GRADUATION PROJECT H ANDBOOK

The following handbook is intended for use by undergraduate students and faculty members in the colle ge of Computer and Information Sciences at King Saud University, Riyadh, Kingdom of Saudi Arabia. I t outlines the procedures, requirements and rules that organizes and governs the graduation project at the computer science department,

King Saud University

Graduation Project Committee Female Section
Computer Science
College of Computer and Information Sciences
King Saud University
Riyadh, Saudi Arabia

Acknowledgments

This handbook is a combination of the policies and procedures of the graduation project at the department of Computer Science, College of Computer and Information Sciences, King Saud University. The purpose of this handbook is to provide the set of procedures required to carry out the graduation projects. The handbook will also provide guidelines of the expected content of the Graduation Project deliverables as well as their required formats. In addition, this document will also provide the faculty members with the evaluation rubrics used to examine the projects.

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1 Glossary

GP: Graduation Project.

CS: Computer Science department

CCIS: College of Computer and Information Sciences

Supervisory Committee: Committee responsible for overseeing the **GP** development and mai ntaining this handbook. The committee is responsible for coordinatin g the GP tasks, and preparing GP ABET/NCAA course files.

Faculty: Permanent faculty member with a PhD degree.

Supervisor: A full-time faculty member in the Computer Science Department responsible for the supervision of a group of **GP**.

Examiner: A professor or an expert of the relevant area chosen from respective depart ment of the College.

Examiner Committee: A committee that composed of a group of examiners supposed to evaluate pr ojects assigned to them

Group/Team: A group of students formed as a team to work on the **GP**.

2 Graduation Project Course Objectives

The Graduation Project in the Department of Computer Science at King Saud University is divided into two courses that span the final year of the undergraduate curriculum. These courses are designed to teach senior students how to tackle large-scale real-world projects, or introduce them to scientific research. The project creates a bridge between course-work and industry or postgraduate studies, where they are expected to spend longer time on large-scale projects. Students will spend two semesters in order to complete their projects, and will be supervised closely by full-time faculty members. During these times, the students will employ knowledge acquired during their studies at the Computer Science Department in order to solve real-world or scientific problems. The projects must have clear deliverables and outcome that will show the students' ability in using their computer science education effectively.

This guideline aims to define these deliverables and procedures needed to standardize the Graduation Project courses currently offered in the CS department. This way we can guarantee a more rigorous and challenging experience for students that will serve them well once they start their careers. This guideline will outline all the expected outcome and evaluation criteria for the Gradation Project courses.

3 Overview of GP Process

The GP is by default spread over the last two semesters. The courses are called CSC 496 during Semester 1 and CSC 497 during Semester 2. CSC 496 and CSC 497 will be marked separately based on the work progress shown, final presentation done, and deliverables submitted by the students in each semester. Prior to Semester 1, students are encouraged to communicate with prospective supervisors to complete a project proposal. However, the actual registration of the GP course will formally start at the onset of Semester 1. By the end of the Semester 1, the students have to complete the project proposal, project management plan, project requirement specification, and present their work through in an oral presentation, which shall be marked and graded. For the next semester, grade is awarded at the end of the Semester 2 after the demonstration and presentation of the project and submission of the project report. Following are some important facts in the GP process.

3.1 Assigning Students to Supervisors and Projects

- A supervisor must be a full-time faculty member in the Department of Computer Science.
- In the semester prior to starting the GP, supervisors will be encouraged to submit their project ideas through a web portal, which will be published to department website. The deadline to accept new proposal is the end of week 9 of each semester, in which the portal will be closed during the student selection period.
- Students have to form a group or team consisting of 5 students. This will be done through a web portal.
- Each group will rank all the projects to their preference. The projects will be assigned based on the average GPA of the group.
- At the beginning of Semester 1 of the project, an orientation session will be conducted to educate the prospective final year students, where this GP handbook will be presented and explained.
- The students formally register for the GP course in the 1st week of Semester 1. They can start formally by submitting the project proposal (see Appendix A.1) to the supervisory committee, throughout the 2nd week.

3.2 Project Supervision and Deliverables

Each group of students is expected to submit a number of deliverables during the two Graduation Project courses CSC 496 and CSC 497. These deliverables will show their progress in the project and will help in evaluating their work. In this section, we list the minimum required deliverables in each course with their expected due dates.

