Product Requirements Document
Use Cases Specification

The Team
SWEN90007 SM2 2020 Project
https://github.com/emilylm/swen90007-project.git

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Revision History

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1. Introduction

1.1 Proposal

This document specifies the SWEN90007 project use cases, describing the flow of events, inputs, and outputs of each use case to be implemented.

1.2 Target Users

This document is mainly intended for this project team and the SWEN90007 teaching team.

1.3 Conventions, terms and abbreviations

This section explains the concept of some important terms that will be used throughout this document. These terms are detailed alphabetically in the following table.

Term	Description
Marks	The points attributed to a question or exam
System	The online examination system under development

1.4 Glossary of Synonyms

This section provides a glossary of synonyms that will be used throughout this document. These synonyms are detailed alphabetically in the following table.

Synonyms
Marks, points, grades
System, application

2. Actors

Actor	Description
Instructor	An university staff member who is teaching a subject
Student	A person enrolled in one or more subjects at the university

3. Assumptions of Project Requirements

Assumption ID	Assumption
1	Administrator role in the system is to: 1. Create Instructor and Student accounts 2. Create subjects 3. Assign privileges to Instructors to view subjects they are instructing and create or edit exams for these subjects 4. Assign privileges to Students to view subjects they are enrolled in and to take exams for these subjects Use cases concerning the Administrator have not been covered in this document
2	Marks can be entered for an exam while the exam is published (prior to the exam being closed by the Instructor)

4.   Use Cases

4.1   Use Cases Summary

Use case ID [UC]	Use case
001	Known Exception
002	User Logs In
003	Instructor Views List of Taught Subjects
004	Instructor Views List of Exams for a Subject
005	Instructor Creates an Exam
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018	Student Accesses All Exams of a Subject
019	Student starts and submits exam
020	Student views results for an exam

4.2 Exception Handling

[UC001] Known Exception

Primary Actor
Stakeholders and Interests
Pre-conditions
- The known exceptions shall be raised by any operation in the system

Main Events Flow
1. The system identifies one of the following problems:
- No Connection with the Server [SF01]
- Security Exception [SF02]
- Out Of Memory Exception [SF03]
- Missing Resource Exception [SF04]
- Invalid Content Exception [SF05]

2. The system performs the respective Sub Flow

Sub Flows

[SF01] No Connection with the Server
Note: This exception could be caught by any operation that involves the Application and Database servers
1. The system identifies that one of the following servers is not available or the connection had exceeded a timeout:
   1. Database server
   2. Application server
2. The system displays the respective error message
3. This error is registered in the exception log

[SF02] Security Exception
1. When a user tries to access any page, the system identifies one of the following scenarios:
   a. A non-authenticated user
   b. A user with no privileges to access a page or perform an action (list, edit, delete or add)
   c. The user session was expired
2. The system displays the respective error message
3. The error is registered in the exception log

[SF03] Out of Memory Exception
1. A system call to memory allocation fails
2. The system displays the respective error message
3. The error is registered in the exception log

[SF04] Missing Resource Exception
1. User performs an operation
2. The system identifies the resource required for the operation is missing
3. The system displays the respective error message
4. The error is registered in the exception log

[SF05] Invalid Content Exception
1. The system identifies a record containing invalid content
2. The system displays the respective error message
3. This error is registered in the exception log

Post-conditions
Additional Information

4.3 User Authentication

[UC002] User Logs In

Primary Actor Instructor, Student
Stakeholders and Interests
- Instructor, Student: want to be able to access their subject exams

Pre-conditions
- User exists in the system

Main Events Flow
1. The user navigates to examination application log-in page
2. The user enters their credentials – see Additional Information
3. The system authenticates user [AF01]

Alternative Flows
[AF01] Incorrect Credentials
1. The user enters incorrect log-in credentials: incorrect username and/or incorrect password
2. The system displays an error message and does not authenticate user
3. The error is registered in the exception log
4. The execution flow continues from main flow step 2

Exception Flows
[EF01] Unknown Exception
1. The system logs the unrecognised runtime exception that has occurred during the application execution

Post-conditions
- User is authenticated in the system

Additional Information
For details of the data type, see [Input Data Table 1] User Credentials in section 4.6.

