CRIMINAL DATABASE MANAGEMENT SYSTEM

REVIEW REPORT

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Prepared For

DATABASE MANAGEMENT SYSTEM (CSE2004)

PROJECT COMPONENT

Submitted To

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Project Title

Criminal Management System.

Abstract

With the upsurge in crime rates, it has become very tedious for the officers at the jail to manage the criminals. The system will be made to keep records of the criminals and about the jailors and officers. Officers can log in as a user and can save the FIR with date and time and FIR number. Jailor can view the details of the criminals under his/her section. The Criminals are saved in the database with their case id. It is very useful as the written papers can get lost but in the criminal management system, this is not possible as the data will be backed up. The criminal's records cannot be deleted because it may be required later by the government, to know any details about the criminals.

1. Introduction

1.1 Background

Our Project Criminal Database Management System was ideated from the thought that there is no thorough database management system that captures the real essence of a criminals sentence period in jail, thus we have kept our database simple and suffice as it concentrates on the essential features like Prisoner, FIR, Jailor, Officer, Section etc..and many correctional facilities do not have proper systems to cater to the vast magnitudes of requirements of criminals, and rely on manual management of critical data.

1.2 Objective

The Main Objective of our Criminal Database Management is to forge an integrated information management system for criminals where all of the required needs and information are met through easy-to-use and intuitive data aggregation, where requests are automatically scaled and fulfilled according to the population of criminals, and their profiles are easily generated and archived. We also look to have real time access where updating to any part of the database, should mean the required change should happen in the other parts of the database.

1.3 Motivation

The Motivation for the Criminal Database Management System is that we want to ensure a computerized organization management system that replaces the current manual management systems used to monitor the data of criminals, and ensures that the management task is eased and its performance, security, efficiency and effectiveness is also catered to. We are looking to create and design a system that has appropriate

methodology, strategy, easy-to-understand and easy-to-use, thus giving the people in

charge of managing the criminals an opportunity to look at better results and reduce

unnecessary overhead costs.

Contributions of the Project 1.4

All three of us developed the project together through collaboration and keeping

in mind our objectives. We learnt a lot throughout the whole project and further

sharpened our knowledge of DBMS and Web Development.

1.5 **Organization of the Project**

Frontend: HTML, CSS, PHP

Backend: XAMPP, PHP, MYSQL, MYSQL WORKBENCH

ER Diagram Creation: ERD-PLUS

2. Project Resources Requirements

2.1 **Software Requirements**

1.XAMPP Server

2.MySQL Database

3.HTML4.CSS5.JavaScript6.PHP

7.PhpMyAdmin

2.2 Hardware Requirements

- 1. 1GB RAM
- 2. 1.6Ghz CPU,32bit
- 3. 1GB disk space

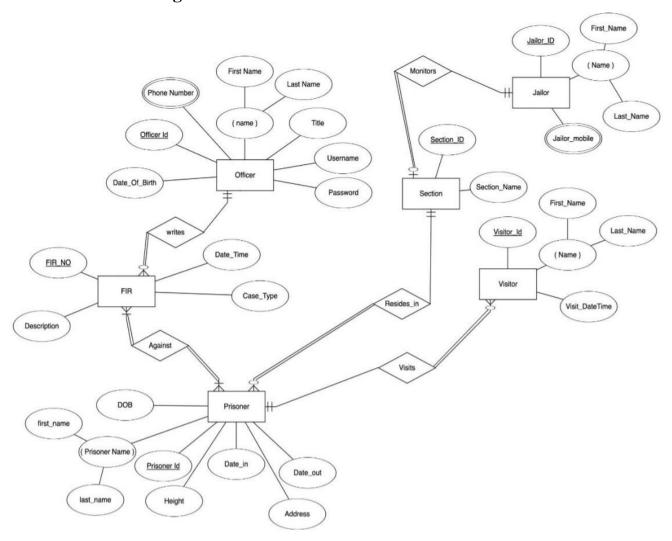
3. Literature Survey

What is a Database Management System? Who and What Defines a Criminal? It is an almost customary feature of any software development process involving law-subjected individuals to begin with a disclaimer about the inherent difficulty of defining exactly what 'database management system' and 'criminal' is and disintegrating its various dimensions. The concept of a criminal database management system has long been a

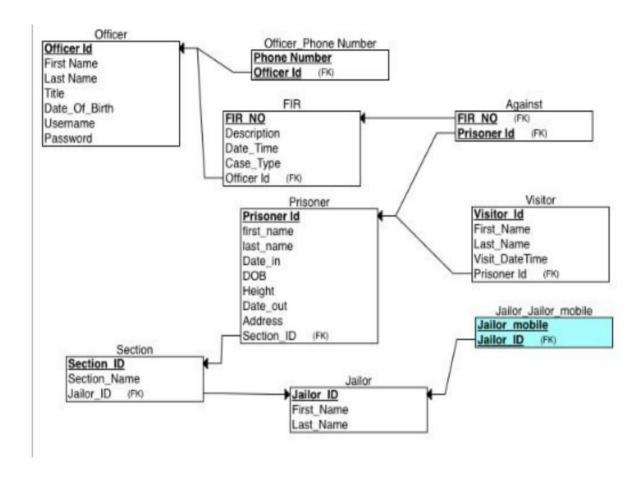
manual process, which results in a greater consumption of time, loss of records, large amount of paperwork and poor quality of maintenance of criminals and their respective officers and jailors. Literature on criminal database management systems tends to give readers an underwhelming sense that a proper system is a long way off, and that is what our website looks to solve by keeping it informative as well as concise and sticking to the point.

