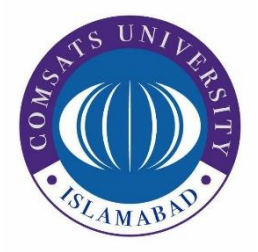

COMSATS University, Islamabad Pakistan

Assignment-06
Project Final Report
For
Project Name

(Valid Title reflecting scope and objectives)

Submitted By:

Student Name 1 FA20-BCS-xxx

Student Name 2 FA20-BCS-xxx

Supervisor

Supervisor Name

Submission Date: (Day-Month-Year)

Original Version 1.0

Bachelor of Science in Computer Science (2021-2025)

The candidate confirms that the work submitted is their own and appropriate credit has been given where reference has been made to the work of others.

COMSATS University, Islamabad Pakistan

Project Name

A project presented to
COMSATS University, Islamabad

In partial fulfillment
of the requirement for the degree of

Bachelors of Science in Computer Science (20xx-20xx)

By

Student Name 1 CUI/SP09-BCS-xxx/ISB
Student Name 2 CUI /SP09-BCS-xxx/ISB

DECLARATION

We hereby declare that this software, neither whole nor as a part has been copied out from any source. It is further declared that we have developed this software and accompanied report entirely on the basis of our personal efforts. If any part of this project is proved to be copied out from any source or found to be reproduction of some other. We will stand by the consequences. No Portion of the work presented has been submitted of any application for any other degree or qualification of this or any other university or institute of learning.

Student Name 1

Student Name 2

Executive Summary

In public places, there is often a need for monitoring people and different activities going on, which can be referred later for many reasons including security. Appointing humans for this task involves many problems such as increased employee hiring, accuracy problem, trust, no proof for later use, and also the fact that a human can remember things till a certain time limit. Talking about the current security system, they use dumb still cameras with a continuous recording facility ir-respective of the fact that any event may happen or not. Moreover they are usually pointing at a specific user defined locations so more than one cameras are required to cover the entire region.

To prevent all these problems from prevailing, the CSCS is developed. It is a surveillance system, which provides solution to many of these problems. It is a stand-alone application which doesn't require any computer to operate. It monitors different situations using a camera which is able to rotate intelligently based on sensor messages and captures the scene in the form of video or photos later reference as well.

Customizable **S**urveillance **C**ontrol **S**ystem **(CSCS)** is a surveillance system that can be assigned a sensor type as in our case a heat sensor is used, it works accordingly, rotates the camera upon event detection and perform user defined actions like capturing video and stores them, for the future use.

It is an embedded system consisting of Linux fox kit with embedded a running server application also a camera, USB storage device and a sensor node base station is attached with fox kit. LAN communication is used by user to download the videos and to operate the system manually.

Acknowledgement

All praise is to Almighty Allah who bestowed upon us a minute portion of His boundless knowledge by virtue of which we were able to accomplish this challenging task.

We are greatly indebted to our project supervisor “Mr. Tehseen Riaz Abbasi”. Without their personal supervision, advice and valuable guidance, completion of this project would have been doubtful. We are deeply indebted to them for their encouragement and continual help during this work.

And we are also thankful to our parents and family who have been a constant source of encouragement for us and brought us the values of honesty & hard work.

Stydent Name 1

Student Name 2

Abbreviations

SRS	Software Require Specification
PC	Personal Computer
SDS	
TP	

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Project Major Category:

A-Desktop Application/Information System
B- Web Application/Web Application based Information System.
C- Problem Solving and AI
D-Simulation and Modeling
E- Smartphone Application
F- Smartphone Game
G- Networks
H- Image Processing
Other (specify category) _____

1 Introduction

This chapter provides the overview of the project. The first paragraph of every chapter should provide the chapter summary.

1.1 Brief

A very brief introduction of project work, outcome of your work, tools, methodology used & highlights of discussions in various chapters of report.

1.2 Project Background

It includes explanation of the idea behind the project. For example, if the project is related to AI then this section describes that what is Artificial Intelligence & how it works.

1.3 Related System Analysis/Literature Review

This section discusses about the existing/similar systems related to the proposed project. At least three existing systems should be discussed. However, there might be only one or no system exist. In this situation, discuss the related system, accordingly. Briefly explain the related system analysis, which help to explicitly specify the contribution of the proposed project. You may use a single paragraph to explain a similar (related) single system/application. However, the explanation for a similar single system/application should not be more than 5 sentences. Note that the Research-based projects may provide literature review instead of related system analysis. You must cite the Tables/ Figures as presented in this document. For example, Table 1 presents the related system with the targeted project solution. This section describes current trends/ research/ products etc. related to your project.