4.4   Instructor Use Cases

[UC003] Instructor Views List of Taught Subjects

Primary actor Instructor
Stakeholders and Interests
- Instructor: wants to see an accurate subject list

Pre-conditions
- Subjects exist in the system
- Instructor is authenticated [UC002]

Main Events Flow
1. The Instructor navigates to subjects page
2. The Instructor arrives at subjects page displaying names and codes of subjects the Instructor is instructing – [AF01]

Alternative Flows
[AF01] No Subjects to Display
1. The system displays a blank page containing a message that there are no subjects to display

Exception Flows
[EF01] Unknown Exception
1. The system logs the unrecognised runtime exception that has occurred during the application execution

[EF02] Known Exception
1. The system logs the exception that has happened during the application execution. Go to [UC001]

Post-conditions

[UC004] Instructor Views List of Exams for a Subject

Primary actor Instructor
Stakeholders and Interests
- Instructor: wants to see an accurate list of exams per subject they instruct

Pre-conditions
- Subject exists in the system
- Instructor is authenticated [UC002]
- Instructor has navigated to the subjects page [UC003]

Main Events Flow
1. The Instructor selects a subject
2. The Instructor arrives at exam page listing all exams for the subject [AF01]

Alternative flows
[AF01] No Exams to Display
1. The system identifies that there are no exams for the subject
2. The system displays a message informing the Instructor

Exception Flows
[EF01] Unknown Exception
1. The system logs the unrecognised runtime exception that has occurred during the application execution

[EF02] Known Exception
2. The system logs the exception that has happened during the application execution. Go to [UC001]

Post-conditions

[UC005] Instructor Creates an Exam

Primary actor Instructor
Stakeholders and Interests
Pre-conditions
- Subject exists in the system
- Instructor is authenticated [UC002]
- Instructor has navigated to subject page [UC003]

Main Events Flow
1. The Instructor selects the menu option to *Create new exam*
2. The system displays a form for creating a new exam
3. The Instructor selects the menu option to *Add new question*
4. The Instructor adds a new question with the related input fields – see Additional Information
5. The system adds a new question
6. The Instructor selects the menu option to add the question to the exam – [AF01]
7. The system validates the fields – [AF04] [AF05]
8. The system displays a confirmation message

The Instructor repeats steps 2-8 until they have added all the questions they wish to add
9. The Instructor selects the menu option *Save* [AF02]
10. The system validates the fields – [AF04] [AF05]
11. The system updates the data and displays a confirmation message [AF03]
12. System displays subject page including the created exam

Alternative Flows
[AF01] Cancel creating new question operation
1. The Instructor chooses the menu option *Cancel*
2. The system discards the question
3. The system displays a message informing the Instructor
4. The execution flow continues from main flow step 3

[AF02] Cancel creating new exam operation
1. The Instructor chooses the menu option to cancel creating the new exam
2. The system discards the question
3. The system displays a message informing the Instructor

[AF03] Exam cannot be created
1. The system identifies that the exam has less than 1 question
2. The system displays a message informing the Instructor
3. Exam is not created and the execution flow continues from main flow step 5

[AF04] Mandatory field not filled
1. The system identifies a record containing at least one mandatory field unfilled
2. The system displays a message informing the Instructor
3. The execution flow continues from main flow step 4

[AF05] Invalid content type
1. The system identifies a record containing an invalid content
2. The system displays a message informing the Instructor
3. The execution flow continues from main flow step 4

Exception Flows
[EF01] Unknown Exception
1. The system logs the unrecognised runtime exception that has occurred during the application execution

[EF02] Known Exception
1. The system logs the exception that has happened during the application execution. Go to [UC001]

Post-conditions
- Exam is created for the subject
- Exam is in the "unpublished" state and is only visible to the Instructor

Additional information
For details of the data type, see [Input Data Table 3] Question Data Fields in section 4.6.