4. Design of the Project

4.1 ER Diagram



4.2 ER to Relational Mapping(Schema Diagram)



4.3 Tables and Constraints

4.3.1.1 Jailor_phone

#	Name	Туре	Collation	Attributes	Null	Default	Comments	Extra
1	Jailor_phone	varchar(10)	utf8mb4_general_ci		No	None		
2	Jailor_id	int(11)			No	None		

Keyname	Туре	Unique	Packed	Column	Cardinality	Collation	Null	Comment
PRIMARY	PTDEE	Voc	No	Jailor_phone	11	Α	No	
PRIMARI	BIKEE	165	INO	Jailor_id	11	A	No	
fk_8	BTREE	No	No	Jailor_id	11	Α	No	

4.3.1.2 Visitor

Field	Туре	Null	Key	Default	Extra
Visitor_id	int(11)	NO	PRI	NULL	auto_increment
First_name	varchar(25)	NO		NULL	
Last_name	varchar(25)	NO		NULL	
Visit_date	varchar(25)	NO		NULL	
Prisoner_id	int(11)	NO	MUL	NULL	

Table	Non_unique	Key_name	Seq_in_index	Column_name	Collation	Cardinality	Sub_part
Visitor	0	PRIMARY	1	Visitor_id	Α	0	NULL
Visitor	1	fk_4	1	Prisoner_id	Α	0	NULL

4.3.1.3 Against

Field	Туре	Null	Key	Default	Extra
Fir_no	int(11)	NO	PRI	NULL	
Prisoner_id	int(11)	NO	PRI	NULL	

Table	Non_unique	Key_name	Seq_in_index	Column_name	Collation	Cardinality	Sub_part	F
Against	0	PRIMARY	1	Fir_no	А	5	NULL	1
Against	0	PRIMARY	2	Prisoner_id	А	5	NULL	Λ
Against	1	fk_6	1	Prisoner_id	А	5	NULL	1

4.3.1.4 Jailor

Field	Туре	Null	Key	Default	Extra
Jailor_id	int(11)	NO	PRI	NULL	auto_increment
Jailor_uname	tinytext	NO		NULL	
Jailor_pwd	Iongtext	NO		NULL	
First_name	varchar(25)	NO		NULL	
Last_name	varchar(25)	NO		NULL	

Keyname	Туре	Unique	Packed	Column	Cardinality	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	Jailor_id	6	Α	No	

4.3.1.5 Section

#	Name	Туре	Collation	Attributes	Null	Default	Comments	Extra
1	Section_id	int(3)			No	None		AUTO_INCREMENT
2	Section_name	varchar(25)	utf8mb4_general_ci		No	None		
3	Jailor_id	int(11)			No	None		

Keyname	Туре	Unique	Packed	Column	Cardinality	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	Section_id	5	А	No	
fk_3	BTREE	No	No	Jailor_id	5	А	No	

4.3.1.6 Prisoner

#	Name	Туре	Collation	Attributes	Null	Default	Comments	Extra
1	Prisoner_id	int(11)			No	None		AUTO_INCREMENT
2	First_name	varchar(25)	utf8mb4_general_ci		No	None		
3	Last_name	varchar(25)	utf8mb4_general_ci		No	None		
4	Date_in	date			No	None		
5	Dob	date			No	None		
6	Height	int(3)			No	None		
7	Date_out	date			No	None		
8	Address	longtext	utf8mb4_general_ci		No	None		
9	Section_id	int(3)		·	No	None		
10	Status_inout	varchar(3)	utf8mb4_general_ci		No	None		

Keyname	Туре	Unique	Packed	Column	Cardinality	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	Prisoner_id	4	А	No	
fk_2	BTREE	No	No	Section_id	4	А	No	

4.3.1.7 FIR

#	Name	Туре	Collation	Attributes	Null	Default	Comments	Extra
1	Fir_no	int(11)			No	None		
2	Description	longtext	utf8mb4_general_ci		Yes	NULL		
3	Fir_date	date			Yes	NULL		
4	Case_type	varchar(25)	utf8mb4_general_ci		Yes	NULL		
5	Officer_id	int(11)			No	None		

Keyname	Туре	Unique	Packed	Column	Cardinality	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	Fir_no	3	А	No	
fk_1	BTREE	No	No	Officer_id	3	А	No	

4.3.1.8 Officer_phone

#	Name	Туре	Collation	Attributes	Null	Default	Comments	Extra
1	Officer_phone	varchar(10)	utf8mb4_general_ci		No	None		
2	Officer_id	int(11)			No	None		

Keyname	Туре	Unique	Packed	Column	Cardinality	Collation	Null	Comment
PRIMARY	BTREE	EE Yes	No	Officer_phone	9	Α	No	
				Officer_id	9	Α	No	
fk_7	BTREE	No	No	Officer_id	9	Α	No	

4.3.1.9 Officer

#	Name	Туре	Collation	Attributes	Null	Default	Comments	Extra
1	Officer_id	int(11)			No	None		AUTO_INCREMENT
2	Officer_uname	tinytext	utf8mb4_general_ci		No	None		
3	Officer_pwd	longtext	utf8mb4_general_ci		No	None		
4	First_name	varchar(25)	utf8mb4_general_ci		No	None		
5	Last_name	varchar(25)	utf8mb4_general_ci		No	None		
6	Title	varchar(25)	utf8mb4_general_ci		No	None		
7	Date_of_birth	date			No	None		

Keyname	Туре	Unique	Packed	Column	Cardinality	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	Officer_id	2	А	No	

4.4 Normalization with the Process

4.4.1.1 Jailor_Phone

Name of Attribute	Symbol
Jailor_id	Α
Jailor_mobile	В

Functional Dependencies	Closures	Candidate keys	Primary key selected	Partial Dependencies(prime->n on-prime)	Transitive Dependencies (non-prime->non-prime)
AB -> AB	$(A) + = \{A\}$	AB	AB	none	none
	$(B)+ = \{B\}$				
	(AB)+={A,B}				

1NF	2NF	3NF	Explaination	Final table
every cell has atomic values, every column has same type of attribute ,name of the attribute is unique	no partial dependencies therefore it is in the second normal form	no transitive dependencies therefore it is inthe third normal form	Every jailor can add more than one mobile number	A,B

4.4.1.2 Visitor

Name of Attribute	Symbol
Visitor_id	Α
First_name	В
Last_name	С
Visit_date	D
Prisoner_id	E

Functional Dependencies	Closures	Candidate keys	Primary key selected	Partial Dependencies(prime->non-pri me)	Transitive Dependencies (non-prime->non-prime)
ABC->DE	(A) + ={A,B,C,D,E}	Α	Α	none	none
A->BCDE	(B)+ ={B}				
	(C)+ ={C}				
	(D)+ ={D}				
	(E)+ ={E}				
	(ABC) + = $\{A,B,C,D,E\}$		·		

