BAHÇEŞEHİR UNIVERSITY

FACULTY OF ENGINEERING

DEPARTMENT OF COMPUTER ENGINEERING

CRIMINAL RECORD MANAGEMENT SYSTEM

Submitted by

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1. Project Management

1.1. Problem Statement

National security has been a source of concern to all times in Colombia. Cause of the fact that there exists a civil war continuing on the country for the last 50 years murder crime rates remains high. According to a research on 2012 , nearly 30.800 people passed away because of murder.

In order to reinforce Security and Justice in Colombia, and to ensure the security of citizens, it is important to establish at all levels a concrete and user-friendly system which will enable an efficient exchange of information on previous convictions of criminals.

Information about previous convictions shall circulate between judges and prosecutors as well as police authorities. This is essential in order to provide adequate responses to crime and also to prevent new crimes from being committed.

1.2. Purpose

The purpose of our project is creating a criminal record management system. Via this system we will be able to keep all crimes and their details together and in order also we will be able to help police and CBI officers to find criminals. Such as when a new crime occurs, they will be able to put all parts of this crime into this system, like criminal, victim, crime, place of crime, date of crime, evident, punishment etc. This system will keep all the data and hold the parts together, also these informations will help solving future crimes, and it will make archiving a lot more easily.

1.3. Objectives

1) Keeping record of most essential (accurate) data about criminals and crimes.

2) Classifying crime events according to their types like murder, theft, mutilation, extortion etc.

3) Integration of data base for different types of Users will maintain a more unified system for ease of gathering information.

4) All details about a crime (e.g. the way of committing a murder, the relation between criminal and victim, scene of crime etc.) should be recorded for storing essential data for further investigations and judgment period. Also for solving other cases similar situations would be needed.

5) Provide anytime available system

6) Record data about jail process of criminals

7) Taking information about police(s) or CBI teams who worked on the case.

1.4. Constraints

1.4.1. Start Date

Starting date of the project is specified as the 14th January 2015.

Deadlines

Durations of the task procured from Time Estimation Table are used for the critical path analysis. Data got from this analysis show that the critical path is 250 workdays long so that the deadline for the project can be specified approximately as the 21th September 2015.

1.4.2. Budget

It is expected to consider Physical Design and Web API customization and Management phases in order to determine the budget. Some phases do not require any additional budget like cost-free phases.
Budget for the designed project is tabled below.

	Unit Cost	Quantity	Total
Physical Design	$25.000	1	$25.000 (monthly)
Employee acquiring for newly formed Units (per - month Salary)			
Web Systems Unit			
• **Employees that track data traffic and edit context**	$600	5	$3000
• **Employees that develop the Web API**	$700	7	$4900
Network Unit			
• **Employees who update network system**	$750	4	$3000
• **Employees that deal with security**	$1000	3	$3000
TOTAL			$38.900 (Monthly)
Resource acquired for newly formed units (desktop PCs)			
Web Systems Unit	$440	12	$5300
Network Unit	$500	7	$3500

TOTAL			$8800(net)

The expected budget is close to $331670.

1.4.3. Technology

Technologies to be used are UML, J2EE, XML, e-Forms, AJAX, Web 2.0, Web-services, SOA. These technologies are defined below.

UML: UML is a communication standard for the world of software development. It consists of different types of diagrams that will, together, help you describe the boundary of the system, the structure of the system, and the behavior of the system. UML is required in the successful deployment of the Rational Unified Process. Agile would consider UML "waste" in its focus to minimize work-in-progress. Like a document written in Greek, it is only useful if everyone on the team speaks the same language and the document is worth reading.

It is worth learning because at the least it would just be another tool in your every growing tool box.

J2EE: J2EE is Java's multi-tier enterprise application development standards. J2EE, a structure composed of standard components and modular without complex processing, enables automatically developed. Numerous machines, server, database, and creates a framework for compatible operation resulting from the application environment.

XML: Extensible Markup Language is human-readable and machine-readable encoding document. It is in textual format and widely used for the representation of arbitrary data structures such as those used in web services.

E-Forms: An e-form (electronic form) is a computer program version of a paper form. E-forms allow more focus on the business process or underlying problem for which they are designed (for example, expense reporting, purchasing, or time reporting). They can understand the roles and responsibilities of the different participants of the process and, in turn, automate routing and much of the decision making necessary to process the form.

AJAX: It is stands for JavaScript + XML. It is a group of interrelated Web development techniques used on the client-side to create asynchronous Web applications. With Ajax, Web applications can send data to and retrieve from a server

asynchronously (in the background) without interfering with the display and behavior of the existing page. Data can be retrieved using the XML HttpRequest object. Despite the name, the use of XML is not required (JSON is often used in the AJAJ variant), and the requests do not need to be asynchronous.

Web 2.0: Web 2.0 describes World Wide Web sites that use technology beyond the static pages of earlier Web sites. It uses these technologies; RIA techniques, AJAX, Adobe Flash, Adobe, CSS, XHTML, Blogs, JSON, XML..

Web-services: A Web service is a method of communication between two electronic devices over a network. It is a software function provided at a network address over the Web with the service always on as in the concept of utility computing.

SOA: This is a service-orientation. SOA is a design pattern based on distinct pieces of software providing application functionality as services to other applications via a protocol. It is independent of any vendor, product or technology.

1.4.4. Scope

To accomplish a project successfully, it is essential to choose stakeholders and their related tasks. If there would be lack of describing stakeholders and their associated work correctly it could cause probably losing productivity or labor loss, which will raise possibility of ending up with failure of the project.

Stakeholders of this project and their related work are specified below:

Stakeholder Title	Descriptions
System Owner	Mr. David ALLEN (Chairman and Managing Director) Role : Sponsor and executive advocate Responsible for funding the project
System Designer	Mrs. Karen JONES (Senior Vice President ,IT) Role: Technical specialist that translates Massive Dynamic Soft's business requirements into a technical solution
System Builder	Technology Specialist of Massive Dynamic Soft Role: Technical specialist that constructs the system and its corresponding components based on the design specifications generated by the System Designer.
System Analyst	Mr. Stephan Richardson (Senior Vice President ,IT) Role: Specialist that studies the problem and needs of the project to determine how people, data, process and information

	technology can best accomplish improvement. Mr. Richardson will define the requirements of each user and expectations from the criminal record management system. Since every person will demand different data from the system, it would be efficient to determine different levels of accessibility to the stored data.
Project Manager	Ms. Derya Şişmanyazıcı Role: Individual who accepts the responsibility for planning, monitoring and controlling the project.
System Users	Internal Users: Police , Jail officers, CBI officers , Legal authorities External Users : Public* *Public can require to reach data for criminal records because it is necessary to get right information for criminals. (e.g., in the process of employment it is important to know if a person is criminal or not, ordinary people would want to know a suspected person from surrounding is whether a criminal or not vice versa.)

Although it is essential to define stakeholders and their roles in the system accurately, project phases and subtasks with stakeholders should be given clearly too.

Processes of the project, their description and the associated stakeholders are denoted in order below.

Project Phases	**Description**
Scope Definition	Base problems , opportunities and constraints are defined, and schedule with budget are specified in this phase Stakeholders: owner, manager, analysts
Problem Analysis	Problems and opportunities that are specified from phase 1 are analyzed along with the business processes. Stakeholders: owner, manager, analysts
Requirement Analysis	System requirements (e.g., like what is needed to build this system secure and reliable) are determined in this phase. Stakeholders: owner, manager, analysts, users
Logical Design	Business requirements in words, obtained from phase 3, are translated into visuals (e.g. activity diagrams, class diagrams).