[UC006] Instructor Views an Exam

Primary actor Instructor
Stakeholders and Interests
Pre-conditions
- Instructor is authenticated [UC002]
- Subject exists in the system
- Exam exists in the system [UC005]
- Instructor has navigated to subject exams page [UC004]

Post-conditions
Main Events Flow
1. The Instructor selects an exam from the list and selects the menu option to view the exam
2. The system displays all questions on the exam
3. The Instructor selects menu option to close exam view
4. The system directs the Instructor back to the subject's exam page

Alternative Flows
Exception Flows
[EF01] Unknown Exception
1. The system logs the unrecognised runtime exception that has occurred during the application execution

[EF02] Known Exception
1. The system logs the exception that has happened during the application execution. Go to [UC001]

Post-conditions
Additional information

[UC007] Instructor Publishes an Exam

Primary actor Instructor
Stakeholders and Interests
Pre-conditions
- Subject exists in the system
- Instructor is authenticated [UC002]
- Exam exists in the system [UC005]
- Instructor has navigated to subject exams page [UC004]

Main Events Flow
1. The Instructor selects the menu option to *Edit exam*
2. The system displays current exam details, including exam state
3. The Instructor selects menu option *Change exam state* to 'published' – see Additional Information
4. The Instructor selects the menu option to save changes – [AF01]
5. The system validates the fields – [AF03] [AF04]
6. The system updates the data and displays a confirmation message

Alternative Flows
[AF01] Cancel the operation
1. The Instructor selects the menu option to cancel the changes
2. The system discards the changes made
3. The system displays a message informing the Instructor

[AF03] Mandatory field not filled
1. The system identifies a record containing at least one mandatory field unfilled
2. The system displays a message informing the Instructor
3. The execution flow continues from main flow step 3

[AF04] Invalid content type
1. The system identifies a record containing an invalid content
2. The system displays a message informing the Instructor
3. The execution flow continues from main flow step 3

Exception Flows
[EF01] Unknown Exception
1. The system logs the unrecognised runtime exception that has occurred during the application execution

[EF02] Known Exception
1. The system logs the exception that has happened during the application execution. Go to [UC001]

Post-conditions
- Exam state is 'published'

Additional information

For details of the data type, see [Input Data Table 2] Exam State Fields in section 4.6.

[UC008] Instructor Edits an Exam's Questions

Primary actor Instructor

Stakeholders and Interests

Pre-conditions
- Subject exists in the system
- Instructor is authenticated [UC002]
- Exam exists in the system [UC005]
- Instructor has navigated to subject exams page [UC004]

Main Events Flow
1. The Instructor selects the menu option to *Edit exam* – [AF03]
2. The system displays all exam questions
3. The Instructor selects the menu option *Edit question*
4. The Instructor edits the question – see Additional Information
5. The Instructor selects the menu option *Add to exam* – [AF01]
6. The system validates the fields – [AF04] [AF05]
7. The system updates the data and displays a confirmation message

Instructor repeats steps 3-7 until they have edited all the questions they wish to edit
8. The Instructor selects option to *Save* – [AF02]
9. The system validates the fields – [AF04] [AF05]
10. The system updates the data and displays a confirmation message – [AF03]

Alternative Flows

[AF01] Cancel Creating Question Operation
1. The Instructor chooses the menu option *Cancel*
2. The system discards the question
3. The system displays a message informing the Instructor
4. The execution flow continues from main flow step 3

[AF02] Cancel Creating Exam Operation
1. The Instructor chooses the menu option *Cancel*
2. The system discards all the changes made to the exam
3. The system displays a message informing the Instructor

[AF03] Exam Cannot Be Edited
1. The system identifies the current exam state is published and that a student is currently attempting the exam or has previously submitted an attempt
2. The system discards the changes made to the exam
3. The system displays a message informing the Instructor – [EF02]

[AF04] Mandatory Field Not Filled
1. The system identifies a record containing at least one mandatory field unfilled
2. The system displays a message informing the Instructor
3. The execution flow continues from main flow step 3

[AF05] Invalid Content Type
1. The system identifies a record containing an invalid content
2. The system displays a message informing the Instructor
3. The execution flow continues from main flow step 3

Exception Flows

[EF01] Unknown Exception
1. The system logs the unrecognised runtime exception that has occurred during the application execution

[EF02] Known Exception
1. The system logs the exception that has happened during the application execution. Go to [UC001]

Post-conditions
- Exam question(s) are updated

Additional information

For details of the data type, see [Input Data Table 3] Question Data Fields in section 4.6.

