E4	1	G11	156982
E7	1	G11	156982
F3	0	G11	097387
F6	0	G11	086775
G1	0	G13	097387
G4	0	G11	167345

## Relation 5.6. MovieShow

shId	Date	Start	End	mId	hId	tId
MS001	2022-05-11	15:00:00	17:06:00	001	G11	097387
MS002	2022-05-11	20:00:00	22:06:00	001	G12	097387
MS003	2022-05-12	16:00:00	17:53:00	002	G13	097387
MS004	2022-05-12	22:00:00	23:53:00	002	D11	097387
MS005	2022-05-14	14:00:00	16:11:00	003	G14	097387
MS006	2022-05-20	16:00:00	17:45:00	004	D12	097387
MS007	2022-05-21	12:00:00	14:23:00	005	G12	086775
MS008	2022-06-01	14:00:00	16:23:00	005	G11	167345
MS009	2022-06-02	20:00:00	21:50:00	006	D11	156982
MS010	2022-06-05	17:00:00	18:43:00	007	G11	036135
MS011	2022-06-07	18:00:00	19:40:00	008	D12	036135

## Relation 5.7. BookingTicket

ticketId	Booking_time	cId	shId	sId	tId	hId	pId
A0905C8	2022-05-09 11:28:00	0762896	MS002	C8	097387	G12	PM02
A0905C9	2022-05-09 11:28:00	0762896	MS002	C9	097387	G12	PM02
A1005B5	2022-05-10 12:00:00	037546	MS001	B5	097387	G11	PM01
A1305B9	2022-05-13 07:00:00	267098	MS005	B9	097387	D11	PM04
A1905C5	2022-05-19 08:23:00	217136	MS006	C5	097387	D12	PM05
B2005C5	2022-05-20 09:30:00	201006	MS007	C5	086775	G12	PM06
D1005E7	2022-05-10 08:55:00	167890	MS003	E7	156982	G11	PM03
D1105E4	2022-05-11 08:55:00	167890	MS003	E4	156982	G11	PM03

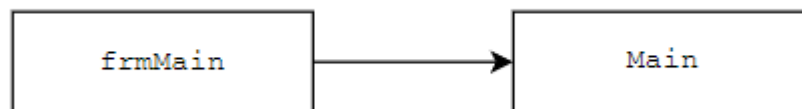
## Relation 5.8. Payment

pId	ticketNo	Price	Amount	Method
PM01	1	50000.00	50000.00	MasterCard
PM02	2	50000.00	100000.00	Visa
PM03	2	50000.00	100000.00	PayPal
PM04	1	50000.00	50000.00	MasterCard
PM05	1	50000.00	50000.00	Visa
PM06	3	50000.00	150000.00	Paypal

## 6. System demo in Java

### 6.1. List of Classes and Responsibilities

No.	Class Name	Responsibility
1	<code>frmMain</code>	Connect the program to the MSSQL Server
2	<code>Cinema</code>	Call <code>frmMain</code> class