1NF	2NF	3NF	Explaination	Final table
every cell has atomic values, every column has same type of attribute ,name of the attribute is unique	no partial dependencies therefore it is in the second normal form	no transitive dependencies therefore it is inthe third normal form	A visitor when enters will be given his /her visitor id. Mobile number and more details of the visitor could have been given,this can be done in future.	A,B,C,D,E

4.4.1.3 Against

Explanation:

- 1. Made from the relationship between Fir and Prisoner table .
- 2. If a prisoner is associated with one or more cases then the prisoner_id of that prisoner can be added to this table



4.4.1.4 **Jailor**

Name of Attribute	Symbol
Jailor_id	Α
First_name	В
Last_name	С
Username	D
Password	E

Functional Dependencies	Closures	Candidate keys	Primary key selected	Partial Dependencies(prime->non-pri me)	Transitive Dependencies (non-prime->no n-prime)
ABC-> DE	(A) + = $\{A,B,C,D,E\}$	A,D	Α	none	none
AD->BCE	$(B)+ = \{B\}$				
A->BCDE	$(C)+=\{C\}$				
D->ABCE	(D) + = $\{D,A,B,C,E\}$				
	(E)+ = {E}				
	(AD) + = $\{A,D,B,C,E\}$				
	(ABC) + = $\{A,B,C,D,E\}$				
	(AB) + = $\{A,B,C,D,E\}$				

A->B,C,D,E,A and D->A,B,C,D,E are the two functional dependencies to check here, since it does not match the criteria for attribute, name of the attribute is unique A->B,C,D,E are the two functional dependencies to check here, since it does not match the criteria for partial dependencies, it is in 2NF and we can check for 2NF Final table is	1NF	2NF	3NF	Explaination	Final table
made accordingly	values, every column has same type of attribute ,name of the	D->A,B,C,D,E are the two functional dependencies to check here, since it does not match the criteria for partial dependencies, it is in 2NF and we can check for 3NF. Final table is	dependencies therefore it	the Primary key so the final table is made	A,B,C,D,E

4.4.1.5 Section

Symbol
Α
В
С

Functional Dependencies	Closures	Candidate keys	Primary key selected	Partial Dependencies(prime->non-pri me)	Transitive Dependencies (non-prime->no n-prime)
AB-> C	$(A) + = \{A, B, C\}$	Α	Α	none	none
A-> BC	$(B) + = \{B\}$				
	$(C)+ = \{C\}$				
	$(AB)+=\{A,B,C\}$				
	$(AC)+=\{A,C,B\}$				
	$(BC)+=\{B,C\}$				

every cell has atomic values, every column has same type of attribute ,name of the attribute is unique since it has no partial dependencies, the table is in the second normal form since it has no partial dependencies, the table is in the third normal form since it has no trastitive dependencies, the table is in the third normal form some defendencies, the table is in the table is in the third normal form some defendencies, the table is in the third normal form some defendencies, the table is in the table is in the table is in the table in the table is in the table in the table in the table in the table is in the table					
every cell has atomic values, every column has same type of attribute ,name of the attribute is unique since it has no partial dependencies, the table is in the second normal form the third normal form the third normal form the section identification. Trasitive dependencies, the table is in the table is in the third normal form the third normal form the section identification. By default there are 5 sections with jailors alloted. When a new jailor is added, we need to mention the section id which has to be alloted to that jailor.	1NF	2NF	3NF	Explaination	Final table
On adding that joiler, the provious joiler will	column has same type of attribute	dependencies,the table is in	trasitive dependencies,t he table is in the third normal	alloted . When a new jailor is added , we need to mention the section id which has to	A,B,C
be deleted from the section table				On adding that jailor , the previous jailor will be deleted from the section table	

4.4.1.6 Prisoner

Name of Attribute	Symbol
Prisoner_id	Α
First_name	В
Last_name	С
Date_in	D
Date_out	E
Dob	F
Height	G
Address	Н
Section_id	I
Status	J

Functional Dependencies	Closures	Candidate keys	Primary key selected	Partial Dependencies(prime->non-pri me)	Transitive Dependencies (non-prime->no n-prime)
ABC -> DEFGHIJ	$(A)+=\{A,B,C,I,D,E,F,G,H,I,J\}$	Α	Α	none	none
A->BCIDEFGHJ	(B)+ ={B}				
	(C)+ ={C}				
	$(ABC)+=\{A,B,C,D,E,F,G,H,I\}$				
	$(AB)+=\{A,B,C,I,D,E,F,G,H\}$				
	$(AC)+=\{A,B,C,I,D,E,F,G,H\}$				
	(BC)+ ={BC}				

1NF	2NF	3NF	Explaination	Final table
every cell has atomic values, every column has same type of attribute ,name of the attribute is unique	no partial dependencies therefore the table is in second normal form	therefore the table is in		A,B,C,D,E,F,G, H,I,J
			This is done because we might need the criminal record later	

4.4.1.7 FIR

Name of Attribute	Symbol
Fir_id	Α
Description	В
Date	С
Case_Type	D
Officer_id	E

Functional Dependencies	Closures	Candidate keys	Primary key selected	Partial Dependencies(prime->non-pri me)	Transitive Dependencies (non-prime->no n-prime)
AE-> BCD	$(A)+ = \{A,B,C,D,E\}$	Α	Α	none	none
A-> BCDE	$(B)+=\{B\}$				
	$(C)+=\{C\}$				
	$(D)+ = \{D\}$				
	$(E)+=\{E\}$				
	(AE)+ = {A,E,B,C,D}				

1NF	2NF	3NF	Explaination	Final table
every cell has atomic values, every column has same type of attribute ,name of the attribute is unique	no partial dependencies therefore the table is in second normal form	there are no transitive dependencies therefore the table is in third normal form	When a prisoner is added, either an FIR already exists against the prisoner or a new FIR is generated. The FIR number is unique.	A,B,C,D,E,F,G ,H,I,J
			Here when the priosner is added FIR number is added with him and a description can also be given	
			If a prisoner is associated with more than one FIRs then it can be added in the Against table	