[UC009] Instructor Adds a Question to an Exam

Primary actor Instructor
Stakeholders and Interests
Pre-conditions
- Subject exists in the system
- Instructor is authenticated [UC002]
- Exam exists in the system [UC005]
- Instructor has navigated to subject exams page [UC004]

Post-conditions
- Question(s) are added to exam

Main Events Flow
1. The Instructor selects the menu option to *Edit exam* – [AF03]
2. The system displays all exam questions
3. The Instructor selects the menu option to *Create question*
4. The Instructor adds the question – see Additional Information
5. The Instructor selects the menu option to *Add question* to the exam – [AF01]
6. The system validates the fields – [AF04] [AF05]
7. The system updates the data and displays a confirmation message

Instructor repeats steps 3-7 until they have edited all the questions they wish to edit
8. The Instructor selects option to save all changes to the exam– [AF02]
9. The system validates the fields – [AF04] [AF05]
10. The system updates the data and displays a confirmation message – [AF03]

Alternative Flows
[AF01] Cancel Creating Question Operation
1. The Instructor chooses the menu option to cancel creating the question
2. The system discards the question
3. The system displays a message informing the Instructor
4. The execution flow continues from main flow step 3

[AF02] Cancel Editing Exam Operation
1. The Instructor chooses the menu option to cancel creating the new exam
2. The system discards all the changes made to the exam
3. The system displays a message informing the Instructor

[AF03] Exam Cannot Be Edited
1. The system identifies the current exam state is published and that a student is currently attempting the exam or has previously submitted an attempt
2. The system discards the changes made to the exam
3. The system displays a message informing the Instructor – [EF02]

[AF04] Mandatory Field Not Filled
1. The system identifies a record containing at least one mandatory field unfilled
2. The system displays a message informing the Instructor
3. The execution flow continues from main flow step 3

[AF05] Invalid Content Type
1. The system identifies a record containing an invalid content
2. The system displays a message informing the Instructor
3. The execution flow continues from main flow step 3

Exception Flows
[EF01] Unknown Exception
1. The system logs the unrecognised runtime exception that has occurred during the application execution

[EF02] Known Exception
1. The system logs the exception that has happened during the application execution. Go to [UC001]

Post-conditions
- Question(s) are added to the exam

Additional information
For details of the data type, see [Input Data Table 3] Question Data Fields in section 4.6.

[UC010] Instructor Deletes Question(s) on an Exam

Pre-conditions
- Subject exists in the system
- Instructor is authenticated [UC002]
- Exam exists in the system [UC005]
- Instructor has navigated to subject exams page [UC004]

Main Events Flow
1. The Instructor selects the menu option to *Edit exam* – [AF03]
2. The system displays all exam questions
3. The Instructor selects the menu option *Delete question*
4. The system displays a message to confirm Instructor wishes to delete the question
5. The Instructor confirms question deletion – [AF01]
6. The system displays a confirmation message

Instructor repeats steps 3-6 until they have edited all the questions they wish to edit
7. The Instructor selects menu option to *Save* changes to the exam – [AF02]
8. The system validates the fields – [AF04] [AF05]
9. The system updates the data and displays a confirmation message – [AF03]

Alternative Flows

[AF01] Cancel Deleting Question Operation
1. The Instructor chooses the menu option to *Cancel* deleting the question
2. The system discards the change
3. The system displays a message informing the Instructor
4. The execution flow continues from main flow step 3

[AF02] Cancel Editing Exam Operation
1. The Instructor chooses the menu option to *Cancel* creating the new exam
2. The system discards all the changes made to the exam
3. The system displays a message informing the Instructor