	Stakeholders: manager, analysts, users
Decision Analysis	Candidate solutions are identified with candidate systems matrix; and after that, they are analyzed via feasibility matrix. Stakeholders: owner, manager, analysts, users, designers
Physical Design	The design of the managed security service is accomplished by Massive Dynamic Soft in this phase. Stakeholders: designer, analysts, user
Implementation	The system gets implemented in this phase. Stakeholders: builders, users, managers, analysts

1.5. Schedule

Task Durations

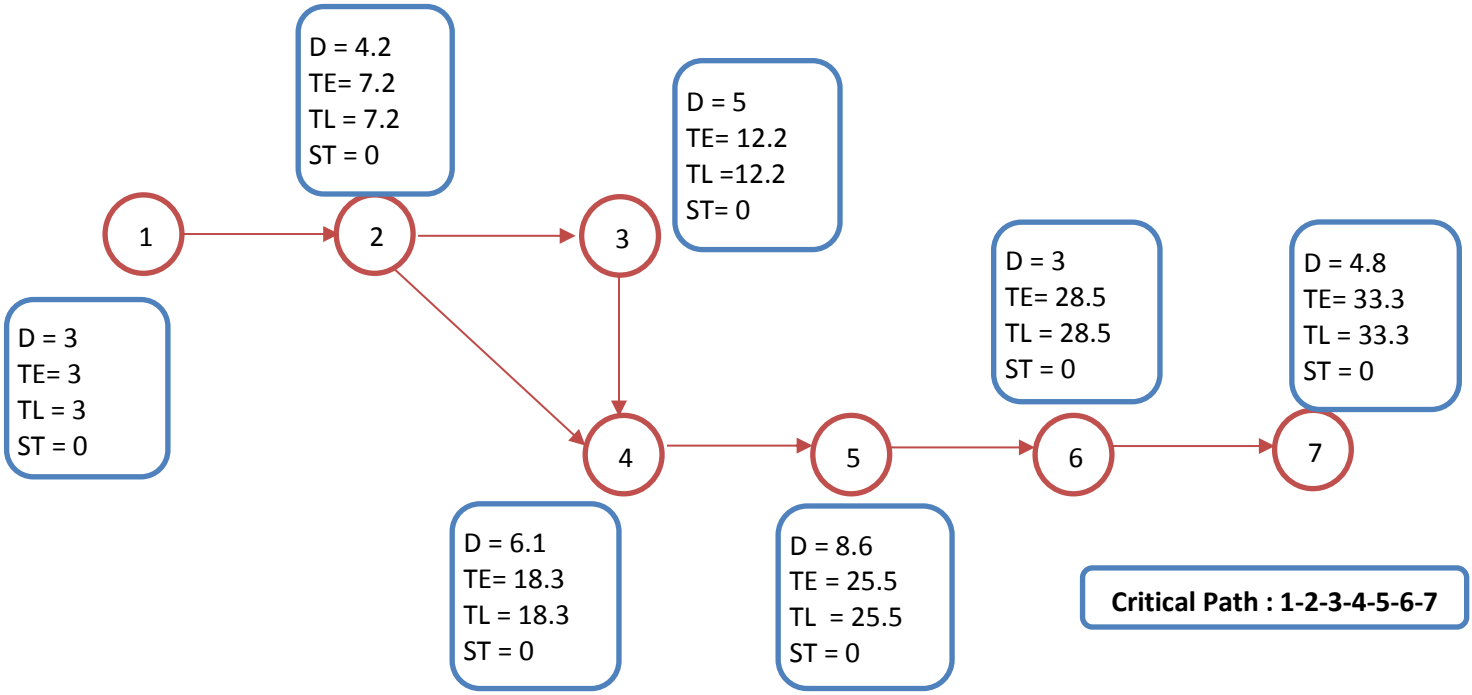
Activity	Time Estimations (in weeks)				
	OD	**RD**	**PD**	**Preceding Activity**	**Duration**
1.Requirements Collection	1	3	5	---	(1*OD+4*RD+1*PD)/6=3
2.Process Modelling	2	4	3	1	(1*OD+4*RD+1*PD)/6=4.2
3.Report Design	4	6	7	2	(1*OD+4*RD+1*PD)/6=5
4.Physical Design	5	6	8	2,3	(1*OD+4*RD+1*PD)/6=6.1
5.Construction	6	9	10	4	(1*OD+4*RD+1*PD)/6=8.6
6.Testing	2	3	4	5	(1*OD+4*RD+1*PD)/6=3
7.Implementation and delivery	2	5	7	6	(1*OD+4*RD+1*PD)/6=4.8

1.5.1. Critical Path

We have to analyze critical path to find the total duration of the project.

Activity	Duration (in weeks)	Preceding Activity
1 Requirements Collection	3	---
2 Process Modelling	4.2	1

3 Report Design	5	2
4 Physical Design	6.1	2,3
5 Construction	8.6	4
6 Testing	3	5
7 Implementation and delivery	4.8	6



We have find Total Duration as 33.3 weeks that means 8.3 months (approximately 250 days).

1.6. Expectations Matrix

	Max or Min	Constrain	Accept
Cost		■	
Schedule			■
Scope and/or Quality	■		

2. System Analysis

2.1. System Requirements

2.1.1. Nonfunctional Requirements

- Confidential data should be secured against unauthorized (outer) access.
- Interface should be simple and look professional for better use. Shown text at the screen should be minimized for simplicity.
- The system should be available in all times needed that mean 7x24.
- Data access should be separated according to the different users on the sytem (e.g., administrators and police can access more confidential data compared to Public. Public can only view type of crime and period of punishment for a criminal. Any user other than jail officer and police cannot record new data related to the criminal)
- All system data should be backed up periodically against probability of losing essential data.

2.1.2. Functional Requirements

This system should have the following characteristics;

- When a new crime occurs police officers should be able to

1. Check if the criminal is already existing in the system
2. Update the new crime of already existing criminal
3. Register new Criminal
4. Record the Crime type and details of the crime
5. Take the information like 3 different view, finger print and DNA sample.
6. Update the new crime of existing criminal
7. Search the criminal by name/blood group/type of crime/ DNA/ Image/ Sketch.
8. Access full information of criminals.
9. Record custody information

- To decide if the criminal is whether will be punished with jail or not legal authorities(Judge) should be able to

1. Access full information of criminals
2. Access full information about other system users
3. Assign a punishment (jail or bail) type and time for the criminal or change the data
4. Transfer the criminal to an another place

- If a criminal is forwarded for jail punishment jail intendant or jail officers should be able to

1. Register the incoming criminal
2. View all details of the criminal like name/blood group/type of crime/ DNA/ Image/ Sketch.
3. Search all criminals information .

4. Maintain the current location of the criminal like Cell No, cell mates and Jail Name
5. Maintain the records of meeting with outsiders.
6. Record information about changes in health condition

- In the situation of an unsolved crime case CBI officers should be able to

1. Search the criminal by name/blood group/type of crime/Jail No. / DNA /Image/Sketch.
2. Access full information of criminals .

- This system should be monitored by an administrator continuously cause of the confidential and essential data

1. Provide the database
2. Assign and revoke user roles for Users
3. Maintain system security against unauthorized users
4. Monitor Jail and Police Administration
5. Backup and restore data permanently
6. Receive and send registration confirmations

- It is also necessary viewing information on CRMS system for public

1. Viewing a personal criminal history for employment applicants or banking processes
2. Viewing crime type if exist
3. View if any punishment is given to that person
4. A report should be taken according to below informations

2.2. Use Case Modeling

2.2.1. Actor Glossary

Term	Description
Jail Superintendent & Jail Officers	They can take the information like photo from 3 different view, blood group, finger print, retina scan and DNA Information and Update the new crime of existing criminal.
CBI Officers	CBI Officers can access full information of criminals and search the criminal by name/type of crime/Jail No./DNA/Image/Sketch.
Police	Police can search the criminal by name/blood group/type of crime/Image/Sketch.
Judge (Legal Authorities)	Judge can access information of criminals also access information about other Users.
Public	Public can use system to make resource about people limitedly.
Administrator	The administrator is a specialist of Massive Dynamic Soft and responsible for the Managed Security Service.
Hacker	Hacker can attack the system.