Each group is expected to meet with the respective supervisor regularly and keep meeting minutes. The students are also responsible for completing project assignments given by the supervisor as well as any work that pertain to the project or required by this document. The students are responsible for the following minimum deliverables:

- During the first semester, students must submit an initial proposal by the end of the second week describing what they plan to do. This initial proposal should indicate the track of the project (research or software tracks).
- A weekly meeting minute report (see form in appendix A.5). This report includes what is discussed in the meeting as well as clear tasks for next meeting. The supervisor will approve the form after each meeting. The supervisor must keep these forms and submit them to the supervisory committee by the end of 14th week of each semester.
- During the first semester, students must submit a mid-semester report by week 8. The mid-semester report should include the proposed project idea, project requirements, a complete literature review and an initial action plan (see Appendix B for proposal format). This report will be reviewed by an examiner, for completeness.(see Appendix B for grading rubrics)
- By the end of 14th week of the first semester, each group is expected to submit a final report. This report should be an extension of the mid-semester report submitted before and includes the following additions: analysis, design, and plan for implementation and testing. The report should be free of any plagiarism. Students will be provided with turn it in accounts to help them check their work. A second workshop will be conducted to discuss how to use this tool and explain what is an acceptable project report.
- On the first day of the examination period of semester 1, the groups are expected to present an oral presentation
- According to the evaluation done and suggestions received from the examination committee, project work should be adapted, in consultation with the supervisor, at the start of Semester 2.
- Each group submits the Final GP Report in hard and soft copy (project details, design, modeling, execution plan, implementation, testing, etc···) by week 14 of Semester 2. The official deliverables required of students as follows:

  o The students should submit 4 copies of their final report and user manual.
  o The students must prepare PowerPoint slides to present their work. The focus of the presentation should be on their own work as opposed to related work.
  o The students must submit their slides in PowerPoint or PDF format.
  o The students should submit a CD containing a softcopy of all above materials along with the source code.

3.3 Project Evaluation

- Examiners and supervisory committee are invited to evaluate students' projects. The Supervisory committee is responsible for scheduling final project presentation, which is a public event where students of the last semester before GP should also be encouraged to attend the event.

- Each CSC496 supervisor will be responsible for grading projects (see Appendix A for grading rubric). At the end of CSC 497, evaluation should be carried out according to the rubrics provided in Appendix A.5 and each project should be marked by at least two examiners (selected by the supervisory committee from current supervisors of CSC 497). Each supervisor shall examine some projects in addition to the project under his supervision.

- Plagiarism will be checked using the online integrity checked www.turnitin.com or through safeassign in the LMS system.

- In case of incomplete work, the supervisor must notify the chair by week 14 who will decide whether and incomplete or failing grade should be given after consulting with the supervisory committee.

4 GP Deliverables

4.1 Overview

The following table contains a minimal set of GP deliverables along with the purpose and the deadline of submission. The set of deliverables (given in Table 1) depends upon the nature of the project. Each deliverable is mandatory and alternate can be defined in consultation with the supervisor and the GP coordinator (at least a week before submission deadline). Each submitted deliverable must be duly signed by the supervisor. The submission without supervisor's approval will not be considered. Late submissions are liable to get penalty decided by supervisory Committee. The students may get a zero for a particular submission.

Table 1: GP Deliverables

Deliverable	Purpose	Student information	Due
Start of Semester 1			
Project Proposal	To document the problem statement, need for the project, project scope and expected benefits	Submitted through portal website: student side	2nd week of Semester 1
Mid-term Report	To assess the students' progress in their proposed project.	Submitted through portal website: student side	8th week of Semester 1
Project Report	To submit project deliverables in the form of a single report. This is the final report for CSC496	Submitted through portal website: student side	14th week of Semester 1
Oral Presentation	Examiners are invited to evaluate each project	Present to Supervisor, Examiners	First week of Examination
Grading of Semester 1 and End of Semester 1			
Start of Semester 2			
Final Report	To bind all project deliverables (including the recommended documents of Semester 2 shown in Table II) in a single report.	Submitted through portal website: student side	14th week of Semester 2
Final Presentation & Demo	An examiner is invited to evaluate students' Projects	Present to Supervisor, Examiners	First week of Examination
Grading of Semester 2 and End of GP			