[AF03] Exam Cannot Be Edited
1. The system identifies the current exam state is published and that a student is currently attempting the exam or has previously submitted an attempt
2. The system discards the changes made to the exam
3. The system displays a message informing the Instructor – [EF02]

[AF04] Mandatory Field Not Filled
1. The system identifies a record containing at least one mandatory field unfilled
2. The system displays a message informing the Instructor
3. The execution flow continues from main flow step 3

[AF05] Invalid Content Type
1. The system identifies a record containing an invalid content
2. The system displays a message informing the Instructor
3. The execution flow continues from main flow step 3

Exception Flows

[EF01] Unknown Exception
2. The system logs the unrecognised runtime exception that has occurred during the application execution

[EF02] Known Exception
2. The system logs the exception that has happened during the application execution. Go to [UC001]

Post-conditions
- Question(s) are deleted from the exam

Additional information

[UC011] Instructor Deletes an Exam

Primary actor Instructor

Stakeholders and Interests
- Student: Wants to ensure the exams they have either started or submitted are not deleted – resulting in wasted energy and time.
- Administrator: Wants to maintain an up-to-date ledger of all exams.

Pre-conditions
- Exam exists in the system [UC005]
- Instructor is authenticated [UC002]
- Instructor has navigated to subject exams page [UC004]

Main Events Flow

1. The Instructor selects the menu option *Delete exam*
2. The system requests confirmation that the Instructor wants to delete the exam – [AF02]
3. The Instructor confirms the deletion – [AF01]
4. The system deletes the exam from the database and informs the user that the operation has succeeded – [AF02] [AF03]

Alternative Flows

[AF01] Cancel the Operation

1. The Instructor chooses the menu option *Cancel*
2. The execution continues from main flow step 2

[AF02] Exam cannot be deleted

1. The system displays a message informing that the exam cannot be deleted because
   a. One or more students have submitted the exam, or
   b. One or more students have started the exam, or
2. The system rejects the request and informs the instructor.
3. The system returns to list of all exams.

[AF03] System unable to modify its database

4. The system informs the user that the operation was unsuccessful and logs the exception – [EF02]

Exception Flows

[EF01] Unknown Exception

1. The system logs the unrecognised runtime exception that has occurred during the application execution

[EF02] Known Exception

1. The system logs the exception that has happened during the application execution. Go to [UC001]

Post-conditions

- Target exam is deleted from the database

Additional information

[UC012] Instructor Manually Closes an Exam

Primary actor Instructor

Stakeholders and Interests

- Student: Wants exam closure to be equitable and accurate as to not be unfairly disadvantaged.

Pre-conditions

- Exam exists in the system [UC005]
- Exam state is 'published' [UC007]
- The Instructor is authenticated [UC002]
- The Instructor has navigated to subject exams page [UC004]

Main Events Flow

1. The Instructor chooses to view the exam they wish to close
2. The system displays the exam details
3. The Instructor chooses the menu option to change Exam sate to 'close' – see Additional Information
4. The system requests confirmation that the Instructor wants to close the exam
5. The Instructor confirms the closure – [AF01]
6. The system immediately attaches a submission to every student in the subject – [AF02]
   a. For any student who has already submitted an exam:
      - All attempted answers are attached to the submission. Any not attempted answers are recorded as 'unanswered'
   b. For any student who has started the exam, but not yet submitted:
      - All questions are recorded as 'unanswered' in the submission
   c. For any student who has not attempted the exam:
      - All questions are recorded as 'unanswered' in the submission.
7. The system informs the Instructor that the operation has succeeded.

Alternative Flows

[AF01] Cancel the Operation

1. The Instructor chooses menu option *Cancel*

[AF02] System unable to modify its database

1. The system informs the user that the operation was unsuccessful and logs the exception – [EF02]

Exception Flows

[EF01] Unknown Exception

1. The system logs the unrecognised runtime exception that has occurred during the application execution

[EF02] Known Exception
1. The system logs the exception that has happened during the application execution. Go to [UC001]

Post-conditions
- Target exam is closed. Students cannot attempt the exam and no further submissions can be created.