4.4.1.8 Officer_Phone_Number

Name of Attribute	Symbol
phone_number	Α
Officer_id	В

Functional Dependencies	Closures	Candidate keys	Primary key selected	Partial Dependencies(prime- >non-prime)	Transitive Dependencies (non-prime->non-prime)
BA->BA	$(B)+=\{B\}$	BA	BA	none	none
	$(A)+=\{A\}$				
	$(BA)+ = \{B,A\}$				

	l table	Final table	Explaination	3NF	2NF	1NF	
every cell has atomic values, no partial no transitive mobile	I,A	B,A	numbers can be added for an	dependencies therefore it is inthe	dependencies therefore it is in the	every column has same type of attribute ,name of the attribute	

4.4.1.9 Officer

Name of Attribute	Symbol
Officer_id	Α
First_name	В
Last_name	С
Title	D
Date_of_birth	E
Username	F
Password	G

Functional Dependencies	Closures	Candidate keys	Primary key selected	Partial Dependencies(prime->non-pri me)	Transitive Dependencies (non-prime->no n-prime)
ABC ->DEFG	$(A)+=\{A,B,C,D,E,F,G\}$	A,F	Α	none	none
A->BCDEFG	(B)+ ={B}				
F->BCDEGA	(C)+ ={C}				
	(D)+ ={D}				
	(E)+ ={E}				
	(F) + ={F,A,B,C,D,E,G}				
	(G)+ ={G}				
	$(ABC)+ = \{A,B,C,D,E,F,G\}$				

1NF	2NF	3NF	Explaination	Final table
every cell has atomic values, every column has same type of attribute ,name of the attribute is unique	A->ABCDEFG, F->ABCDEFG functional dependencies does not fulfill the condition for partial dependecies, hence it is in 2NF and we can check for 3NF.The final table is made accordingly	No transitive dependencies therefore the table is in the third normal form	An Officer can be added to the Officer table.Only the officer can add prisoners and add jailors	A,B,C,D,E,F,G

5. Implementation

5.1 Introduction

Since we are building a full-scale website that includes a frontend and a backend, which further involves a complex database and its queries, we started from the backend. We Started by Designing the Basic Structure of the Schema, and after further discussions we designed the perfect ER Diagram. On Creating the ER Diagram, we developed the

Relational Schema through a thorough procedure of Normalization and Relational Mapping. On Creating the Necessary Tables with their Constraints, we developed the database use MySQL and its respective queries. On Developing and Testing the Database, we Developed the Frontend using HTML, CSS and JavaScript. We Integrated the Backend to the Frontend using PHP and its various functions, thus providing an effective interface for all users involved. We have also used PhpMyAdmin for testing the database, and XAMPP for hosting our website locally.