Table-1: Related System Analysis with Targeted Project Solution.

Application Name	Weakness	Proposed Project Solution
• The name of related application(s).	• Weaknesses may include limited features, low quality functionality and processes.	• The way the proposed project mitigates the weaknesses.

1.4 Advantages/Benefits of Proposed System

This section explicitly mentions the advantages and benefits of the proposed system. In other words, it is required to discuss advantage of the proposed solution to the existing problem. Generally, 5-7 advantages need to be mentioned.

1.5 Project Scope

Write down the scope of the targeted project in a paragraph. Briefly define the main functionalities of the proposed project. Scope defines the boundaries and range of the proposed solution, i.e. what would be the part of the targeted project and what will be not. Write down in logical flow with consistency. Usually, 14-18 sentences are enough to succinctly discuss the scope of the proposed system.

Context diagram is widely used to define and clarify the boundaries of the software system. So, present a context diagram to model the scope of the targeted project. Figure 1 depicts the context diagram of a cafeteria ordering system.

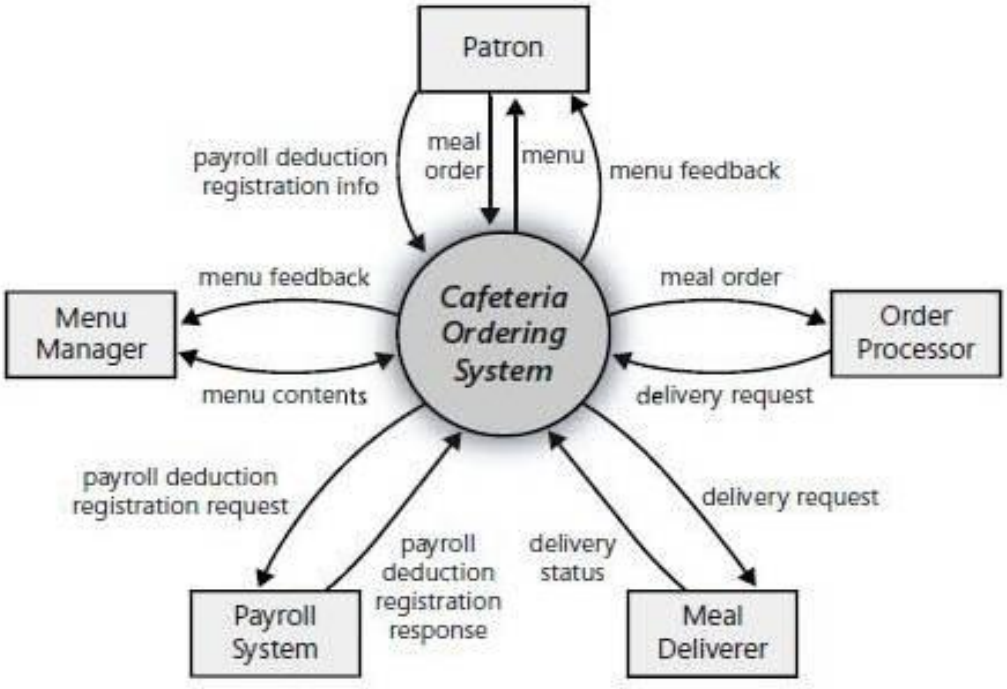

Figure 1: Context Diagram of the Targeted Project.

1.6 Modules

Write down the modules of the targeted project. Do not forget to mention special/new features. Briefly explain the identified module using 6 to 8 sentences.

Note that for a group of 2 student's project, usually 6-8 Modules are expected. Similarly, 9-11 modules are expected for a 3 student's project.

Explanation of a Module: Module is a section of a program that performs a task. Programs consist of modules, each of which contains one or more routines. The term routine is synonymous with procedure, function, and subroutine.

Example:
Enterprise resource planning (ERP) software - is comprised of several large modules (for example, finance, supply chain and payroll, etc.), which may be implemented with little or no customization.

Briefly explain each of the modules of the targeted project with respect to major functionality in a user context.

1.7.1. Module 1: Module Name

Brief description…

1.7.2. Module 2: Module Name

Brief description…

1.7 System Limitations/Constraints

Write down the main limitations and constraints of the targeted project. Generally, 2-4 constraints need to be mentioned.