Additional information

[UC013] Instructor Views Table View of all Students and Exams for a Subject

Primary actor Instructor

Stakeholders and Interests
- Instructor: wants to see an accurate list of students and exams per subject they instruct

Pre-conditions
- Subject exists in the system
- Instructor is authenticated [UC002]
- Instructor has navigated to the subjects page [UC003]

Main Events Flow
1. The Instructor selects a subject
2. The system displays exam page listing all exams for the subject [AF01]
3. The Instructor selects menu option *Switch to Table View* of all enrolled students and exams
4. The system displays a table where each row maps to a single student in the subject, and each column represents an exam. Table cells contain any mark that has been awarded to a student for the corresponding student and exam.

Alternative Flows

[AF01] No Exams to Display
1. The system identifies that there are no exams for the subject
2. The system displays a message informing the Instructor

[AF01] No Students to Display
1. The system identifies that there are no students enrolled in the subject
2. The system displays a message informing the Instructor

Exception Flows

[EF01] Unknown Exception
1. The system logs the unrecognised runtime exception that has occurred during the application execution

[EF02] Known Exception
2. The system logs the exception that has happened during the application execution. Go to [UC001]

Post-conditions

Additional information

For details of the data type, see [Input Data Table 2] Exam State Fields in section 4.6.

[UC014] Instructor Enters Exam Marks via Table View

Primary actor Instructor

Stakeholders and Interests
- Student: Wants correct marks allocated to their exam submission.

Pre-conditions
- Subject with students exists in the system
- An exam for this subject exists in the system [UC005]
- Instructor is authenticated [UC002]
- Instructor has navigated to the table view of all students and exams for a subject [UC013]

Main Events Flow
1. The Instructor selects menu option *Edit marks* for an exam from the corresponding column header – [AF01]
2. The system changes all cells in this column into editable input fields
3. The Instructor updates the exam mark for one or more students – see Additional Information
4. The Instructor selects menu option *Save* updates in the corresponding column header – [AF02]
5. The system validates all input fields – [AF03]
6. The system saves updated marks, changes input fields to text fields, and displays a confirmation message – [AF04]
7. For all updated submission records, the system resets all individual question marks to empty values.

Alternative Flows

[AF01] Exam is 'unpublished'
1. The exam is in an 'unpublished' state, so marking is disabled.

[AF02] Cancel the Operation
1. The Instructor chooses menu option *Cancel*
2. The system informs the user that any changes will be lost and requests confirmation
   a. Instructor rejects the cancellation. Execution continues from main flow step 3
   b. Instructor confirms the cancellation. System discards any changes made and changes input fields to text fields.

[AF03] Invalid content type
1. The system identifies a field containing an invalid content
2. The system displays a message informing the Instructor
3. The execution flow continues from main flow step 3

[AF04] System unable to modify its database
1. The system informs the user that the operation was unsuccessful and logs the exception – [EF02]

Exception Flows
[EF01] Unknown Exception
1. The system logs the unrecognised runtime exception that has occurred during the application execution

[EF02] Known Exception
1. The system logs the exception that has happened during the application execution. Go to [UC001]

Post-conditions
- Each updated mark has been saved in the system. Any individual question marks attached to the updated submission records are removed.

Additional information
For details of the data type, see [Input Data Table 4] Question Score Fields in section 4.6.

[UC015] Instructor Views Detailed View of Student Submission

Primary actor: Instructor

Stakeholders and Interests:
- Instructor: wants to see an accurate view of a student's submission

Pre-conditions
- Subject with students exists in the system
- Exam exists in the system [UC005]
- Instructor is authenticated [UC002]
- Instructor has navigated to the table view of all students and exams for a subject [UC013]

Main Events Flow
1. The Instructor selects the option to view a student's detailed submission for an exam
2. The system displays the student's exam submission containing: each question, its maximum available marks and any attached answer – [AF01]
3. The system displays an input field per question containing any previously allocated marks

Alternative Flows
[AF01] Exam is "unpublished"
1. The exam is in an "unpublished" state, so student view is disabled.