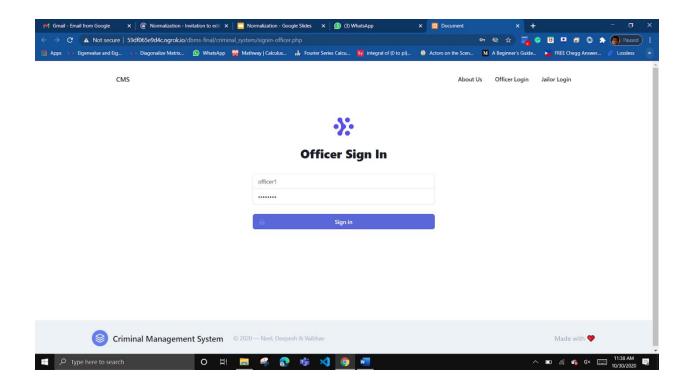
5.2 Implementation

Repository Link: CRIMINAL DATABASE MANAGEMENT SYSTEM CODE

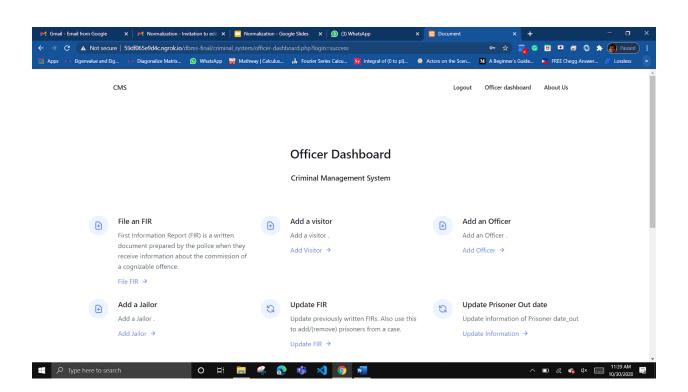
6. Snapshots of the Website

6.1 Officer

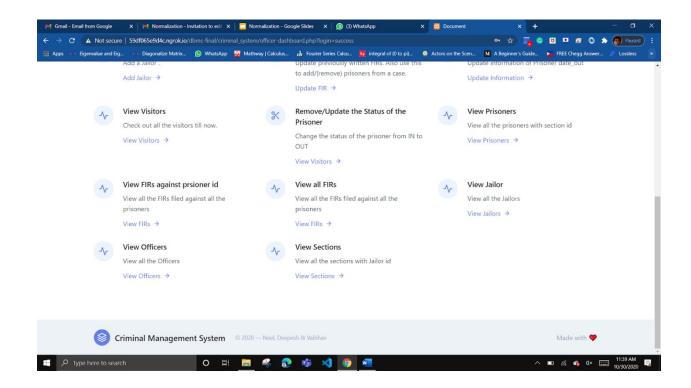
6.1.1.1 Officer Login



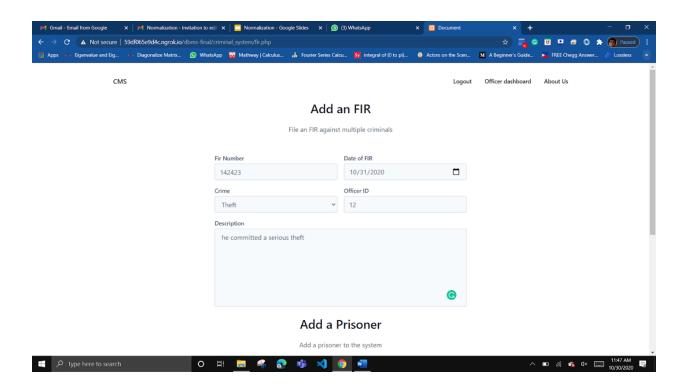
6.1.1.2 Officer Dashboard-1



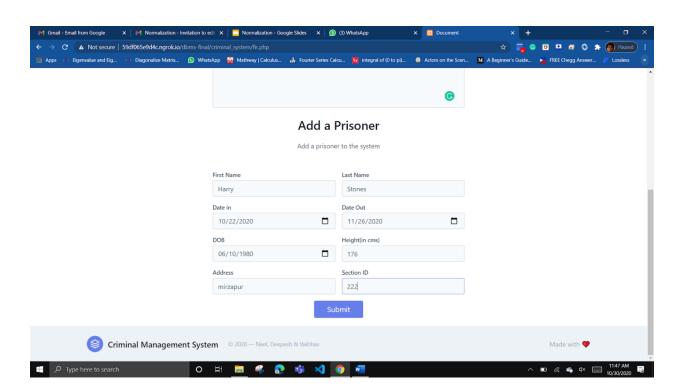
6.1.1.3 Officer Dashboard-2



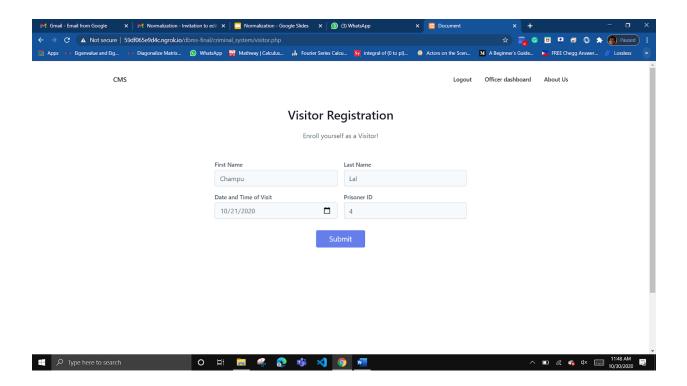
6.1.1.4 File a FIR



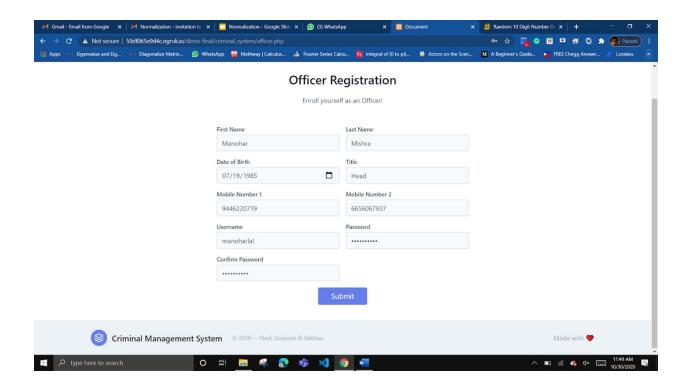
6.1.1.5 Add a Prisoner



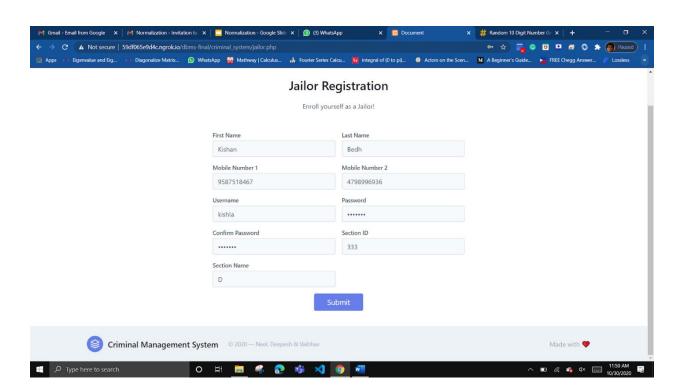
6.1.1.6 Add a Visitor



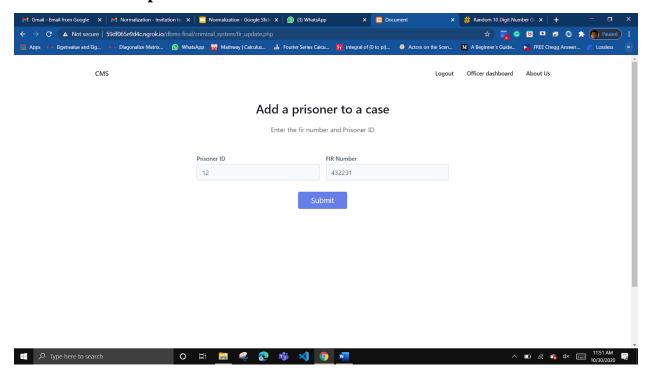
6.1.1.7 Add an Officer