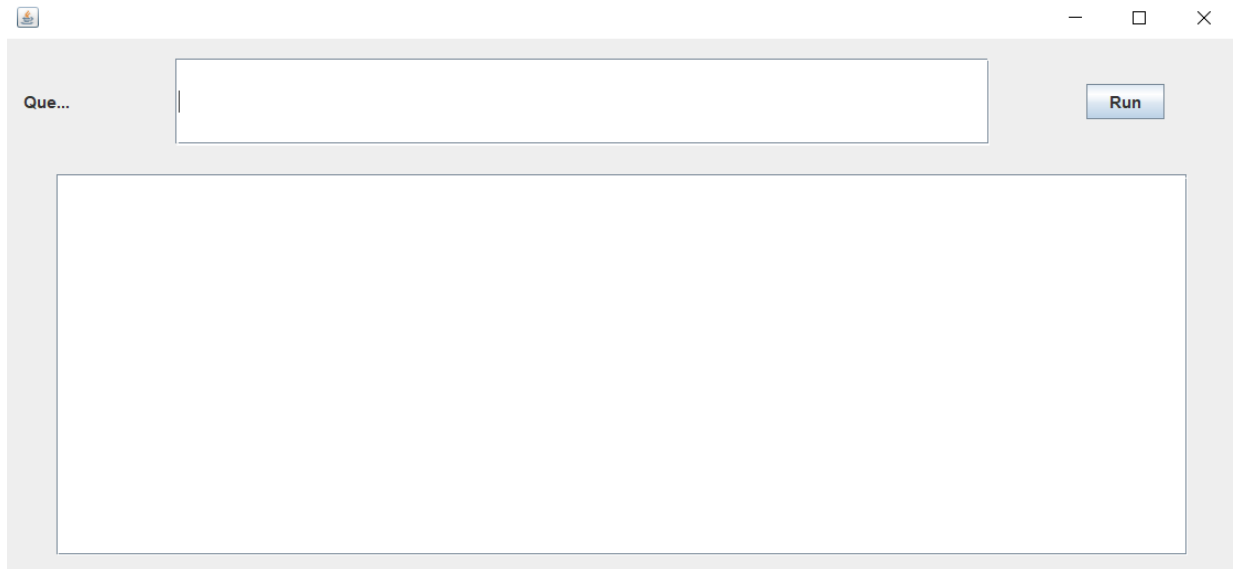


### 6.2. Class Diagram

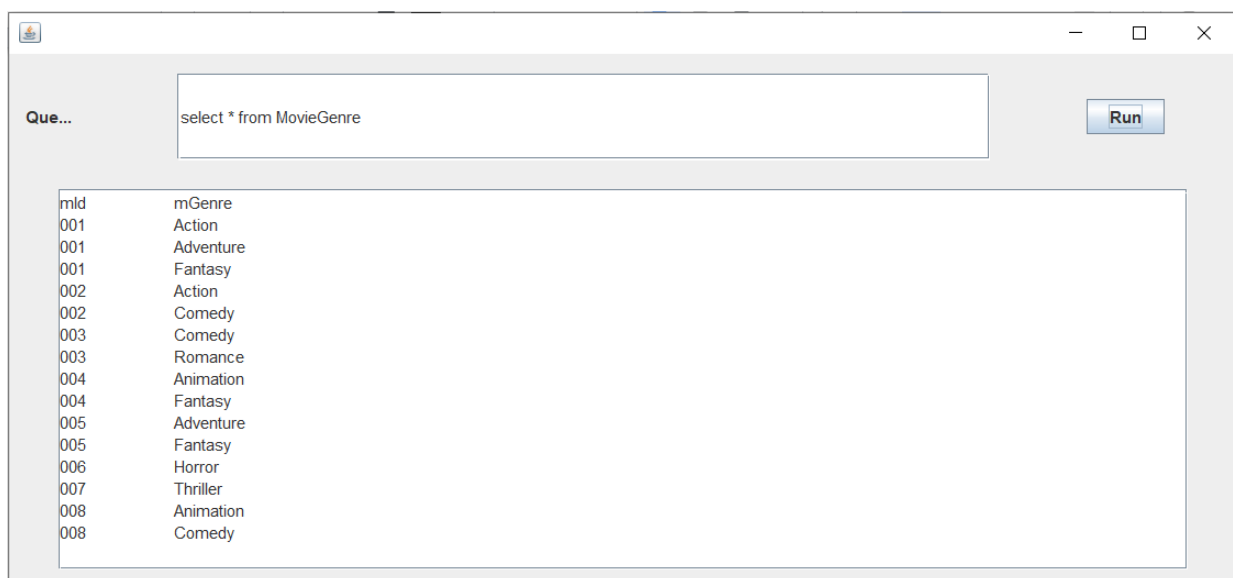
### 6.3. System screenshots

- Blank Screen:





- Example of query running:



## 7. Conclusion

The project has built a database for the Cinema Booking Management System as well as a basic Java application that allows the administrator to select, retrieve, edit, and manage the data stored in the cinema database. Each relation in the database meets normalization forms, particularly at least the third normal form (3NF). We've also implemented nearly all of the topics covered in this course, including Entity, Relationship, Keys, SQL, Entity-Relation Diagram (ERD), Relational Model translation, and Normalization.

## 7.1. Limitations

- Originally, the Cinema booking management system should allow customers to book tickets online, and the administrator to manage the database. However, due to a lack of time, the database management system can only be presented as a basic Java application.
- When customers reserve a ticket, the system still cannot check whether a specific seat is available.
- The system was unable to verify whether the number of tickets recorded in BookingTicket relation is relevant to the total ticket number inserted in the Payment relation at the beginning of the booking flow.

## 7.2. Future plans

- The system would be a more attractive and intuitive application, capable of performing the original primary function.
- The system would be able to handle a large number of concurrent users. At any given time, there will be many booking requests for the same seat. This should be handled gracefully and fairly by the service.
- A system's main feature is ticket booking, which entails financial transactions. Therefore, the system must be safe.
  - User registration using mobile OTP (one-time-password)
  - Notifications for any information and changes

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