Exception Flows
[EF01] Unknown Exception
1. The system logs the unrecognised runtime exception that has occurred during the application execution

[EF02] Known Exception
1. The system logs the exception that has happened during the application execution. Go to [UC001]

Post-conditions
Additional information

[UC016] Instructor Enters Exam Marks via Detailed View of Student Submission

Primary actor Instructor

Stakeholders and Interests
- Student: Wants correct marks allocated to their exam submission.

Pre-conditions
- Instructor is authenticated [UC002]
- Instructor has navigated to the detailed view of a student's submission [UC015]

Main Events Flow
1. The Instructor updates the mark for one or more questions in the exam – see Additional Information
2. The Instructor selects *Save* when all updates are complete – [AF01]
3. The system prompts Instructor to confirm the action

4. The Instructor confirms
5. The system validates each input field – [AF02]
6. The system saves the updated marks for each question – [AF03]
7. The system aggregates the mark for each question and saves this value to the 'total exam mark' – [AF03]
8. The system confirms that the operation was successful and returns to the Table View of student and exams

Alternative Flows

[AF01] Cancel the Operation
1. Instructor chooses option in the column heading to cancel the operation
2. System informs the user that any changes will be lost and requests confirmation
   a. Instructor rejects the cancellation. Execution continues from main flow step 1
   b. Instructor confirms the cancellation. System discards any changes made and returns to the Table View of students and exams.

[AF02] Invalid content type
1. The system identifies a field containing an invalid content
2. The system displays a message informing the Instructor
3. The execution flow continues from main flow step 3

[AF03] System unable to modify its database
1. The system informs the user that the operation was unsuccessful and logs the exception – [EF02]

Exception Flows

[EF01] Unknown Exception
1. The system logs the unrecognised runtime exception that has occurred during the application execution

[EF02] Known Exception
1. The system logs the exception that has happened during the application execution. Go to [UC001]

Post-conditions
- Each individual question mark is correctly updated for the submission. The aggregated exam mark reflects the sum of all individual question marks.

Additional information
For details of the data type, see [Input Data Table 4] Question Score Fields in section 4.6.

4.5   Student Use Cases

[UC017] Student Accesses List of Enrolled Subjects

Primary actor Student

Stakeholders and Interests
- Student: wants to view all subjects they are currently taking with an exam in the system

Pre-conditions
- Student is enrolled in the subject
- Student is authenticated [UC001]

Main Events Flow
1. The Student navigates to the subjects page
2. The Student arrives at subjects page displaying names and codes of subjects the Student is enrolled in – [AF01]

Alternative Flows

[AF01] No Subjects to Display
1. The system displays a blank page containing a message that there are no subjects to display

Exception Flows

[EF01] Unknown Exception
1. The system logs the unrecognised runtime exception that has occurred during the application execution

[EF02] Known Exception
1. The system logs the exception that has happened during the application execution. Go to [UC001]

Post-conditions

Additional Information

[UC018] Student Accesses All Exams of a Subject

Primary actor Student

Stakeholders and Interests
- Student: wants to view all exams of a subject

Pre-conditions
- Student is enrolled in the subject
- Student is authenticated [UC001]
- Student has navigated to the subjects page [UC017]

Main Events Flow
1. The Student selects a subject
2. The Student arrives at exam page listing all exams for the subject [AF01]

Alternative flows

[AF01] No Exams to Display
3. The system identifies that there are no exams for the subject
4. The system displays a message informing the Instructor

Exception Flows

[EF01] Unknown Exception
2. The system logs the unrecognised runtime exception that has occurred during the application execution

[EF02] Known Exception
2. The system logs the exception that has happened during the application execution. Go to [UC001]

Post-conditions

Additional information

[UC019] Student Starts and Submits an Exam

Primary actor Student

Stakeholders and Interests
- Student: wants to begin and submit an exam
- Instructor: wants students to be able to begin and submit exams if they are in 'published' state

Pre-conditions
- Student is enrolled in the subject
- Student is authenticated [UC001]
- The instructor has created an exam for the subject [UC005]
- The instructor has published the exam [UC007]
- The student has navigated to the exams page [UC18]