Table 2: Documents recommended and can be part of the deliverables shown in Table 1

Deliverable	Purpose	Student information	Due
	Start of Semester 1		
Project Management Plan (PMP)	To document project development approach, associated milestones, agreed deliverables and dates	Submit to supervisor	10th week of Semester 1
Project Requirement Specification (PRS)	To document the agreed requirements, expected features, constraints, interfaces. This document is also supposed to provide the system design and modeling	Submit to supervisor	13th week of Semester 1
	Start of Semester 2		
Project Design Document	To document the design in order to provide the basis for implementation and unit test. Also describes the rationale for design decisions taken.	Submit to Supervisor	3rd week of Semester 2
Test Document	To document how the project will be tested, and record the results.	Submit to Supervisor	14th week of Semester 2
	Grading of Semester 2 and End of GP		

4.2 End of GP Submission

- Four copies of the bound report (one for male departmental library, one for female departmental library, one for examiner, and one for supervisor)
- Upload the following folders to the Web portal:
    - Report (and PowerPoint presentation)
    - Code (complete source code of the project)
    - Demo (the executable in working order and a readme file containing the information about the software requirements (tools) and hardware requirements for the GP as well as the instructions or the steps (soft copy of the user manual) for running the GP executable).

5 GP Evaluation

5.1 Evaluation Criteria

Following table explains a guideline for the criteria to be used for GP evaluation/assessment along with description and evaluation authority (s).

Table 3: Evaluation Criteria

Criteria	Description	Evaluation Authority(s)
Semester 1 and Semester 2 Process	To assess that student(s) have kept continuous contact during the work and have been on time both to meetings and in sending deliverables.	Supervisor
Semester 1 Proposal	To assess that the chosen project is worthy of being acceptable as a GP and if acceptable, register the project in the GP database through web portal.	Examiners
Semester 1 Midterm report	To asses that student(s) know the problem and propose an appropriate solution. The student(s) should also have conducted the necessary literature review at this stage.	Examiners
Semester 1 Project Presentation	To assess that student(s) have completed tasks and delivered documents expected in the first half of the course i.e. Semester 1. It includes both demonstration and presentation of the work (in the form of a power point presentation).	Supervisor, Examiners
Semester 2 Project Demonstration	To assess the end product developed in terms of interfaces, coding standards, and originality of the work. It requires student(s) to install project and run it for real time presentation.	Supervisor, Examiners
Semester 2 Oral Presentation	To assess problem understanding, adequate analysis, quality of the design and presentation skills. Each group is required to discuss the completeness and accomplishment of the project.	Supervisor, Examiners
Semester 1 and Semester 2 Project Report	To assess the structure of the project report. Student(s) are required to show planning and progress in an organized way with emphasis on the interpretation of the information gathered during the project. Project reports have to be submitted in both	Supervisor, Examiners

Criteria	Description	Evaluation Authority(s)
	Semester 1 and Semester 2.	

5.2 Mark Allocation Policy

A recommended percentage for each criterion is shown in the following table:

Table 4: Semester 1 Percentage of evaluation for each criterion

Criteria	Supervisor	Examiner(s)	Total
Process	15	-	15
Proposal	-	05	05
Midterm report		10	10
Oral Presentation	10	30	40
Final Report	15	15	30
Total	40	60	100

Rubrics for each criterion are explained in Appendix B.

Table 5: Semester 2 Percentage of evaluation for each criterion

Criteria	Supervisor	Examiner(s)	Total
Semester 2 Process	15		15
Semester 2 Demo	05	15	20
Semester 2 Presentation	05	25	30
Semester 2 Report	15	20	35
Total	40	60	100

Rubrics for each criterion are explained in Appendix B.

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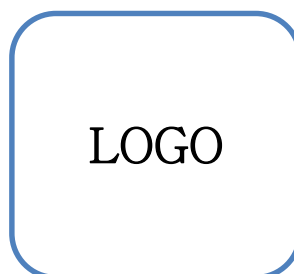
"Project Title"

CSC 496 – Proposal

Prepared by:

Student 1 Name	Student 1 ID
Student 2 Name	Student 2 ID
Student 3 Name	Student 3 ID
Student 4 Name	Student 4 ID

Supervised by:

Dr. Name

[Research/Software] project for the degree of Bachelor in Computer Science

First/Second Semester 14##/14##

Autumn/Spring 20##

I. Acknowledgements

II. English Abstract

This is where the abstract goes. It should be a minimum of 500 words. The abstract summarizes the project in general: the problem you are trying to solve, the proposed solution and how you plan to implement this solution.