1.8 Tools and Technologies

Explicitly mention the hardware/software tools and technologies with version number, which would be used in implementation. It is also expected to mention about the APIs, language(s), SDK(s) etc. which will be used for implementation of the targeted project. After briefly discussing the used tools/technologies, present the information using a tabular format.

Table 2: Tools and Technologies for the Targeted Project.

	Tools	Version	Rationale
Tools and Technologies	Visual Studio Code	1.59	IDE
	MongoDB	5.0	DBMS
	Firebase	9.12.1	DBMS
	Adobe Illustrator	CSC 6	Design Work
	AR Core	1.24.0	AR SDK
	MS Project	2016	Project Management
	MS Word	365	Documentation
	MS Power Point	365	Presentation
	MS Visio	2013	Diagram Creation
	Figma	1.7	Mockups Creation
	Technology	**Version**	**Rationale**
	Python	3.9.0	Programming language
	JavaScript	2.2.0	Programming language
	Flutter	2.5	Framework
	TensorFlow	2.7.0	Library
	OpenCV	4.3.0	Library
	Node JS	14.17.4	Runtime Environment
	Express JS	4.17.3	Framework
	React	React 17	Library

1.9 Relevance to Course Modules

A brief explanation of how your project is related to various courses studied during BCS.

1.10 Design and Process Methodology for This Project

A brief discussion of deisgn methodology and SDLC model selected for this project.

1.10.1 Rationale behind Selected Methodology

Why you selected above methodology (such as structural and Object Oriented) and software life cycle model for this project?

1.10.1.1 Rationale behind Selected Methodology

It is the example of third and last level heading. Please do not insert further levels in numbers. Use different format style e.g., italic to highlight the important text.

1.11 Team Members Individual Tasks/Work Division

Explicitly discuss the work division among the team members. Optionally, you may provide the reasoning of the task allocation between/among the team members.

Table 3: Team Member Work Division the Targeted Project.

Student Name	Student Registration Number	Responsibility/ Modules
• **Student 1 Name**	• **Registration Number (Student 1)**	• **Describe the work division of each student along with modules** **E.g.** **Mr. Ali (Module1-Module3)** **Augmented reality and Databases tasks.**

2 Problem Definition

This chapter discusses the precise problem to be solved. It should extend to include the outcome.

2.1 Problem Statement

Problem statement goes here. This is core section of scope document. It mainly focuses on mentioning the core targeted problem that drives on the development of the project. The FYP-0 student may focus on the following questions to write an effective problem:

- **What** problem does the proposed system solve?
- **Why** you are developing this system?
- **Does** the same system already exist? **If** yes, how will a re-implementation aid your learning?
- **What** skills do you expect to learn from this project?

It is suggested to check it online that how to write a quality problem statement. At the same time, students may consult the previous FYP final reports to refine their problem statement. The following URL helps in writing a quality problem statement:
https://www.wikihow.com/Write-a-Problem-Statement

2.2 Problem Solution for the Proposed System

Briefly explain how your proposed system solves the problems as mentioned in the Problem Statement. May be, the proposed system provides a more cost-effective solution than the existing systems. Therefore, it is required to explicitly mention the logic of the proposed system, which provides additional benefits in contrast to the existing systems. The problem solution can be usually describe using **14-16 sentences.**

2.3 Deliverables and Development Requirements

Deliverables and development requirements.

2.4 Current System (if applicable to your project)

A brief description of an existing system.

The following figure is a sample figure, Figure 2.1. You are required to follow the same style of numbering and caption for the whole report.

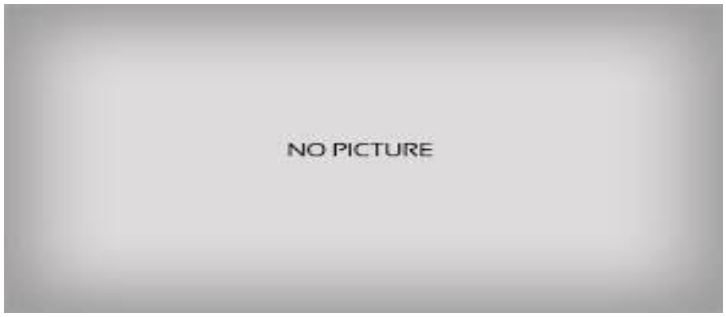

Figure 2: Sample picture

The following table (Table 2.1) is sample table; You are required to follow the same style of numbering and caption for the whole report.