Main Events Flow
1. The system presents a list of all the exams of the subject and their state
2. The Student selects menu option *Begin exam* – [AF01]
3. The Student answers the question – [AF02] [AF03]
4. The Student selects menu option *Next question*

The Student repeats steps 2-4 until they have answered all questions on the exam
5. The Student selects menu option to *Submit exam* – [AF04] [AF05]
6. The system validates each input field – [AF06]
7. The system displays a message confirming the exam has been submitted

Alternative Flows

[AF01] No Exam Available
1. The system recognises the exam is in 'closed' state
2. The system does not allow the student to begin exam
3. The system displays a message informing the Student

[AF02] Change Answer
1. The student navigates to prior questions
2. The student edits their response
3. The execution flow continues from main flow step 5

[AF03] Skip Answer
1. The student leaves the question response blank and navigates to the next question
2. The execution flow continues from main flow step 5

[AF04] Exam Closure During Attempt
1. The system recognises the exam is in 'closed' state

2. The system discards all responses
3. The system informs the Student – [EF02]

[AF05] Cancel the Operation
1. The Student chooses menu option *Cancel* or closes the browser page
2. The system informs the Student that all changes will be lost and requests confirmation
   a. The Student rejects the cancellation. The execution flow continues from main flow step 5
   b. The Student confirms the cancellation. The system discards all changes made by the Student.

[AF06] Invalid content type
1. The system identifies a field containing an invalid content
2. The system displays a message informing the Instructor
3. The execution flow continues from main flow step 3

Exception Flows

[EF01] Unknown Exception
1. The system logs the unrecognised runtime exception that has occurred during the application execution

[EF02] Known Exception
1. The system logs the exception that has happened during the application execution. Go to [UC001]

Post-conditions
- The Student's submission for the subject and exam exists in the system

Additional information

[UC020] Student Views Results for an Exam

Primary actor Student

Stakeholders and Interests
- Student: wants to view their mark for an exam
- Instructor: wants students to be able to communicate marks to students

Pre-conditions
- The Student is authenticated [UC001]
- The Student is enrolled in at least one subject
- The Student has submitted an attempt for the exam [UC018]

Main Events Flow
1. The Student selects and navigates to a subject
2. The Student selects and navigates to an exam – [AF01]
3. The system displays the aggregate marks to the Student

Alternative Flows

[AF01] Exam Not Marked
1. The system recognises that the exam is not marked
2. The system does not display a grade to the Student

Post-conditions

Additional information

4.6   Data Inputs

[Input Data Table 1] User Credentials

Field	Description	Type (Length)	Mandatory	Unique	Editable	Filtered	Details
Username	<text>	Integer	✔				
Password	<text>	Integer	✔				

[Input Data Table 2] Exam State Fields

Field	Description	Type (Length)	Mandatory	Unique	Editable	Filtered	Details
Exam state	<text>	List: 1. Unpublished 2. Published 3. Closed	✔		✔		The exam type will be used to display or mask the exam from students:

							- Unpublished is not visible - Published is visible - Closed was previously published and no longer allows submissions

[Input Data Table 3] Question Data Fields

Field	Description	Type (Length)	Mandatory	Unique	Editable	Filtered	Details
Question number	<text>	Integer	✔	✔			Position on exam
Question type	<text>	List: 1. Short answer 2. Multiple-choice	✔		✔		Questions can be either short answer or multiple-choice
Short answer body	<text>	Integer			✔		If short-answer is selected in question type, Instructor must enter question text
Multiple-choice body	<text>	Integer >= 2			✔		If multiple-choice is selected in question type, Instructor must enter at least 2 choices
Question score	<text>	Integer	✔		✔		The number of marks allocated to each exam question

[Input Data Table 4] Question Score Fields

Field	Description	Type (Length)	Mandatory	Unique	Editable	Filtered	Details
Question score	Decimal number	Integer	✔		✔		The number of marks allocated to each exam question

4.7 Use Cases Diagram