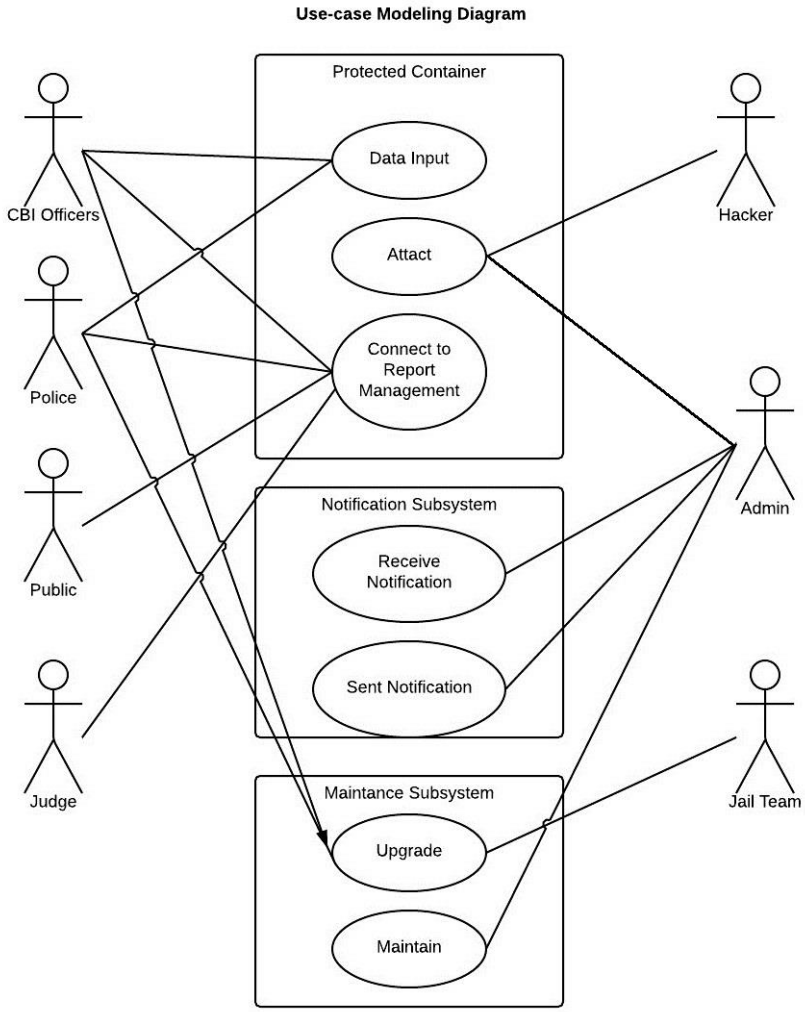
2.2.2. Use-Case Glossary

Use-case Name	Use-Case Description	Participating Actors and Roles

Data Input	Entrance of new crime information; *Criminal name *Crime type *Evidence of crime *Place and time *Collaborator people for crime	CBI Officers, Police
Connect to Record Management	The user tries to reach online Services of Record Management system.	CBI Officers, Police, Judge, Jail Team
Connect to Record Management	Public tries to reach limited version of Record Management System to make resource about people.	Public
Access Report	Necessary information will be shown to employee in charge.	CBI Officers, Police, Judge, Jail Team
Access Report	Public will see only specific part of criminal record which include type of crime, his or her punishment how many years, and if s/he is escaped prisoners.	Public
Upgrade the System	When new crime happens officers will enter functional and non-functional requirements. Jail team will also enter prison information for criminal.	CBI Officers, Police, Jail Team
Maintain The System	If failures in the system administer occur, admin can maintain it.	Administrator
Attack on the system	The hacker attacks the	Hacker

	system using an attack.	
Create summary	The admin composes a summary about an attack that happened.	Administrator
Access summary	Massive Dynamic can open the summaries about attacks on their company.	Administrator
Send notification	The system sends a notification about the attack automatically to Massive Dynamic.	Administrator
Receive notification	The Administrator of Massive Dynamic receives a notification about an attack.	Administrator

2.2.3. Use-case Modeling Diagram



2.2.4. Use Case Narratives

Use-case Name	**Attack on System**
Use-case ID	**Attack_on_system**
Priority	**High**
Source	**Requirement - Attack_on_system**
Primary Business Actor	**Hacker**
Other Participating	**Admin**

Actors			
Description	**This use-case describes how the hacker tries to attack Massive Dynamic online services and how the company react to the attack.**		
Trigger	**Hacker decides to attack Massive Dynamic.**		
Typical Course of events	**Actor Action**	**System Response**	
	Step 1: Hacker tries to attack the system.	**Step 2:**	**System monitors incoming traffic.**
		Step 3:	**System looks for threatening IP addresses.**
		Step 4:	**System reroutes traffic to the Scrubbing facility.**
		Step 5:	**System compares suspicious IP-addresses with server logs.**
		Step 6:	**System compares suspicious IP-addresses with geo-IP location data.**
		Step 7:	**System finds threatening IP-addresses.** **Scrubbing system filters the traffic of the hacker, only valid traffic can pass.**
		Step 8:	**The notification system sends a notification to the Administrator to inform him about the attack attempt.**

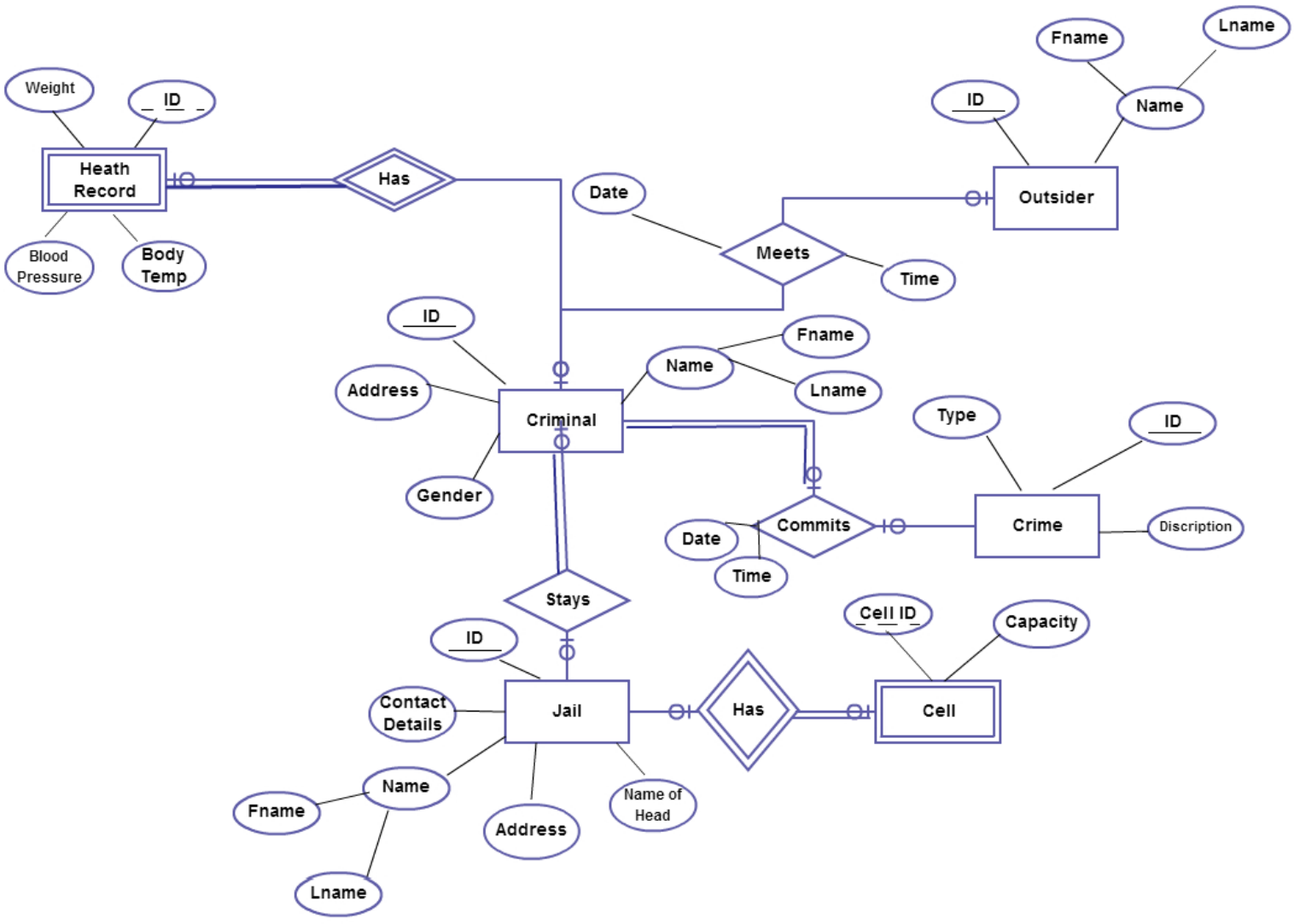
Alternate courses		**Alternative Step 6:** **Alternative Step 7:** **Alternative Step 8:**	**System cannot find threatening IP addresses.** **System does not reroute any traffic.** **Online services of Massive Dynamic are not available anymore, so the use-case gets terminated.**
Conclusion	**This use-case concludes when the attack has been stopped successfully.**		
Post condition	**The attack was stopped, a notification will be send to the administrator of Massive Dynamic.**		

