FCIT Management System

By

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# FCIT Management System

## Project Description

FCIT students suffer from not having a management system that could help them to search, add, drop, and calculate their GPA in an easy and organized way. Instead, students must ask their supervisors to do all the functions mentioned above.

As a result, we have decided to solve this problem by developing a new system that saves both, students’ and their supervisors’ time. Also, we would like to give students the opportunity to be independent and perform all the usual activities on their own with no intervention from the supervisor through the use of our system. Moreover, the system will consider supervisors too, and will allow them to perform some minor tasks, such as searching for a student, print a student's record or add a new student to the system.

As mentioned earlier, the system is targeted more to students, but the most important condition is that no student can sign up to the system on his own! A supervisor must register the student's information first so he can login to the system (A signup option is not available for students, only supervisors can sign up). All students will be stored in a Binary Search Tree based on their student ID number, all students’ ID who can access the system will be defined and stored in a file, so we can compare it with the current student’s ID who is trying to login. And it will be guaranteed that this ordering of students (by ID) will be the exact same as the alphabetical ordering by last name and first name. Each student record will also have a reference to a linked list, which will have all the courses taken by that student and the grades the student received.

Finally, in addition to this Binary Search Tree of student records, our system should also have LinkedList of course records, which will allow you to keep a record of how many times a course was taken and the average grade for all students who took that course.

## Requirements

The following two sections describe the functional and non-functional requirements of the system:

### Functional requirements

* Each user (student/supervisor) shall be able to login to the system using a specific user ID and password.
* Each supervisor shall be able to sign up to the system using a specific user ID and password.
* Each user (student/supervisor) shall be able to view his own profile.
* Each student shall be able to add and drop courses.
* Each student shall be able to view all her information including all the courses taken by her.
* Each supervisor shall be able to add/register students in the system.
* Each supervisor shall be able to delete/remove students from the system.
* Each supervisor shall be able to search for students by ID.
* Each supervisor shall be able to view all the students' information (only those who are under her supervision).
* Each supervisor shall be able to add courses for students under her supervision.
* Each supervisor shall be able to delete courses for students under her supervision.
* Each supervisor shall be able to add students' grades.

### Non-functional Requirements

* The system shall provide a high level of security.
* The system shall provide a high level of responsiveness.
* The system shall work 24/7.
* The system should not make wasteful use of memory.
* The system should be easy to use and provide a well - designed GUI.
* The system should be able to recover from failure.

## Use Case Diagram

The following diagram illustrates the main functions that a user can perform in the system taking into consideration that we have two types of users, students and supervisors:

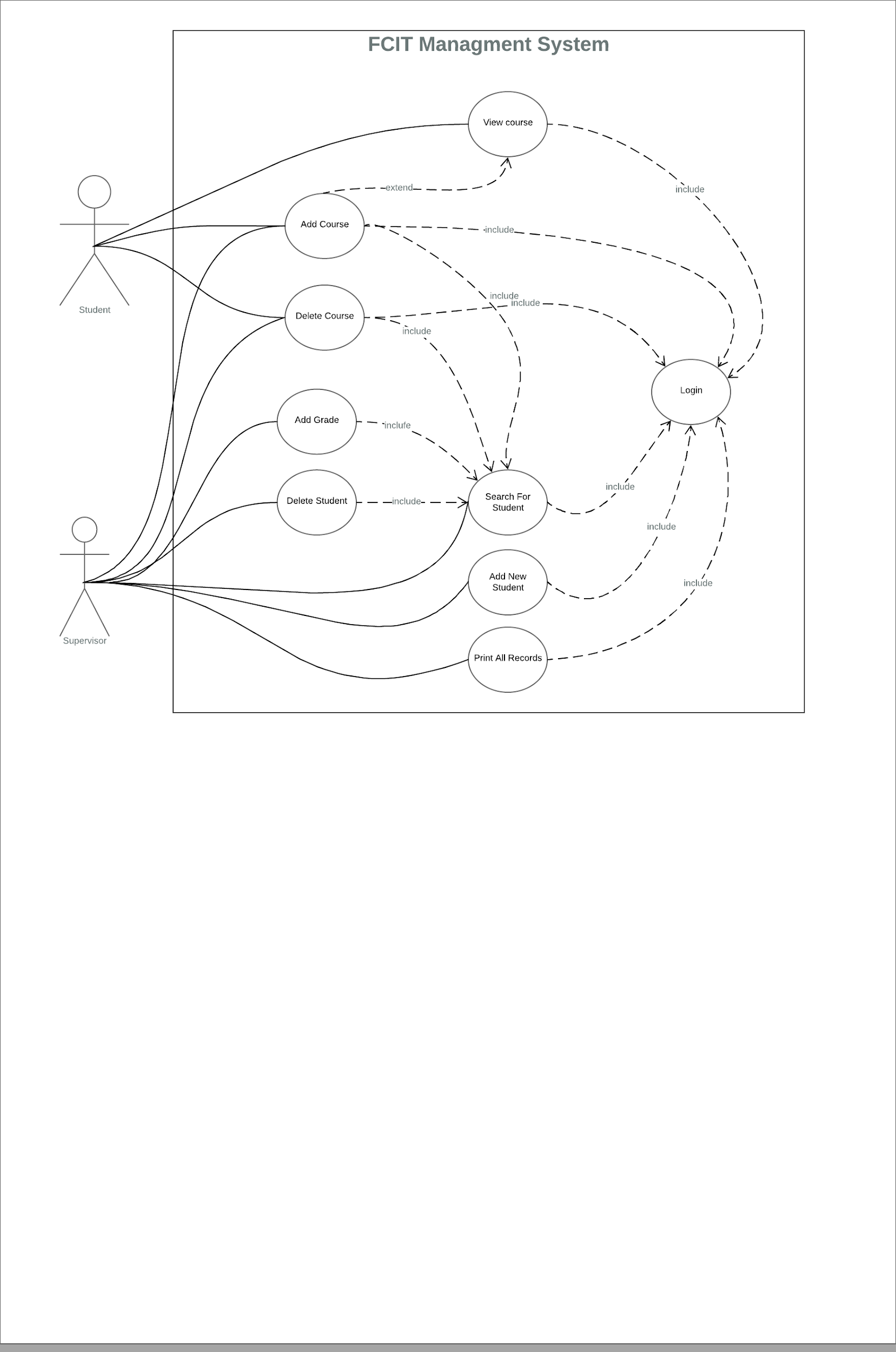


Figure ‎1‑1 Use Case Diagram

### System Main GUIs

The following figures show the main interfaces of the system:

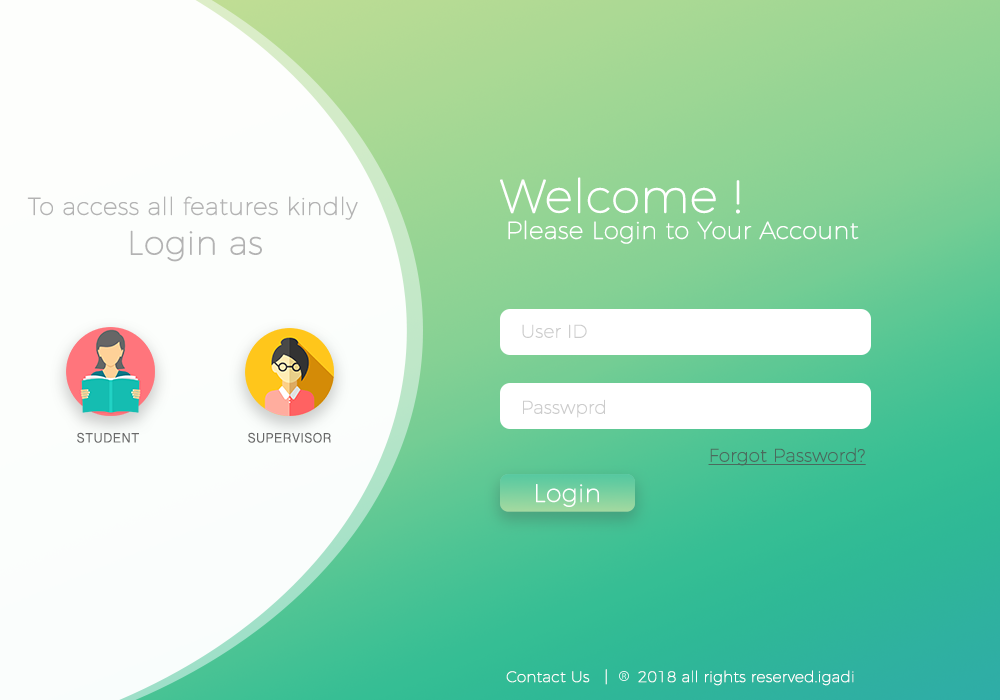


Figure ‎1‑2 Home Page (Student)

A close up of a logo

Description automatically generated

Figure ‎1‑3 Home Page (Supervisor)

A screenshot of a cell phone

Description automatically generated

Figure ‎1‑4 Sign Up Page (Supervisor)

A screenshot of a cell phone

Description automatically generated

Figure ‎1‑5 Main Services Page (Student)

A screenshot of a cell phone

Description automatically generated

Figure ‎1‑6 User Profile Page (Student)

A screenshot of a cell phone

Description automatically generated

Figure ‎1‑7 Course Adding Page (Student)

A screenshot of a cell phone

Description automatically generated

Figure ‎1‑8 Main Services Page (Supervisor)

A screenshot of a cell phone

Description automatically generated

Figure ‎1‑9 User Profile Page (Supervisor)

A screenshot of a cell phone

Description automatically generated

Figure ‎1‑10 Student Adding Page (Supervisor)

A screenshot of a cell phone

Description automatically generated

Figure ‎1‑11 Search for Student Page (Supervisor)

A screenshot of a cell phone

Description automatically generated

Figure ‎1‑12 Student Profile (Search Result)

A screenshot of a cell phone

Description automatically generated

Figure ‎1‑13 Students' Records Page (Supervisor)

## System Test cases

Preconditions:

* Each user shall be uniquely identified by his or her 7-digit ID number.
* Each student shall uniquely identify himself with a user ID that starts with "1".
* Each supervisor shall uniquely identify himself with a user ID that starts with "2".
* Correct student's account details:
  + User ID: 1112345.
  + Password: St111234500.
  + Full Name: Sadeem Alamoudi.
  + Email: [salamonudi@stu.kau.edu.sa](mailto:salamonudi@stu.kau.edu.sa).
  + Age: 21.
  + Phone Number: 0572972654.
  + Department: IS.
* Correct supervisor's account details:
  + User ID: 2112345.
  + Password: Sp211234500.
  + Full Name: Helen Baksh.
  + E-mail: hbaksh@kau.edu.sa.
  + Age: 45.
  + Phone Number: 0508881555.
  + Department: CS.
  + Position: Doctor.
  + Office Number: 205S.
  + Office Hours: Sun 10-11.

The following table demonstrates the system's test cases:

Table ‎1‑1 Test Cases

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Test Case No.** | **Test Case Steps** | **Test Data/Input** | **Expected Output** | **Actual Output** | **Tested Method** | **Note** |
| 1 | 1. Select student category. | - | Only login option should appear, no signup option | One option did appear: login | checkUserCategory() |  |
| 2 | 1. Select supervisor   category. | - | Two options should appear: login and sign up | Two options did appear: login and sign up | checkUserCategory() |  |
| 3 | 1. Select student category. 2. Enter user ID. 3. Press LOGIN button. | 1. User ID = 1112345. | A warning message should be displayed:  (' Please, fill all the required fields! ') | The warning message has been displayed. | studentLogin() | Only correct user ID |
| 4 | 1. Select student category. 2. Enter password. 3. Press LOGIN button. | 1. Password = St111234500. | A warning message should be displayed:  (' Please, fill all the required fields! ') | The warning message has been displayed. | studentLogin() | Only Correct Password |
| 5 | 1. Select student category. 2. Enter user ID. 3. Enter password. 4. Press LOGIN button. | 1. User ID = 2112345. 2. Password = St111234500. | A warning message should be displayed:  (' The ID should start with 1! ') | The warning message has been displayed. | studentLogin() | Incorrect User ID |
| 6 | 1. Select student category. 2. Enter user ID. 3. Enter password. 4. Press LOGIN button. | 1. User ID = 1112345. 2. Password = St113245. | A warning message should be displayed:  (' Wrong password. Please, try again! ') | The warning message has been displayed. | studentLogin() | Incorrect Password |
| 7 | 1. Select student category. 2. Enter user ID 3. Enter password. 4. Press LOGIN button. | 1. User ID = 5412345. 2. Password = St113245. | A warning message should be displayed:  (' Sorry, you are not registered in our system! ') | The warning message has been displayed. | studentLogin() | Incorrect User ID and Password |
| 8 | 1. Select student category. 2. Enter user ID 3. Enter password. 4. Press LOGIN button. | 1. User ID = 1112345. 2. Password = St111234500. | The student's main services page should be displayed. | The page has been displayed. | studentLogin() | Correct User ID and Password |
| 9 | 1. Select supervisor category. 2. Enter user ID. 3. Press LOGIN button. | 1. User ID = 2112345. | A warning message should be displayed:  (' Please, fill all the required fields! ') | The warning message has been displayed. | supervisorLogin() | Only correct user ID |
| 10 | 1. Select supervisor category. 2. Enter password. 3. Press LOGIN   button. | 1. Password = Sp211234500. | A warning message should be displayed:  (' Please, fill all the required fields! ') | The warning message has been displayed. | supervisorLogin () | Only Correct Password |
| 11 | 1. Select supervisor category. 2. Enter user ID 3. Enter password. 4. Press LOGIN button. | 1. User ID = 1112345. 2. Password = Sp211234500. | A warning message should be displayed:  (' The ID should start with 2! ') | The warning message has been displayed. | supervisorLogin () | Incorrect User ID |
| 12 | 1. Select supervisor category. 2. Enter user ID 3. Enter password. 4. Press LOGIN button. | 1. User ID = 2112345. 2. Password = Sp113245. | A warning message should be displayed:  (' Wrong password. Please, Try again! ') | The warning message has been displayed. | supervisorLogin () | Incorrect Password |
| 13 | 1. Select supervisor category. 2. Enter user ID 3. Enter password. 4. Press LOGIN button. | 1. User ID = 56112345. 2. Password = Sp113245. | A warning message should be displayed:  (' Sorry, you are not registered in our system! Sign up! ') | The warning message has been displayed. | supervisorLogin () | Incorrect User ID and Password.  Since he is a supervisor, he will be offered to sign up! |
| 14 | 1. Select supervisor category. 2. Enter user ID 3. Enter password. 4. Press LOGIN button. | 1. User ID = 2112345. 2. Password = Sp211234500. | The system should display the supervisor's main services page. | The page has been displayed. | supervisorLogin() | Correct User ID and Password |