Table 24: Sample Table

Header 1	**Header 2**	**Header 3**
Text	Text	Text

The following list style is the sample to consistently follow in the whole report.

- List items 1
- List items 2

3 Requirement Analysis

The following parts of Software Requirements Specification (SRS) report should be included in this chapter.

3.1 Requirement Elicitation Techniques.

Write down the techniques you have selected for requirement gathering approach along with reasons. **Commonly used techniques are:** Brainstorming, Document Analysis, Focus Groups, Interface Analysis, Interviews, Observation, Prototyping, Requirements Workshops.

3.2 Use Cases Diagram(s)

3.3 Detailed Use Case (Tabular- Module Wise)

3.4 Functional Requirements (Tabular FR- Module Wise)

3.5 Non-Functional Requirements

4 Architecture and Design

The following parts of Software Design Description (SDD) report should be included in this chapter.

4.1 System Architecture

Develop a modular program structure and explain the relationships between the modules to achieve the complete functionality of the system. This is a high-level overview of how the system's modules collaborate with each other to achieve the desired functionality.

Don't go into too much detail about the individual subsystems. The main purpose is to gain a general understanding of how and why the system was decomposed, and how the individual parts work together.

Provide a diagram showing the major subsystems and their connections.

- **In initial design stage create Box and Line Diagram for simpler representation of the systems**
- **After finalizing architecture style/pattern diagram (MVC, Client-Server, Layered, Multi-tiered) create a detailed mapping modules/components to each part of the architecture**

4.2 Design methodology

Explain and justify the choice of design methodology being followed. (OOP or procedural).

4.3 Data Representation [Diagram + Description] (ERD , JSON SCHEMA)

- ERD with description (Database conceptual schema)
- JSON schema of developed Modules storage.

4.4 Design Models [along with descriptions]

Create design models as are applicable to your system. Provide detailed descriptions with each of the models that you add. Also ensure visibility of all diagrams.

Design Models for Object Oriented Development Approach

The applicable models for the project using object-oriented development approach may include:

- Activity Diagram (**Total 10 to 12 Diagrams based on use cases, considering 1-2 diagrams from each module major use cases**)
- Class Diagram (**Total 1 class diagram for overall system**)
- Sequence Diagram (**Total 10 to 12 Diagrams, considering 1-2 diagrams from each module, best is to create those use cases which are considered in activity diagram**)
- State Transition Diagram (**for the projects which include event handling and back-end processes**)

Design Models for Procedural Approach

The applicable models for the project using procedural approach may include:

- Activity Diagram
- Data Flow Diagram (data flow diagram should be extended to 2-3 levels. It should clearly list all processes, their sources/Links, and data stores.)
- State Transition Diagram (for the projects which include event handling and backend processes)

To view examples of all above models, see Appendix B

5 Human Interface Design

Describe the functionality of the system from the user's perspective. Explain how the user will be able to use your system to complete all the expected features and the feedback information that will be displayed for the user.

7.1. Screen images

Display screenshots showing the interface from the user's perspective. These can be hand-drawn, or you can use an automated drawing tool. Just make them as accurate as possible. (Graph paper works well.)

7.2. Screen objects and actions

A discussion of screen objects and actions associated with those objects

6 Implementation

This chapter will discuss implementation details supported by UML diagrams (if applicable). You will not put your source code here. Any of the following sections may be included based on your project.

6.1 Algorithm

Mention the algorithm(s) used in your project to get the work done with regards to major modules. Provide a pseudocode **OR** a natural language explanation regarding the functioning of main features. Be sure to use the correct syntax and semantics for algorithm representations.

6.2 External APIs

Describe the APIs used in the following table.

Table 5: Details of APIs used in the project

Name of API	Description of API	Purpose of usage	List down the function/class name in which it is used

6.3 User Interface

Details about user interface with descriptions.

7 Testing and Evaluation

This chapter may include the following sections. (Students are required to perform the testing both manually and automatedly).

7.1 Verification

7.2 Validation

7.3 Usability Testing

7.4 Module / Unit Testing

7.5 Integration Testing

7.6 System Testing

7.7 Acceptance Testing

7.8 Manual Testing

.

7.9 Test Cases.

7.9.1 Unit Testing (Test Cases)

Unit Testing 1: Login as FYP Committee
Testing Objective: To ensure the login form is working correctly

No.	Test case/Test script	Attribute and value	Expected result	Result
1.	Verify user login after click on the 'Login' button on login form with correct input data	Username: L001 Password: 1234	Successfully log into the main page of the system as FYP Committee member.	Pass
2.				