III. Arabic Abstract

Your abstract translated to Arabic.

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1. Project Details

Here you should describe the details of how the project will be carried out. You should especially specify the hardware and software requirements of your project.

2. Project Timeline

Provide a rough timeline/ schedule outlining the main phases of your project. Specify start and end dates for all tasks, milestones, and deliverables.

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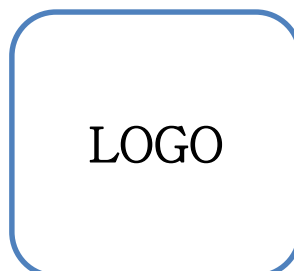
"Project Title"

CSC 496 – Midterm Report

Prepared by:

Student 1 Name	Student 1 ID
Student 2 Name	Student 2 ID
Student 3 Name	Student 3 ID
Student 4 Name	Student 4 ID

Supervised by:

Dr. Name

[Research/Software] project for the degree of Bachelor in Computer Science

First/Second Semester 14##/14##

Autumn/Spring 20##

IV. Acknowledgements

V. English Abstract

The abstract should complement your proposal abstract and might include additions that do not contradict the previously proposed abstract.

VI. Arabic Abstract

Your abstract translated to Arabic.

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Chapter 1: Introduction

The introduction of the project report should aim to catch the reader's interest and should be written in a style that can be understood easily by any reader with a general computer science background. It gives an overview of the research project you propose and explains the background of the project, focusing briefly on the major issues of its knowledge domain. It then proceeds with the presentation of the research focus, which can take the form of a hypothesis, a research question, a project statement, or a goal statement.

1.1 Problem Statement

This section states the problem that you are exploring and emphasizes the importance of your research. It should also include a clear description of the context of your research.

1.2 Goals and Objectives

This section should include a precise description of the goal you are planning to achieve and how you will achieve it. It should explicitly emphasize the contribution you are planning to make with the intended study.

Goals describe what you want to achieve. Objectives describe how you are going to achieve those goals (what do you want to know, prove, demonstrate, analyze, test, investigate or examine?)

Objectives should be S.M.A.R.T.:

- **Specific** – be precise about what you are going to do.
- **Measureable** – specify an indicator for success, so that you will know when you have reached your goal
- **Achievable** –a less ambitious but completed objective is better than an over-ambitious one that you cannot possible achieve.
- **Realistic** – do you have the necessary resources to achieve the objective?
- **Time constrained** – determine when each stage needs to be completed.

1.3 Solution

A brief description of how your research can contribute in solving the above stated problem.

1.4 Research Scope

Define the boundaries of your research; describe precisely what is included in your research and what is not.

Chapter 2: Background

This chapter should give an overview of the knowledge domain where your research takes place. You should define the notations you will be using later in your report, and introduce the user to any concepts, terms, algorithms, or tools you will be using in your project.

Chapter 3: Literature Review

In this chapter, you should show familiarity with the literature. By exposing the reader to the relevant published work. The literature review should be comprehensive for the problem you are writing about. The purpose of this chapter is to put your work in context with others, and benefit from their experience. You may mention any changes that you have made to your original solution after you have conducted the literature review. Your conclusions should be included in a discussion section by the end of this chapter.

Chapter 4: Summary

Provide a clear, insightful summary of what you concluded from the literature review and how you plan on proceeding with your project.

References

A bibliography of all cited works and sources you have used throughout this report. All references should follow IEEE format and should be ordered by their occurrence in the report.
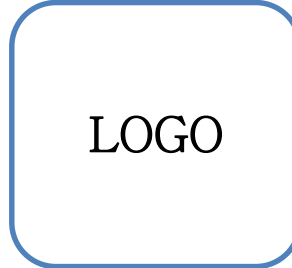
King Saud University

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Computer Science Department

LOGO

"Project Title"

CSC 496/7 – Final Report

Prepared by:

Student 1 Name	Student 1 ID
Student 2 Name	Student 2 ID
Student 3 Name	Student 3 ID
Student 4 Name	Student 4 ID

Supervised by:

Dr. Name

Research project for the degree of Bachelor in Computer Science

First/Second Semester 14##/14##

Autumn/Spring 20##

VII. Acknowledgements

VIII. English Abstract *

The abstract should complement your proposal abstract and might include additions that do not contradict the previously proposed abstract.