| 15 | 1. Select supervisor category. 2. Enter user ID 3. Enter password. 4. Press SIGNUP button. | 1. User ID = 2112354. 2. Password = Sp211235400. | A warning message should be displayed:  (' You are already registered in the system! Please, login! ') | The warning message has been displayed. | supervisorSignup() |  |
| 16 | 1. Select supervisor category. 2. Enter user ID 3. Enter password. 4. Press SIGNUP button. | 1. User ID = 2772354. 2. Password = Sp2235400. | The signup page (Where the supervisor must enter some additional information) should be displayed. | The page has been displayed. | supervisorSignup() | Check figure1-4 |
| 17 | 1. Select student category. 2. Enter correct user ID 3. Enter correct password. 4. Press LOGIN button. 5. Select the 'View Profile' service. | 1. User ID = 1112345. 2. Password = St111234500. | The student's profile should be displayed with all its options and data. | The profile is displayed. | displayStudentProfile() |  |
| 18 | 1. Select student category. 2. Enter correct user ID 3. Enter correct password. 4. Press LOGIN button. 5. Select the 'View Profile' service. 6. Select a course to delete from the list. 7. Press DELETE button. | 1. User ID = 1112345. 2. Password = St111234500. 3. CPCS203 course is selected to be deleted. | An informing message should be displayed (' The selected course has been deleted successfully ') and the list of courses should be updated. | The message has been displayed and the list has been updated. | deleteCourse() |  |
| 19 | 1. Select student category. 2. Enter correct user ID 3. Enter correct password. 4. Press LOGIN button. 5. Select the 'View Profile' service. 6. Press DELETE button. | 1. User ID = 1112345. 2. Password = St111234500. | A warning message should be displayed (' Please, choose one of the courses from the list to delete!'). | The message has been displayed. | deleteCourse() |  |
| 20 | 1. Select student category. 2. Enter correct user ID 3. Enter correct password. 4. Press LOGIN button. 5. Select the 'View Profile' service. 6. In the 'Profile' page, press ADD button. | 1. User ID = 1112345. 2. Password = St111234500. | Adding courses page should be displayed. | The page has been displayed. | displayAddCoursePage() |  |
| 21 | 1. Select student category. 2. Enter correct user ID 3. Enter correct password. 4. Press LOGIN button. 5. Select the 'View Profile' service. 6. In the 'Profile' page, press ADD button. 7. Select Course to add. 8. Press ADD COURSE button. | 1. User ID = 1112345. 2. Password = St111234500. 3. CPCS204 course is selected to be added. | An informing message should be displayed (' The selected course has been added successfully ') and the list of courses should be updated. | The message has been displayed and the list has been updated. | addCourse() |  |
| 22 | 1. Select student category. 2. Enter correct user ID 3. Enter correct password. 4. Press LOGIN button. 5. Select the 'View Profile' service. 6. In the 'Profile' page, press ADD button. 7. Press ADD COURSE button. | 1. User ID = 1112345. 2. Password = St111234500. | A warning message should be displayed (' Please, choose one of the courses from the list to add! '). | The message has been displayed. | addCourse() |  |
| 23 | 1. Select student category. 2. Enter correct user ID 3. Enter correct password. 4. Press LOGIN button. 5. Select the 'Add Course' service. | 1. User ID = 1112345. 2. Password = St111234500. | Adding courses page should be displayed. | The page has been displayed. | displayAddCoursePage() | This test case is different than the test cases 20,21,22.  Here, the ADD course is selected from the student's main services page. |
| 24 | 1. Select supervisor category. 2. Enter correct user ID. 3. Enter correct password. 4. Press LOGIN button. 5. Select the 'View Profile' service. | 1. User ID = 2112345. 2. Password = Sp211234500. | The supervisor's profile with all data should be displayed. | The supervisor's profile is displayed. | displaySupervisorProfile() |  |
| 25 | 1. Select supervisor category. 2. Enter correct user ID. 3. Enter correct password. 4. Press LOGIN button. 5. Select the 'View Profile' service. 6. Edit phone number field. 7. Press EDIT button. | 1. User ID = 2112345. 2. Password = Sp211234500. 3. Phone number = 0537012324. | An informing message should be displayed (' Your information has been edited successfully. ') and the phone number field should be updated. | The message has been displayed and the field has been updated. | editSupervisorProfile() |  |