Use-case Name	**Upgrade System**	
Use-case ID	**Upgrade_system**	
Priority	**High**	
Source	**Requirement - Upgrade_system**	
Primary Business Actor	**CBI Officers, Police, Jail Team**	
Other Participating Actors	**Admin**	
Description	**This use-case describes how admin upgrades their system for making it a better and more secure solution.**	
Trigger	**Admin developed an upgrade for the Managed Security Service and the system is not up-to-date anymore.**	
Typical Course of events	**Step 1:**	**CBI Officers, Police, Jail Team checks if there is new information to enter the system at Massive Dynamic is up-to-date.**

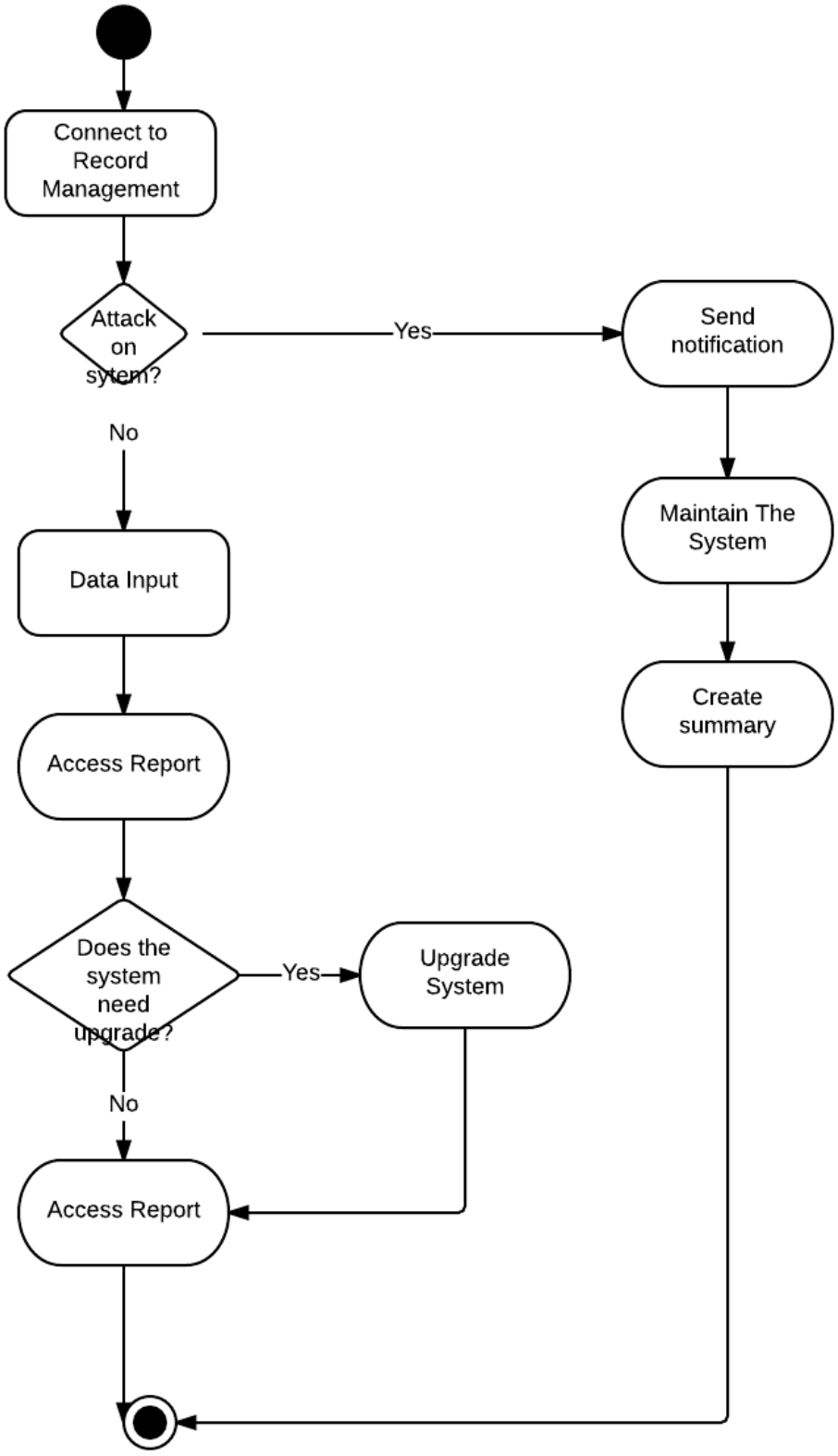
	Step 2: **Step 3:**	**Admin updates the system.** **Admin checks again if the system is up-to-date now.**
Conclusion	**This use-case concludes when the system has been upgraded successfully.**	
Post condition	**The old system is up-to-date again.**	