* These sections should be modified based on the phase of the graduation project.
** These sections are to be included in the final report of CSC497

IX. Arabic Abstract *

Your abstract translated to Arabic.

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Chapter 1: Introduction

The introduction of the research report should aim to catch the reader's interest and should be written in a style that can be understood easily by any reader with a general computer science background. It gives an overview of the research project you propose and explains the background of the project, focusing briefly on the major issues of its knowledge domain. It then proceeds with the presentation of the research focus, which can take the form of a hypothesis, a research question, a project statement, or a goal statement.

1.5 Problem Statement

This section states the problem that you are exploring and emphasizes the importance of your research. It should also include a clear description of the context of your research.

1.6 Goals and Objectives

This section should include a precise description of the goal you are planning to achieve and how you will achieve it. It should explicitly emphasize the contribution you are planning to make with the intended study.

Goals describe what you want to achieve. Objectives describe how you are going to achieve those goals (what do you want to know, prove, demonstrate, analyze, test, investigate or examine?)

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- **Realistic** – do you have the necessary resources to achieve the objective?
- **Time constrained** – determine when each stage needs to be completed.

1.7 Solution

A brief description of how your research can contribute in solving the above stated problem.

1.8 Research Scope

Define the boundaries of your research, describe precisely what is included in your research and what is not. This section should also include questions that your research intends to answer.

Chapter 2: Background

This chapter should give an overview of the knowledge domain where your research takes place. You should define the notations you will be using later in your report, and introduce the user to any concepts, terms, algorithms, or tools you will be using in your project.

Chapter 3: Literature Review

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Chapter 4: Methodology *

This is the "How" component of your research. This section should include a detailed description of the following (use subsections where applicable):

- What steps will you take and what methods will you use to address your question?
- How will your proposed method provide a reliable answer to your question?
- What specific techniques will you use to test the hypothesis, such as laboratory procedures, interviews, questionnaires, modeling, simulation, text analysis, use of secondary data sources, etc.
- What practical considerations are there; for example, what equipment, facilities, and other resources will be required?

Chapter 5: Experimental Design *

In CSC496, this chapter shows the datasets, and specifies the hypotheses your research will address.
In CSC497, you should identify the independent, dependent, and nuisance variables and indicates the way in which the randomization and statistical aspects of an experiment are to be carried out. The primary goal of an experimental design is to establish a causal connection between the independent and dependent variables. A secondary goal is to extract the maximum amount of information with the minimum expenditure of resources

Chapter 6: Implementation Issues **

This chapter should describe the different algorithms and techniques used to conduct the research and explain the purpose of each algorithm and how they have been combined or adapted. This chapter should also address any faced obstacles (if any) and how they have been solved.

Chapter 7: Results and Discussion **

7.1 Results

The first section of this chapter should detail how the validation approach was conducted, by providing the formulas used in to measure the performance and accuracy of the proposed approach and explain how they have been used for this particular case. This section should also include your results and compare them to other approaches (especially those mentioned in the literature review). If comparison is not possible, you should describe the reasons for that.

7.2 Discussion

The purpose of this section is to explain and discuss the final findings/output of the research and how they are used to prove or disapprove your hypothesis.

Chapter 8: Conclusion *

The final chapter of this report should provide a clear, insightful summary of your research, briefly mention the major findings/output, and emphasize the local and global impact of the research. Future directions may also be added.
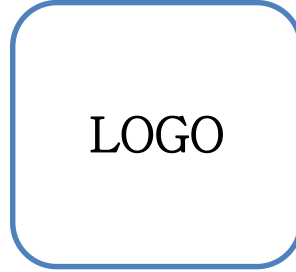
References

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King Saud University
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Computer Science Department

كلية علوم الحاسب والمعلومات

LOGO

"Project Title"

CSC 496/7 – Final Report

Prepared by:

Student 1 Name	Student 1 ID
Student 2 Name	Student 2 ID
Student 3 Name	Student 3 ID
Student 4 Name	Student 4 ID
Student 5 Name	Student 5 ID

Supervised by:

Dr. Name

Software project for the degree of Bachelor in Computer Science

First/Second Semester 14##/14##

Autumn/Spring 20##

X. Acknowledgements

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1.11 Solution

A brief description of how your software can contribute in solving the above stated problem.