| 26 | 1. Select supervisor category. 2. Enter correct user ID. 3. Enter correct password. 4. Press LOGIN button. 5. Select the 'View Profile' service. 6. In the 'Profile' page, press EDIT button. | 1. User ID = 2112345. 2. Password = Sp211234500. | A warning message should be displayed (' You should change the value of one of the fields to edit your profile! '). | The message has been displayed. | editSupervisorProfile() |  |
| 27 | 1. Select supervisor category. 2. Enter correct user ID. 3. Enter correct password. 4. Press LOGIN button. 5. Select the 'Add Student' service. | 1. User ID = 2112345. 2. Password = Sp211234500. | The student adding page should be displayed. | The page has been displayed. | displayAddStudentPage() |  |
| 28 | 1. Select supervisor category. 2. Enter correct user ID. 3. Enter correct password. 4. Press LOGIN button. 5. Select the 'Add Student' service. 6. In the 'Student Adding' page, insert the data (user ID, full name, email, age, phone number, department). 7. Press ADD button. | 1. User ID = 2112345. 2. Password = Sp211234500. 3. Student ID = 1115432. 4. Full Name = Lujain Alharbi. 5. Email = [lalharbi@stu.kau.edu.sa](mailto:lalharbi@stu.kau.edu.sa) . 6. Age = 23 7. Phone Number = 0592933654. 8. Department: IT. | An informing message should be displayed (' The student has been added successfully! ') | The message has been displayed. | addStudent() |  |
| 29 | 1. Select supervisor category. 2. Enter correct user ID. 3. Enter correct password. 4. Press LOGIN button. 5. Select the 'Add Student' service. 6. In the 'Student Adding' page, insert the data (user ID, full name, email, age, phone number, department). 7. Press ADD button. | 1. User ID = 2112345. 2. Password = Sp211234500. 3. Student ID = 1112345. 4. Full Name = Sadeem Alamoudi. 5. Email = [salamonudi@stu.kau.edu.sa](mailto:salamonudi@stu.kau.edu.sa) 6. Age: 21. 7. Phone Number: 0572972654. 8. Department: IS. | A warning message should be displayed (' Sorry! The student you are trying to add is already registered in the system! ') | The message has been displayed. | addStudent() |  |
| 30 | 1. Select supervisor category. 2. Enter correct user ID. 3. Enter correct password. 4. Press LOGIN button. 5. Select the 'Add Student' service. 6. In the 'Student Adding' page, insert the data (user ID, full name, email, age, phone number, department). 7. Press ADD button. | 1. User ID = 2112345. 2. Password = Sp211234500. 3. Full Name = Lujain Alharbi. 4. Email = [lalharbi@stu.kau.edu.sa](mailto:lalharbi@stu.kau.edu.sa) . 5. Age = 23 6. Phone Number = 0592933654. 7. Department: IT. | A warning message should be displayed (' Please, fill all the required fields to add a student! ') | The message has been displayed. | addStudent() | Student ID of the student to be added is missing |
| 31 | 1. Select supervisor category. 2. Enter correct user ID. 3. Enter correct password. 4. Press LOGIN button. 5. Select the 'Search for Student' service. 6. In the 'Search' page, insert the user ID. 7. Press SEARCH button. | 1. User ID = 2112345. 2. Password = Sp211234500. 3. Student ID = 1112345 | The profile of the student should be displayed. | The profile has been displayed. | searchForStudent() |  |
| 32 | 1. Select supervisor category. 2. Enter correct user ID. 3. Enter correct password. 4. Press LOGIN button. 5. Select the 'Search for Student' service. 6. Press SEARCH button. | 1. User ID = 2112345. 2. Password = Sp211234500. | A warning message should be displayed (' Please, enter the user ID of the student you would like to search for! ') | The message has been displayed. | searchForStudent() |  |
| 33 | 1. Select supervisor category. 2. Enter correct user ID 3. Enter correct password. 4. Press LOGIN button. 5. Select the 'Search for Student' service. 6. In the 'Search' page, insert the user ID. 7. Press SEARCH button. | 1. User ID = 2112345. 2. Password = Sp211234500. 3. Student ID: 111233 | A warning message should be displayed (' The student you are searching for does not exist in the system. Please, enter a correct user Id or add the student to the system!') | The message has been displayed. | searchForStudent() |  |