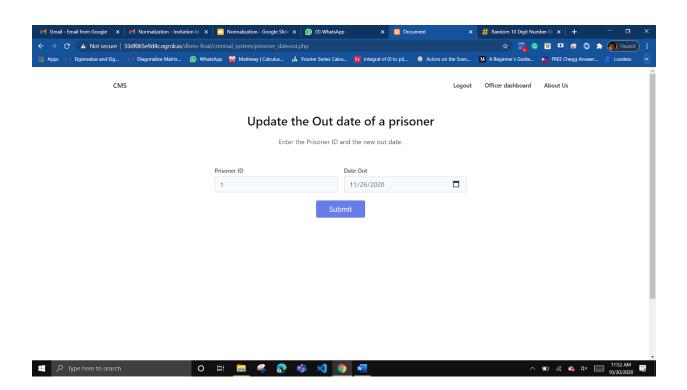
6.1.1.8 Add a Jailor



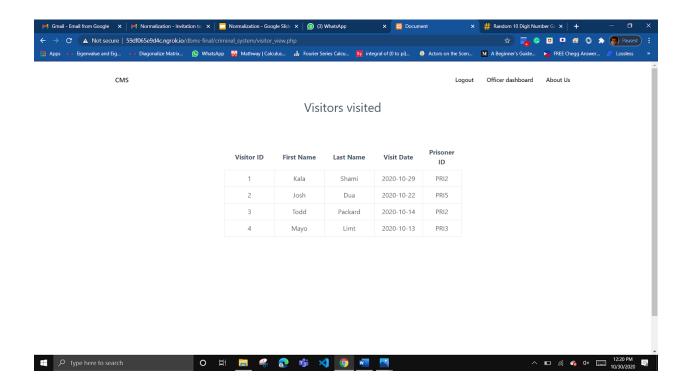
6.1.1.9 Update the FIR



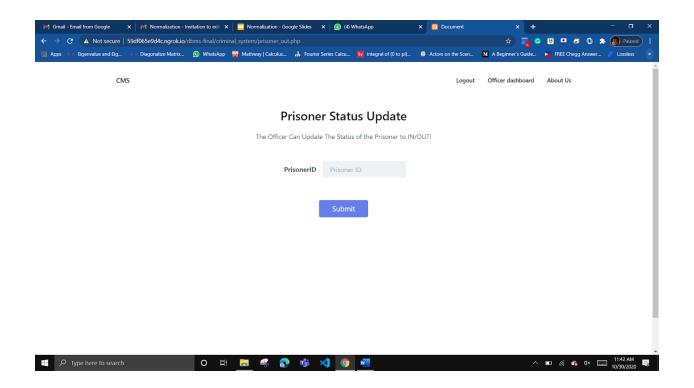
6.1.1.10 Update Prisoner Out Date



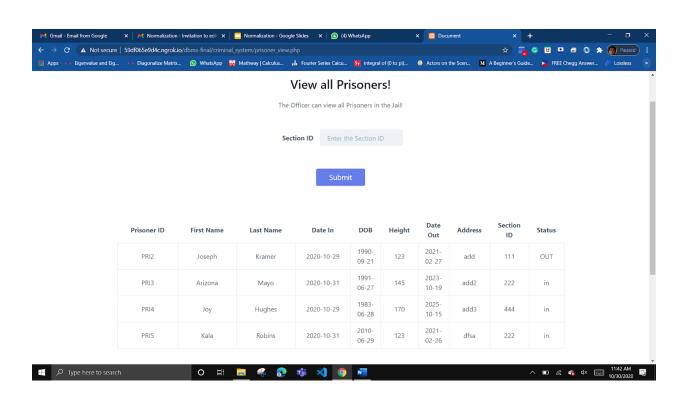
6.1.1.11 View Visitors



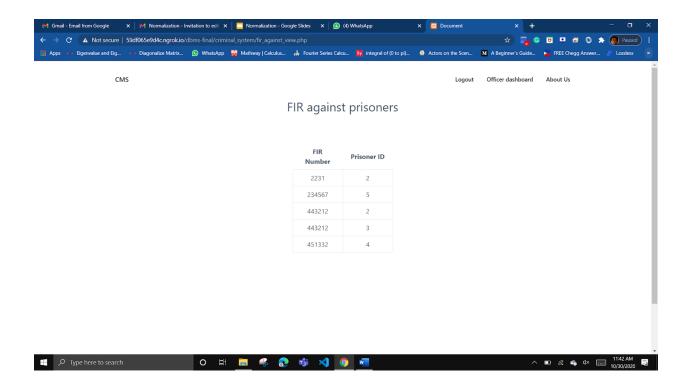
6.1.1.12 Remove/Update the status of the Prisoner



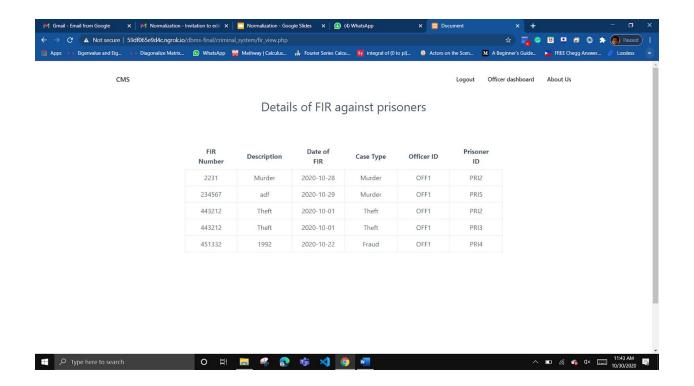
6.1.1.13 View Prisoners



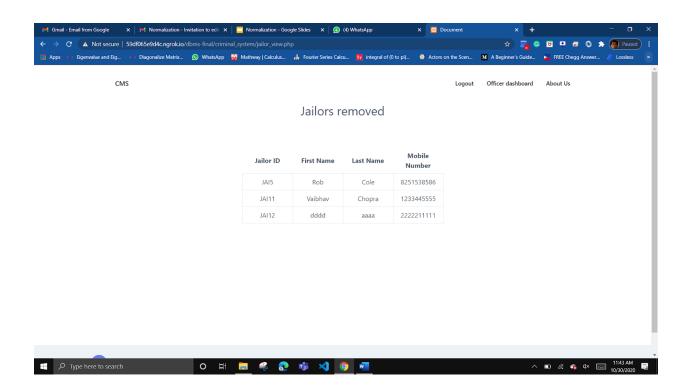
6.1.1.14 View FIRs against Prisoner ID



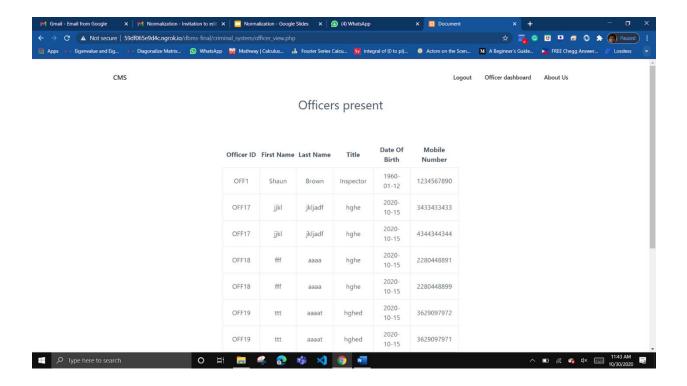
6.1.1.15 View all FIRs



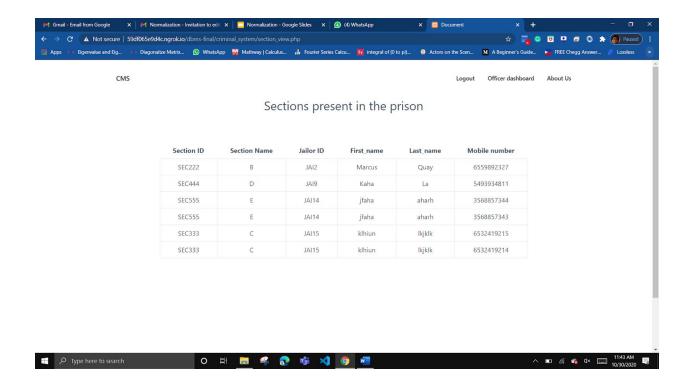
6.1.1.16 View all the Unassigned Jailors