2.3. Data Modeling

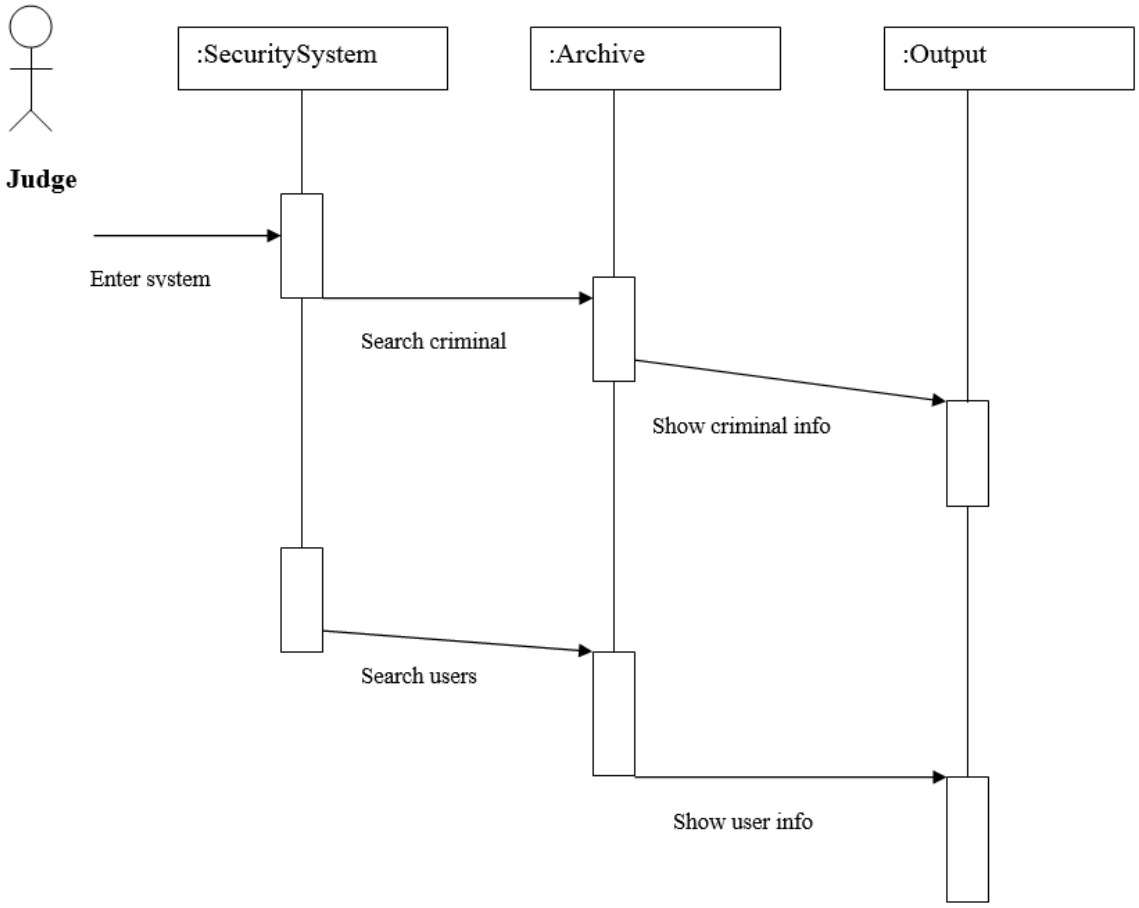
2.3.1. E-R Diagram

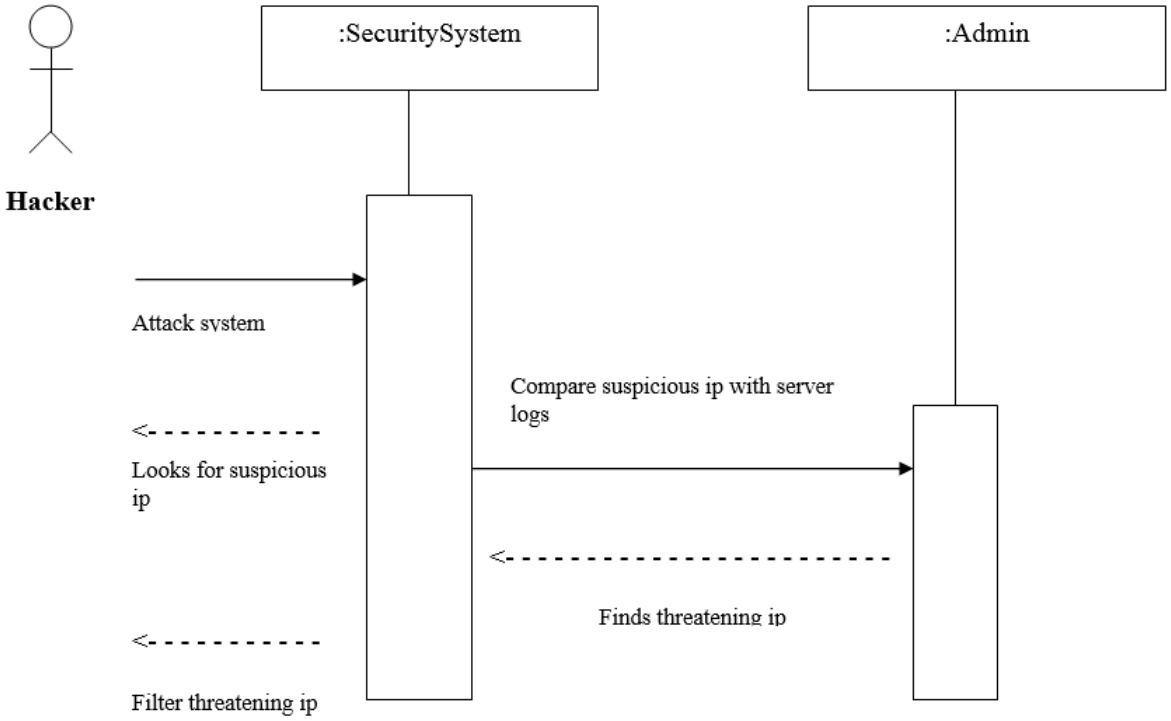


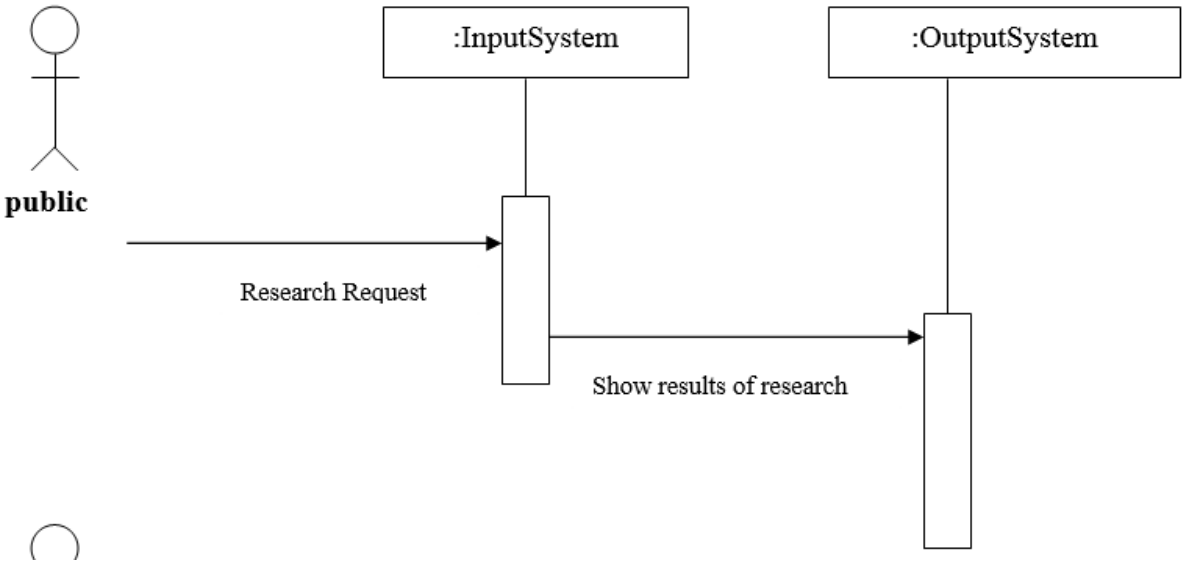
2.3.2. Activity Diagram

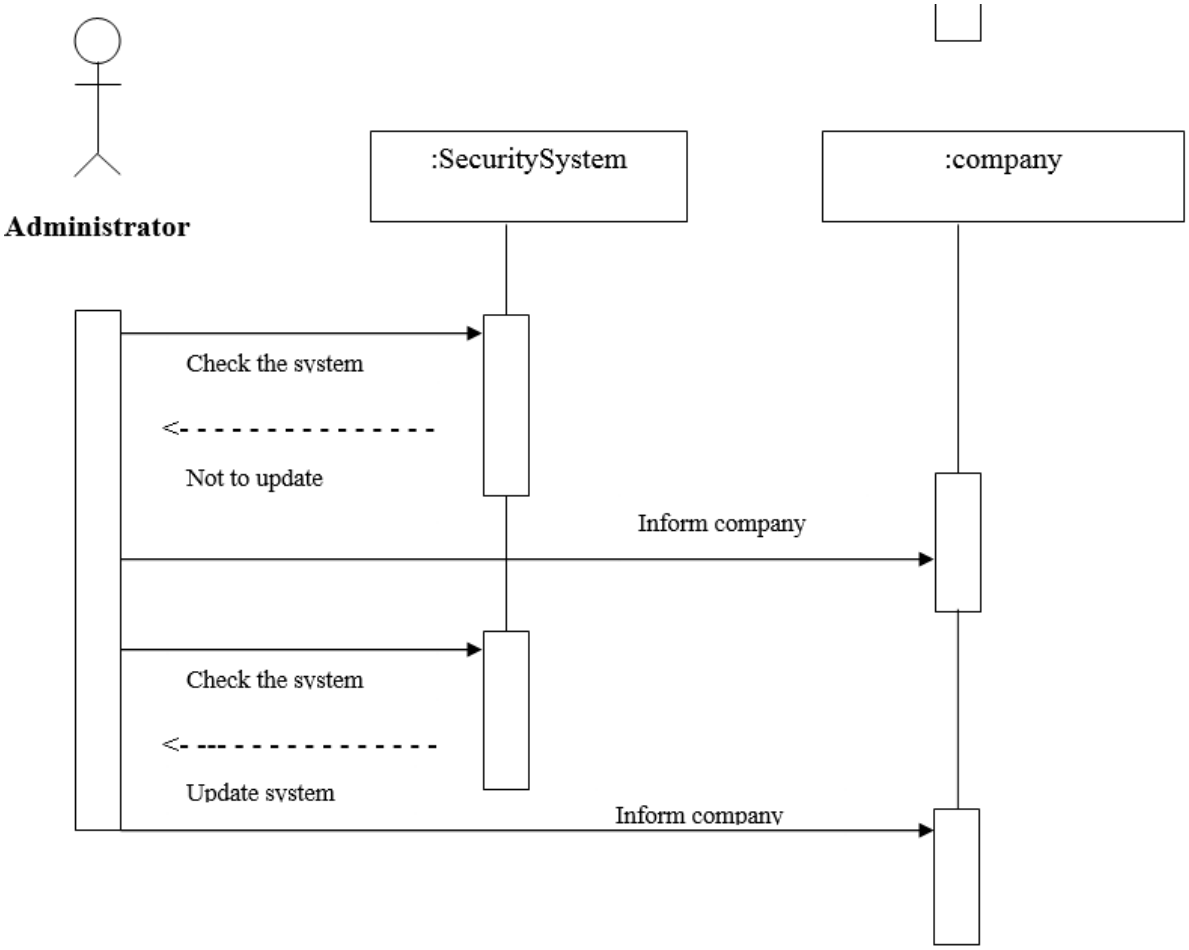