Unit Testing 2: Edit Profile
Testing Objective: To ensure the edit profile form is working properly.

No.	Test case/Test script	Attribute and value	Expected result	Result
1.				
2.				

7.9.2 Functional Testing

The functional testing will take place after the unit testing. In this functional testing, the functionality of each of the module is tested. This is to ensure that the system produced meets the specifications and requirements.

Functional Testing 1: Login with different roles
Objective: To ensure that the correct page with the correct navigation bar is loaded.

No.	Test case/Test script	Attribute and value	Expected result	Result
1.	Login as a 'FYP Committee' member.	Username: L001 Password: 1234	Main page for the FYP Committee member is loaded with the FYP Committee navigation bar	Pass
2.				

7.9.3 Integration Testing

No.	Test case/Test script	Attribute and value	Expected result	Result
1.	Login as "FYP Committee" member	Username: L001 Password: 1234	Login successful and the FYP Committee page with its navigation bar is loaded and in the view profile page	Pass
2.	Upload student record for Project 1	-	File successfully uploaded and return to the upload page. Student records are updated.	Pass
3.	View supervising student	-	The list of supervisees shown on the screen.	Pass

6.1. Automated Testing:

Tools used:

Tool Name	Tool Description	Applied on [list of	Results

		related test cases / FR / NFR]	

7.10 Environmental Needs

Are there any special requirements for this test plan, such as:

- Special hardware such as simulators, static generators etc.
- How will test data be provided? Are there special collection requirements or specific ranges of data that must be provided.
- How much testing will be done on each component of a multi-part feature?
- Special power requirements.
- Specific versions of other supporting software.
- Restricted use of the system during testing.
- Tools (both purchased and created).
- Communications
  - Web
  - Client/Server
  - Network
    - Topology
    - External
    - Internal
    - Bridges/Routers
- Security

8 Conclusion and Future Work

This chapter concludes the project and highlights future work.

8.1 Conclusion

8.2 Future Work

9 Work Summary and Reviews

9.1 Lesson Learnt.

- **Write all lessons that your learnt while doing this semester project**
- **Write both aspects Technical and Non-Technical.**
- **Each Group Member write its own lesson learn as well.**

Table 6: Lesson Learnt for the course project

	Lesson Learned
Student 1 Name: Student 1 Registration Number:	.
Student 2 Name: Student 2 Registration Number:	

9.2 Work Break Down

Table 7: Work Break down of individual student for each milestone.

Milestones	**Student 1 Name Student 1 Registration Number**	**Student 2 Name Student 2 Registration Number**
1- SCOPE Document and SCOPE presentation		.
2- SRS Document and SRS Presentation		
3- SDS Document and SDS Presentation		
4- Project Design (Figma and Implementation)		
5- Project Test Plan and Presentation		
6- Project Final Report and Presentation		

9.3 Reviews Details

Review Given By: Write group number

Table 7: Work Break down of individual student for each milestone.

Milestones	Reviewer -1 Comments (Student-1 name and details)	Reviewer -2- Comments (Student-2 name and details)
1- SCOPE Document and SCOPE presentation		.
2- SRS Document and SRS Presentation		
3- SDS Document and SDS Presentation		
4- Project Design (Figma and Implementation)		
5- Project Test Plan and Presentation		
6- Project Final Report and Presentation		
Feedback and Acceptance status of Reviewer Comments		

10 References

Mention the books, research papers, web links etc.
(Usually 3-5 References)

11 Appendix I

- How to design using UML (OOP): For guidance please follow the instructions mentioned in the link: http://agilemodeling.com/artifacts/

- How and when to design ER diagrams: For guidance please follow the instructions mentioned in the link:
  http://people.inf.elte.hu/nikovits/DB2/Ullman_The_Complete_Book.pdf

- Data flow diagrams: For guidance please follow the instructions mentioned in the link and book:
  - http://www.agilemodeling.com/artifacts/dataFlowDiagram.htm
  - Software Engineering –A Practitioner's approach by Roger Pressman
- Architecture diagram: For guidance please follow the instructions mentioned in the link and book:
  - Ian Sommerville – Software Engineering 9th Edition– Chapter 6

12 Plaragism Report (Mandatory)

Attach the Plaragism report of your project requirement document from library staff of turnitin tool (http://turnitin.com)