6.1.1.17 View Officers

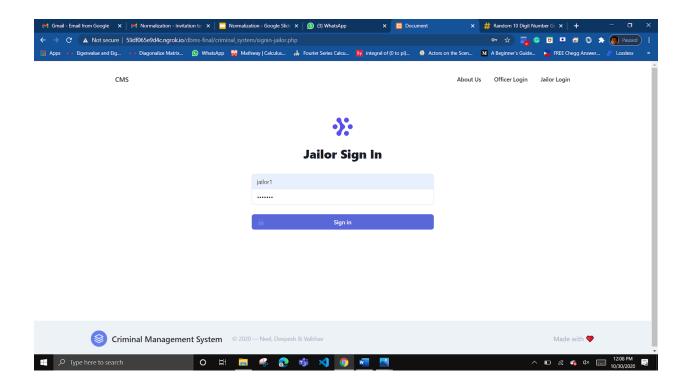


6.1.1.18 View Sections

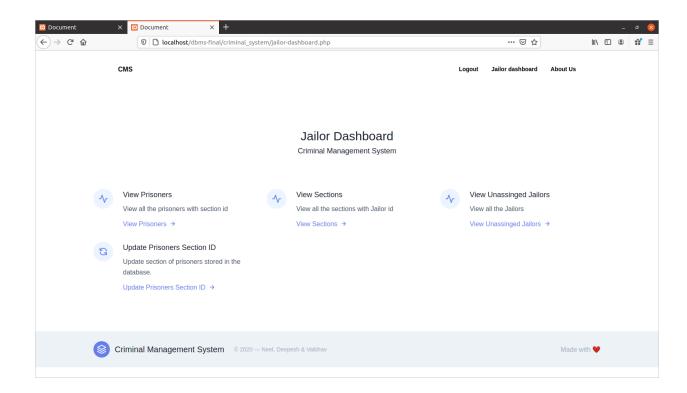


6.2 Jailor

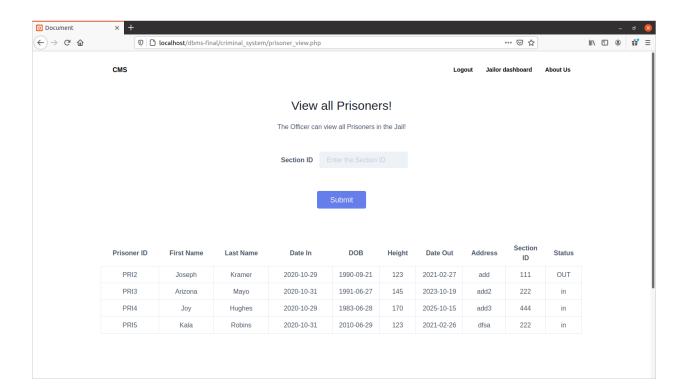
6.2.1.1 Jailor Login



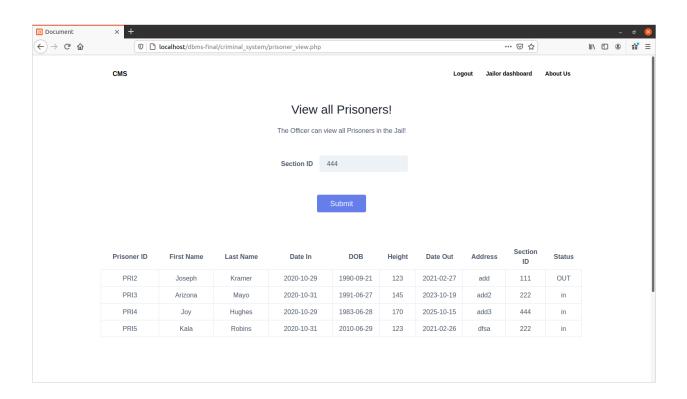
6.2.1.2 Jailor Dashboard

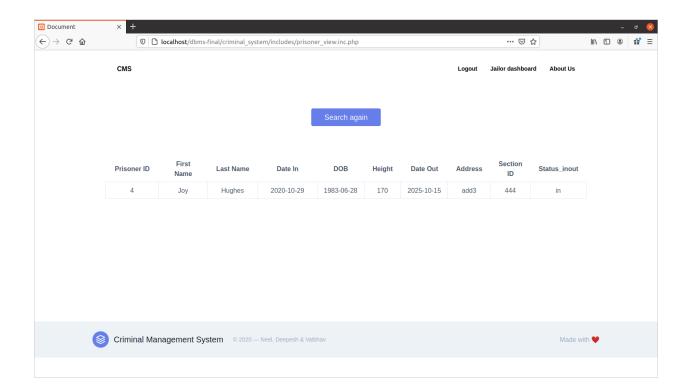


6.2.1.3 View Prisoners

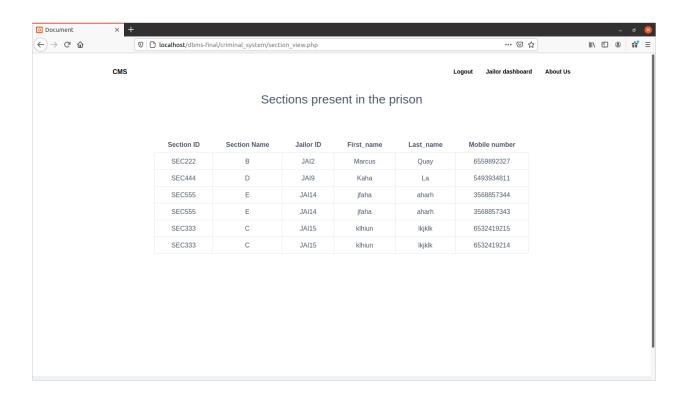


6.2.1.4 Search for Prisoners by Section ID

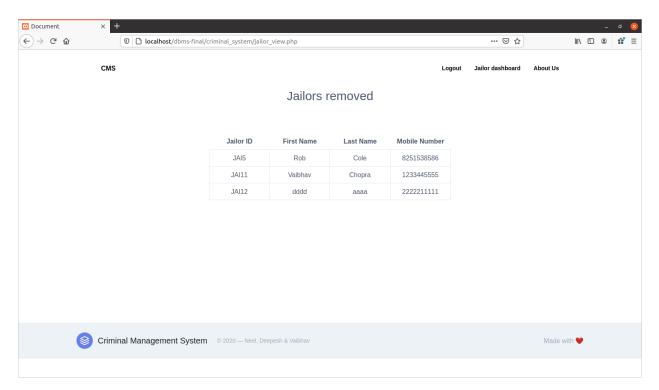




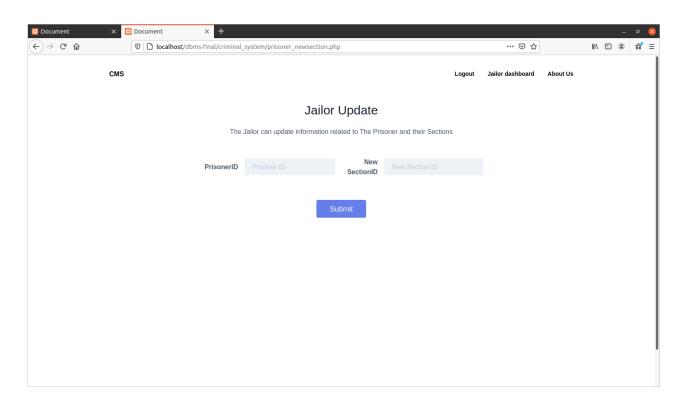
6.2.1.5 View Sections with Jailor Information



6.2.1.6 View the Unassigned Jailors



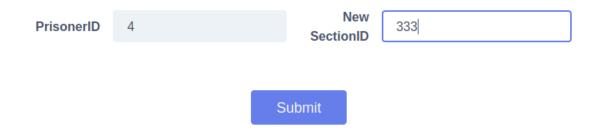
6.2.1.7 Update Prisoner's Section



Prisoner ID	First Name	Last Name	Date In	DOB	Height	Date Out	Address	Section ID	Status
PRI2	Joseph	Kramer	2020-10-29	1990-09-21	123	2021-02-27	add	111	OUT
PRI3	Arizona	Mayo	2020-10-31	1991-06-27	145	2023-10-19	add2	222	in
PRI4	Joy	Hughes	2020-10-29	1983-06-28	170	2025-10-15	add3	444	in
PRI5	Kala	Robins	2020-10-31	2010-06-29	123	2021-02-26	dfsa	222	in

Jailor Update

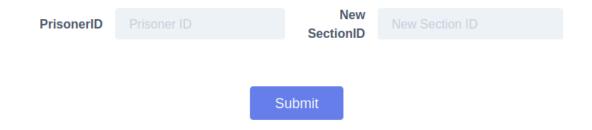
The Jailor can update information related to The Prisoner and their Sections



Prisoners Section has been updated successfully!!

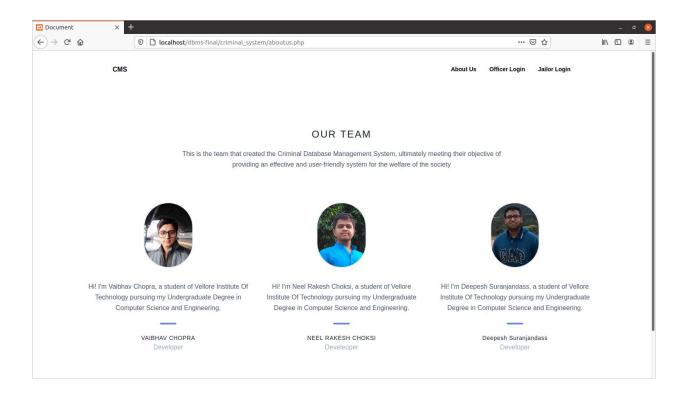
Jailor Update

The Jailor can update information related to The Prisoner and their Sections



Prisoner ID	First Name	Last Name	Date In	DOB	Height	Date Out	Address	Section ID	Status
PRI2	Joseph	Kramer	2020-10-29	1990-09-21	123	2021-02-27	add	111	OUT
PRI3	Arizona	Mayo	2020-10-31	1991-06-27	145	2023-10-19	add2	222	in
PRI4	Joy	Hughes	2020-10-29	1983-06-28	170	2025-10-15	add3	333	in