2.3.3. Sequence Diagrams



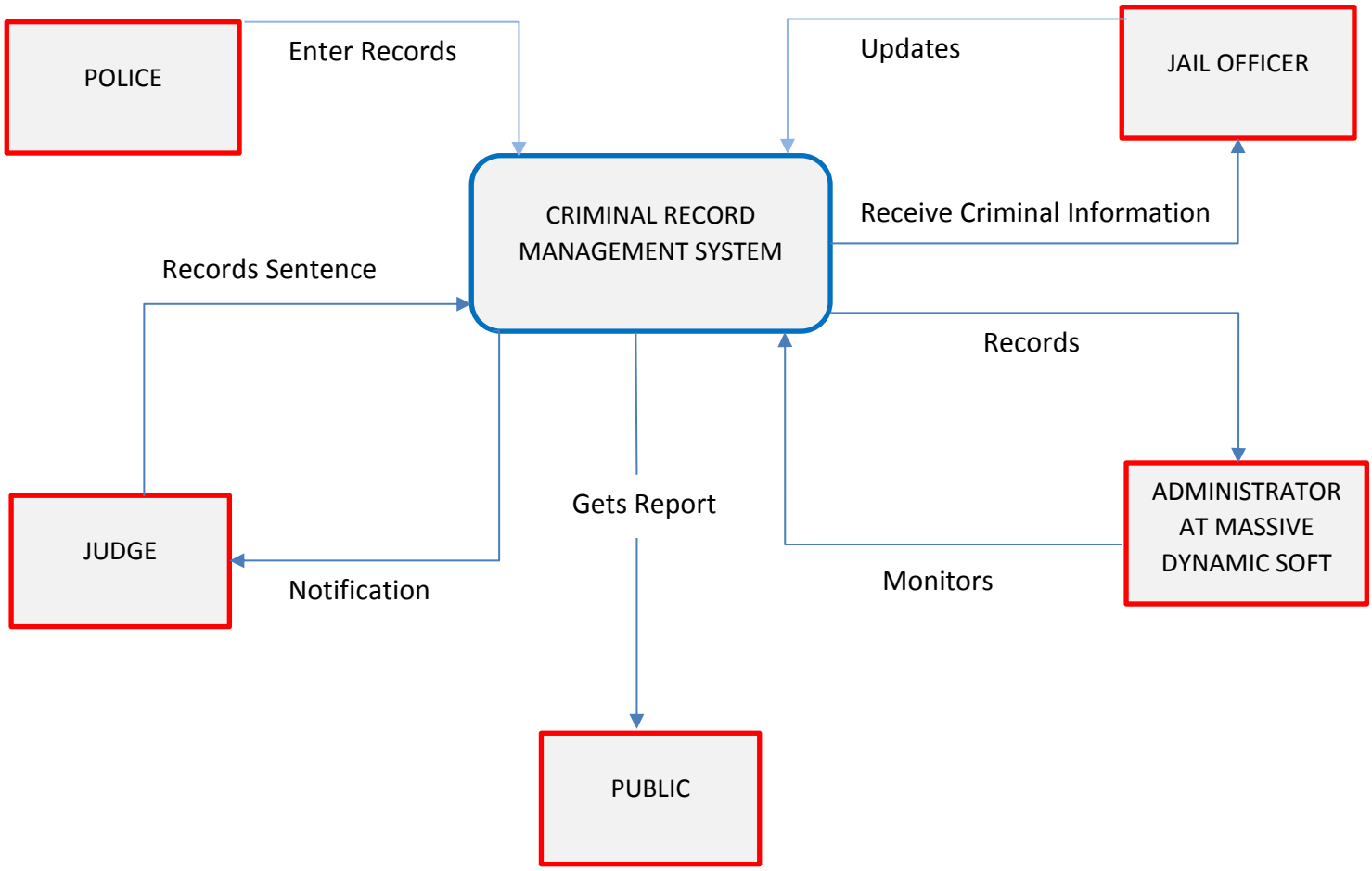

:SecuritySystem
:Admin
Hacker
Attack system
Compare suspicious ip with server logs
Looks for suspicious ip
Finds threatening ip
Filter threatening ip