| 34 | 1. Select supervisor category. 2. Enter correct user ID. 3. Enter correct password. 4. Press LOGIN button. 5. Select the 'Search for Student' service. 6. In the 'Search' page, insert the user ID. 7. Press SEARCH button. 8. Select a course from the 'Current Courses' list. 9. Press on ADD GRADE button. | 1. User ID = 2112345. 2. Password = Sp211234500. 3. Student ID = 1112345. 4. CPIS220 course is selected to add a grade. | The add grade page should be displayed. | The page has been displayed. | dispayAddGradePage() |  |
| 35 | 1. Select supervisor category. 2. Enter correct user ID. 3. Enter correct password. 4. Press LOGIN button. 5. Select the 'Search for Student' service. 6. In the 'Search' page, insert the user ID. 7. Press SEARCH button. 8. Select a course from the 'Current Courses' list. 9. Press on ADD GRADE button. 10. In the 'Adding grade' page, enter a grade. 11. Press ADD GRADE button. | 1. User ID = 2112345. 2. Password = Sp211234500. 3. Student ID = 1112345. 4. CPIS220 course is selected to add a grade. 5. Grade = 98. | An informing message should be displayed (' The grade has been added successfully! '). | The message has been displayed. | addGrade() |  |
| 36 | 1. Select supervisor category. 2. Enter correct user ID. 3. Enter correct password. 4. Press LOGIN button. 5. Select the 'Search for Student' service. 6. In the page, insert the user ID. 7. Press SEARCH button. 8. Select a course from the 'Current Courses' list. 9. Press on ADD GRADE button. 10. In the 'Adding grade' page, enter a grade. 11. Press ADD GRADE button. | 1. User ID = 2112345. 2. Password = Sp211234500. 3. Student ID = 1112345. 4. CPIS220 course is selected to add a grade. 5. Grade =110. | A warning message should be displayed (' Please, enter a valid grade. The grade should be a positive integer between 1 and 100 (inclusive)!'). | The message has been displayed. | addGrade() |  |
| 37 | 1. Select supervisor category. 2. Enter correct user ID. 3. Enter correct password. 4. Press LOGIN button. 5. Select the 'Search for Student' service. 6. In the page, insert the user ID. 7. Press SEARCH button. 8. Select a course from the 'Current Courses' list. 9. Press on 'Add Grade' button. 10. In the 'Adding grade' page, press 'Add Grade' button. | 1. User ID = 2112345. 2. Password = Sp211234500. 3. Student ID = 1112345. 4. CPIS220 course is selected to add a grade. | A warning message should be displayed (' Please, fill the required field with a valid grade!'). | The message has been displayed. | addGrade() |  |
| 38 | 1. Select supervisor category. 2. Enter correct user ID. 3. Enter correct password. 4. Press LOGIN button. 5. Select the 'Show All Students Records' service. | 1. User ID = 2112345. 2. Password = Sp211234500. | All students' records should be displayed. | The records have been displayed. | showAllStudentsRecords() |  |
| 39 | 1. Select supervisor category. 2. Enter correct user ID. 3. Enter correct password. 4. Press LOGIN button. 5. Press Exit button. | 1. User ID = 2112345. 2. Password = Sp211234500. | The system should shut down. | The system has shut down. | exit() |  |
| 40 | 1. Select student category. 2. Enter correct user ID. 3. Enter correct password. 4. Press LOGIN button. 5. Press EXIT button. | 1. User ID = 1112345. 2. Password = St111234500. | The system should shut down. | The system has shut down. | exit() |  |
| 41 | 1. Select supervisor category. 2. Enter correct user ID. 3. Enter correct password. 4. Press LOGIN button. 5. Select the 'View Profile' service. 6. Press on 'Go Back' Arrow. | 1. User ID = 2112345. 2. Password = Sp211234500. | The supervisor's main services page should be redisplayed. | The page has been displayed. | goBack() |  |
| 42 | 1. Select student category. 2. Enter correct user ID. 3. Enter correct password. 4. Press LOGIN button. 5. Select the 'View Profile' service. 6. Press on 'Go Back' Arrow. | 1. User ID = 1112345. 2. Password = St111234500. | The student's main services page should be redisplayed. | The page has been displayed. | goBack() |  |

## Conclusion

The test cases detailed in [**Section**](#_System_Test_cases) **1.4** show that system does conform with the requirements and could satisfy the potential users.