PRI5	Kala	Robins	2020-10-31	2010-06-29	123	2021-02-26	dfsa	222	in

6.2.1.8 About Us



7. Conclusion and Future Work

7.1 Conclusion

We would like to conclude this project by saying that we have successfully implemented it and achieved our objective. The Criminal Database Management System we have made caters to the right users and provides an effective use. Through this process we also learnt the usage of various technologies like PHP and got to put our existing knowledge of MySQL to work. We would like to thank Dr.Angulakshmi M Ma'am for providing us this esteemed opportunity to showcase our skills.

7.2 Future Work

The Future Scope of this Project includes the further enhancements we can make in order to make it more feasible. Firstly, we would like to ensure further protection maybe via hardware driven devices like an iris scanner or fingerprint scanner. Secondly, We would also probably like to integrate our database management system with secure cloud services to ensure proper backup of information. Lastly, we will aim for multilingual support in order to serve a larger audience and increase user friendliness.

8. References

[1] Steven Holzner, "HTML Black Book", Jon Skeet,"C# in depth

[2]Shiju Sathyadevan, Crime analysis and prediction,IEEE,25Sept2014,10.1109/CNSC.20 14.6906719

[3] Wikipedia-SQL Server Express – https://en.wikipedia.org/wiki/SQL_Server_Expr ess.

[4] Anil Jaiswal, Neeta Gunjal, PoojaLondhe, Shikha Singh, Ramesh Solanki, "Crime Automation & Reporting System", International Journal of Science and Modern Engineering (IJISME), Volume-1, Issue-11, October 2013

[5] http://troindia.in/journal/ijcesr/vol5iss6/20-21.pdf