:InputSystem
:OutputSystem
public
Research Request
Show results of research

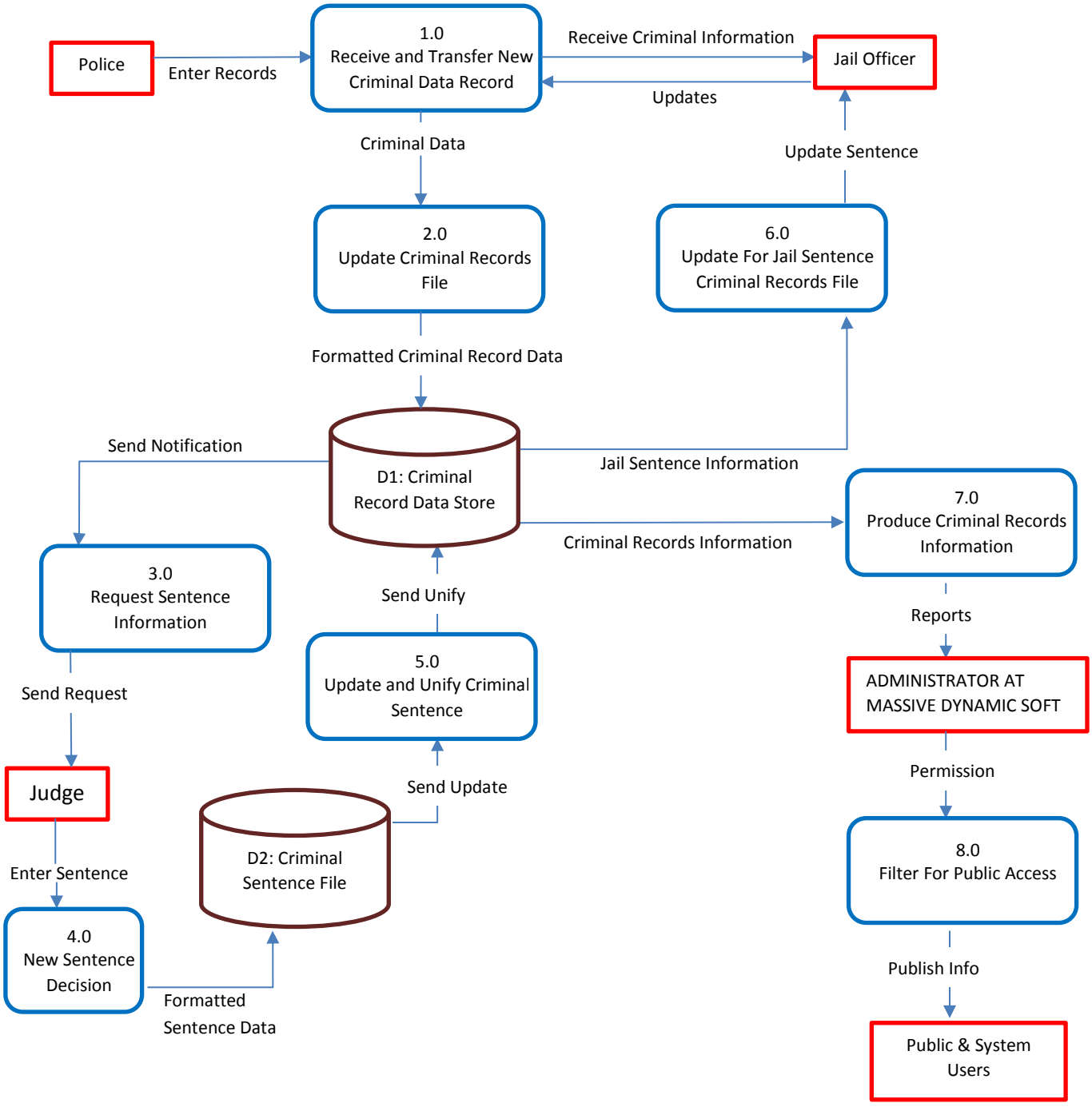

Administrator
:SecuritySystem
:company
Check the system
Not to update
Inform company
Check the system
Update system
Inform company