1.12 Research Scope

Define the boundaries of your project; describe precisely what is included in your project and what is not.

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Chapter 4: System Analysis *

4.1 Functional Requirements

List all user and system requirements for your software.

4.2 Non-Functional Requirements

List all non-functional requirements for your software. (All requirements should be precise and measurable).

Chapter 5: System Design *

Give a clear description of your software design using sufficient diagrams/subsections from those mentioned below.

5.1 System use-cases:
This section lists use cases or scenarios to represent some significant, central functionality of the final system.

5.2 Interaction Diagrams:
In this section you show the interaction in terms of sequence or communication diagram between the objects/classes for different use case scenarios. You may ignore the trivial use cases. You can also show the interaction in case of exceptional flows in a use case. Exceptional flows include the following:
- Error handling. What should the system do if an error is encountered?
- Time-out handling. If the user does not reply within a certain period, the use case should take some special measures.
- Handling of erroneous input to the objects that participate in the use case (for example, incorrect user input).

5.3 Class Diagram:
In this section all classes, their attributes and methods should be defined. It should also indicate the interaction and relationships among the defined classes.

5.4 System Architecture:
 Provide the software architecture diagrams and descriptions.

5.5 Database Design:
This section should include a precise entity relationship diagram, and a corresponding schema describing the databases and file systems used in this project.

5.6 User Interface Prototype:
Provide screen shots of the developed user interfaces, or mockups to illustrate the looks and feel of the system for critical scenarios.

5.7 Algorithms:
Give brief overview of any special algorithms you will use (e.g. image processing, game strategy, scheduling etc.) And provide pseudo codes for the major functionalities in the system.

Chapter 6: System Implementation**

This chapter should provide an exhaustive explanation of the implementation stage of your project, review and explain all used technologies, describe the adopted integration process, and mention any limitations in the system (if any).
You should also give a clear detailed description of the software's main interfaces and core logic. You can also include a walkthrough of the system by showing the sample interfaces to demonstrate other functionalities. Provide code snippet to show the main logic but do not give the whole code.

Chapter 7: System Testing **

This chapter should describe the test strategies and methodologies used to plan, organize, execute and manage the testing of your

software project. Mention and explain any tools used for testing the software.

7.1 Unit testing
Show the results of testing each component separately.

7.2 Integration and regression testing
Describe how components where tested during the integration process, and report any issues or unexpected behavior and how it has been resolved.

7.3 Performance and stress testing
Measure and report the performance of your software, and explain the behavior of your system under extreme cases.

7.4 User acceptance testing
The purpose of acceptance testing is to confirm that the system is ready for operational use. During acceptance test, end-users (customers) of the system compare the system to its initial requirements. You should describe this process and may list people involved in testing, and the feedback you obtained from them.

7.5 Test cases

The goal of any given test case or set of test cases is to detect defects in the system being tested. This section should provide descriptions of various test cases to test each component in your application with all the possible actions and input. Each test case should include a brief description of the sequence of events being tested, the test data, testing environment, expected results, actual results, and whether the software passed or failed that test case.

Chapter 8: Conclusion *

The final chapter of this report should provide a clear, insightful summary of your project, briefly mention the major findings/output, and emphasize the local and global impact of the project. Future directions may also be added.

References

A bibliography of all cited works and sources you have used throughout this report. All references should follow IEEE format and should be ordered by their occurrence in the report.

King Saud University
Collage of Computer and Information Sciences
Computer Science Department

CSC 496 – Capstone project 1-
Project Name
Progress Meeting

Day, Date - Time

MINUTES

Attended:

Apologies:

Team member	Weekly contribution
Name	*Tasks accomplished by this member from the previous meeting*

Discussion Item	Actions
➢ *Discussed Topic*	**Supervisor:** ➢ *Tasks the supervisor should prepare.* **Team:** ➢ *Tasks that should be done by the group.*

Meeting adjourned around *00:00 a.m.*; next Meeting on *Day Date (time.).*

Appendix B

All rubric are available electronically. The will be added to the next version of this document.