2.4. Process Modelling

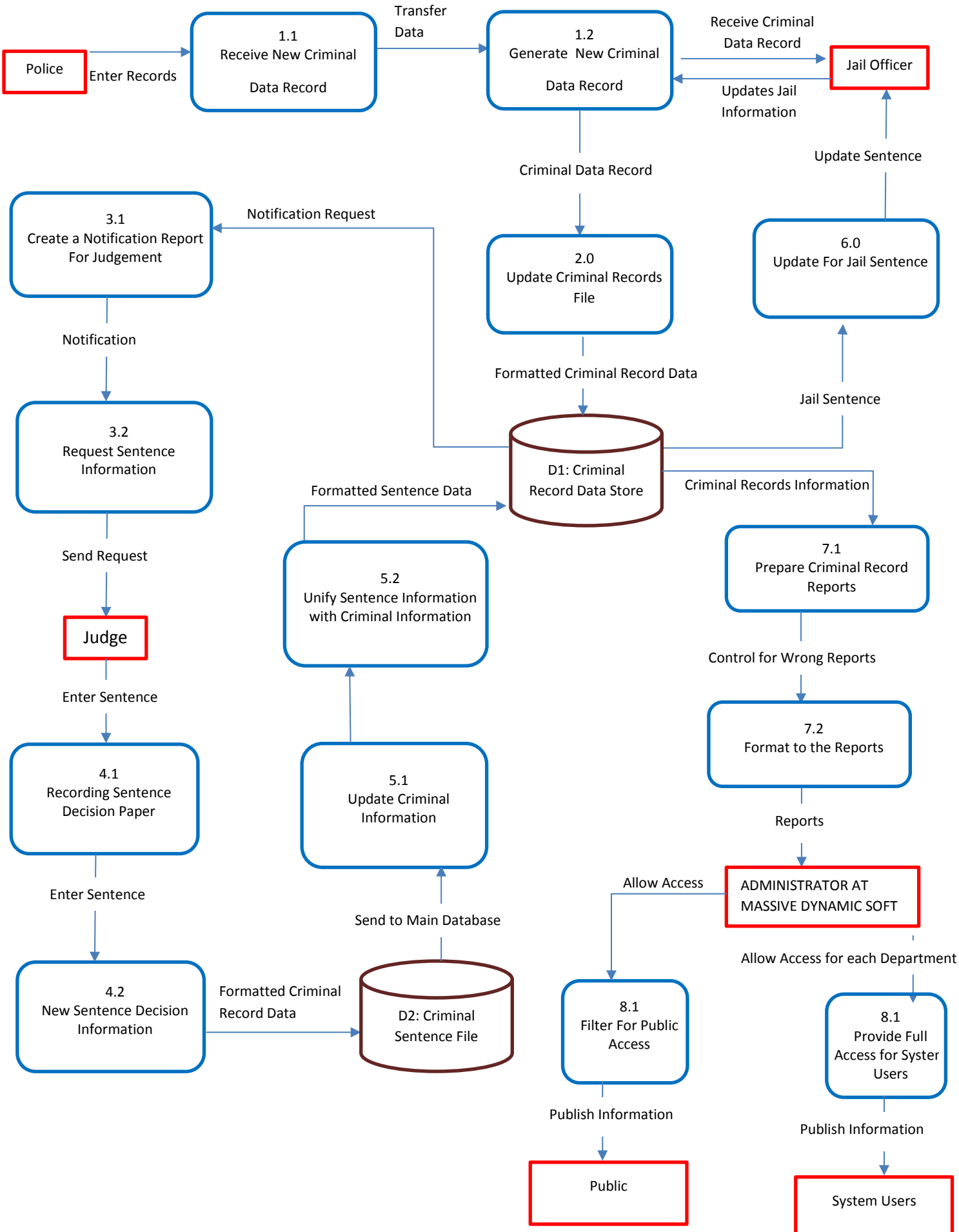
2.4.1. Context Level DFD



2.4.2. Level-0 DFD

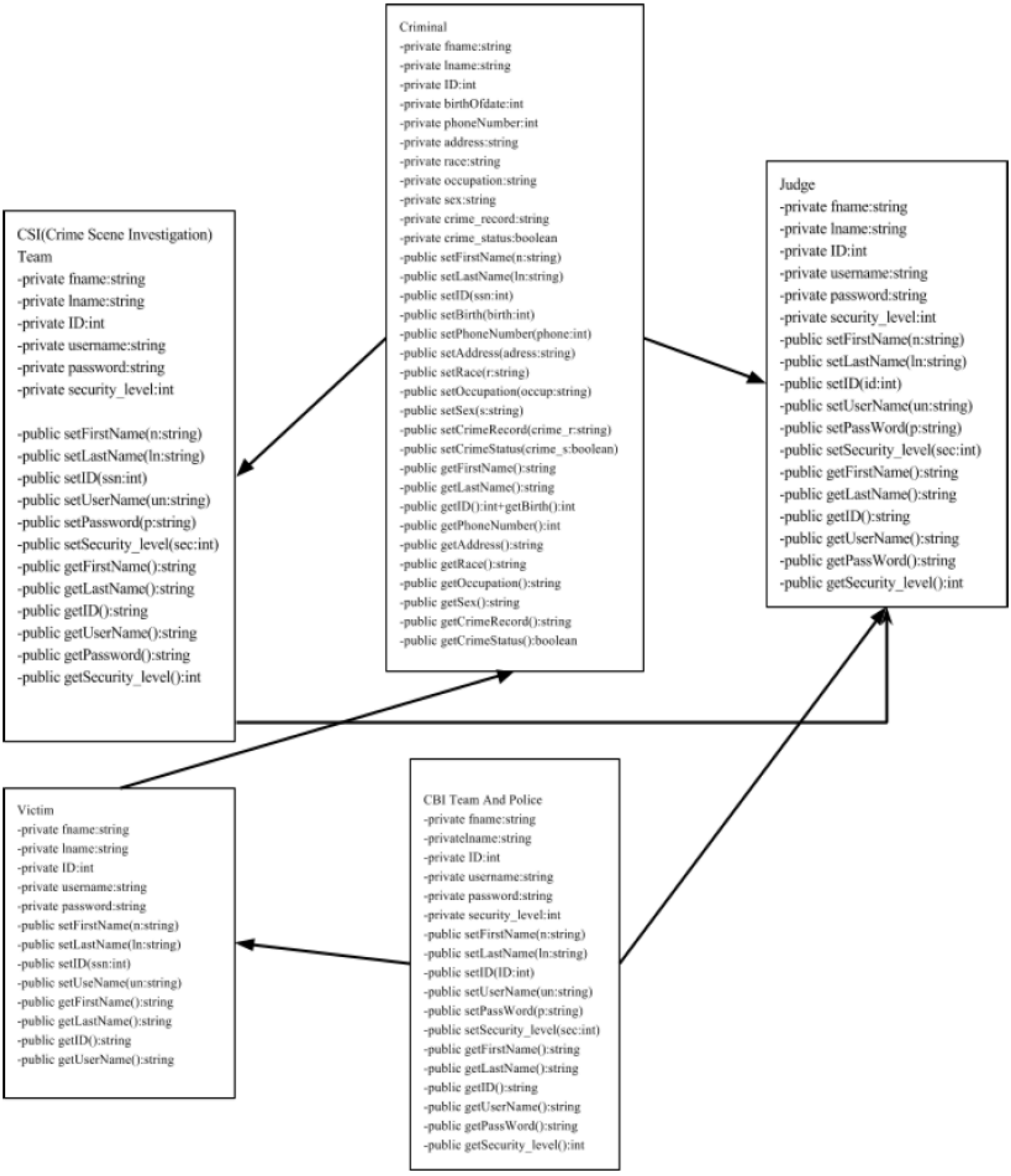


2.4.3. Level-1 DFD



2.5. Class Modelling

2.5.1. UML Class Diagram



3. System Proposal

3.1. Feasibility Analysis Matrix

	Weighting	Candidate 1	Candidate 2	Candidate 3
Description		Standart User	Business User	Professional User
Operational Feasibility	25%	Supports only member services requirements.A user is only able to obtain his/her crime report via log in.Limited edition of the main system. Score : 80	Member services are extended according to given edition.Suitable for large companies and business requirements Score : 70	Fully supports user required functionality. Score : 90
Cultural Feasibility	25%	Possible user resistance to limited context and simple interface. Score:80	No foreseeable problems. Score :85	No foreseeable problems. Score :100
Technical Feasibility	20%	Current production release version 1.0 and has been on the market for only 3 weeks. Required to hire or train Java J2EE experties to perform modifications for integration . Score:80	Soluiton depends on writing application in VB.NET .Altough current technical staff has only powerbuilder experience . Score:90	Despite of current technical staff is comfortable with powerbuilder.Man ag ement is concerned about acquiring of Powerbuilder .MS SQL server is the current company standart for the database. Score : 70
Economic Feasibility		N/A	N/A	N/A
Schedule Feasibility	15%	Less than a 3 weeks Score : 85	4-8 weeks Score : 90	6 weeks Score :80
Legal Feasibilty	15%	No foreseen problems Score :100	No foreseen problems Score :100	No foreseen problems Score :100

Ranking	100,00%	83,5	95	88

ROLE OF EACH TEAM MEMBER

1.Project Management .....

1.1.Problem Statement..... **YASEMİN AYDINLI**

1.2.Purpose ..... **ALL TOGETHER**

1.3.Objectives..... **YASEMİN AYDINLI-ALPER POSLU**

1.4.Constraints .....

1.4.1.Start Date..... **YASEMİN AYDINLI**

1.4.2.Budget ..... **YASEMİN AYDINLI**

1.4.3.Technology ..... **DERYA ŞİŞMANYAZICI**

1.4.4.Scope ..... **YASEMİN AYDINLI**

1.5.Schedule..... **ZEYNEP ÇETİN**

1.5.1.Critical Path ..... **YASEMİN AYDINLI**

1.6.Expectations Matrix..... **ALPER POSLU**

2.System Analysis .....

2.1.System Requirements .....

2.1.1.Nonfunctional Requirements ..... **ALL TOGETHER**

2.1.2.Functional Requirements ..... **ALL TOGETHER**

2.2.Use Case Modeling..... **DERYA ŞİŞMANYAZICI-RAVZA BEGÜM ÖZDEMİR**

2.2.1.Actor Glossary ..... **DERYA ŞİŞMANYAZICI-RAVZA BEGÜM ÖZDEMİR**

2.2.2.Use-Case Glossary ..... **DERYA ŞİŞMANYAZICI-RAVZA BEGÜM ÖZDEMİR**

2.2.3.Use-Case Modelling Diagram ..... **DERYA ŞİŞMANYAZICI-RAVZA BEGÜM ÖZDEMİR**

2.2.4.Use Case Narratives..... **DERYA ŞİŞMANYAZICI-RAVZA BEGÜM ÖZDEMİR**

2.3.Data Modeling.....

2.3.1.E-R Diagrams..... **ZEYNEP ÇETİN**

2.3.1.Activity Diagrams..... **DERYA ŞİŞMANYAZICI**

2.3.1.Sequence Diagrams ..... **ZEYNEP ÇETİN**

2.4.Process Modelling.....

2.4.1.Context Level DFD ..... **YASEMİN AYDINLI**

2.4.2.Level-0 DFD..... **YASEMİN AYDINLI**

2.4.3.Level-1 DFD..... **YASEMİN AYDINLI**

2.5.Class Modelling.....

2.5.1.UML Class Diagram..... **ALPER POSLU**