

Introduction to Software Engineering-Milestone 0

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Functional Requirements:

Resources:

Requirement 1

Requirement: As a student, I can access the boards of courses I'm enrolled to, so that I can see information about my courses.

Relevant: A student can access the boards of courses she is enrolled to.

Test: As a student, enroll to several courses. Then try to access the board of each course you're enrolled to; you should be able to do it.

Changes Justification: No change.

Requirement 2

Requirement: : In each course a student is enrolled to, he should see its published resources (slides, assignments, and zoom recordings), so he can do his tasks and watch lectures in his courses.

As a teacher I can publish resources to courses I am teaching so that the course board will contain necessary things such as slides, assignments, and zoom recordings.

Relevant: In each course she can see published resources (slides, assignments, and zoom recordings).

Test: As a teacher, try to publish a resource to a course "x". As a student, enroll to the course "x". Then try to access the board of the course x you are enrolled to, and check if you can see its published resource.

Changes Justification: Ambiguous - in the original requirement it was not mentioned who can publish a resource, we might want the teachers of a course to have this ability.

Testable- we need to know who can publish resources because it is necessary for testing this requirement (we cannot see published resources if we did not publish them).

Requirement 3

Requirement: As a teacher I can create a course board so that course boards can exist in the system. When I as a teacher create a course board, I should set a title for the course so that it'll be clear which course it is. If I do not set a title- I will get a suitable error message. As a teacher I can also add subtitles to a course board so that the course board will be more organized and "friendly" to the user.

Relevant: Course board contains a title and subtitles.

Test: As a teacher, create a course board and do not set a title-you should get an error message. Now set a title. Then add a subtitle to the course board and see and then enroll the course as a student and see if it appears in the course board.

Changes Justification: Ambiguous- in the original requirement it was not mentioned how the title is being defined(we decided that the teacher sets it before creating the course board). Complete- if there is not title the system should not let the teacher create the course board, we chose to show an error to the teacher(in the original requirement there was not an addressing of the issue). Testable- we had to create a "stage"(before creating the course board-the teacher sets a title) of setting a title of a resource to be able to test if it has a title or not.

Requirement 4

Requirement: As a user(either a student or a teacher), when I click on a resource it should be downloaded, so that I can watch zoom recording/slides/assignment on my device.

Relevant: A resource should be downloaded upon clicking on it.

Test: As a user(either student or a teacher), click on a resource and check if it has been downloaded.

Changes Justification: No changes.

Requirement 5

Requirement: As a teacher, I can update or delete resources on a course I am teaching, so that if there's a mistake in a resource I can fix it.

Relevant: Resources on the course can be updated or deleted.

Test: As a teacher, publish a resource on a course you are teaching . Then, try to update the resource and check if it has been updated. Finally try to delete it and check if it has been deleted.

Changes Justification: Ambiguous . We might want only teachers who teaches the course to have the ability of updating a resource and deleting it.

Requirement 6

Requirement: As a teacher I can limit one resource or a group of resources to a group of students or by a Copyrights Agreement condition, so that only the relevant students can see the resource and so that the students won't share a resources they mustn't.

As a student I can see only the resources that I am permitted to see. If a resource is limited by a Copyrights Agreement condition, I should accept it before I can see the resource.

Relevant: Resource access can be limited to a group of students, and can be limited by a Copyrights Agreement condition. A teacher can limit one resource or group of resources.

Test: As a student(let's say y), enroll to course "x". As a teacher, publish three resources in course "x": one resource will be limited for all the student except y, second resource will be limited for y only and the last resource will be limited by a Copyrights Agreement condition.

A student y, I should be able to see at first only the second resource. In order to see the last resource, I have to accept the Copyrights Agreement condition and the I shouldn't be able to see the first resource.

Then, try as a teacher to limit two new resources at one time so that y can't access them and check as student y if he can access them or not.

Changes Justification: Complete. The original requirement doesn't mention what happens from a student perspective when a teacher limits a resource or a group of resources.

Requirement 7

Requirement: Each resource has a field of a title so that it's clear what is the resource.. When a teacher publishes a resource the teacher should set a title for the resource. If a teacher tries to publish a resource without setting a title, the teacher will get a suitable error message.

Relevant: Each resource should contain a title.

Test: As a teacher, try to publish a resource without predefining a title. If you get a suitable error than the requirement is satisfied, otherwise it is not.

Changes Justification: Ambiguous- in the original requirement it was not mentioned how the title is being defined (we decided that the teacher sets it before publishing). Complete- if there isn't title the system shouldn't let the teacher publish the resource, we chose to show an error to the teacher (in the original requirement there wasn't an addressing of the issue). Testable- we had to create a "stage" (before publishing- the teacher sets a title) of setting a title of a resource to be able to test if it has a title or not.

Requirement 8

Requirement: When a student enrolls a course, he should enter his email- if he does not- he should get an error message, if he does- he should be enrolled to the course and see a message that he has been enrolled successfully. Each course holds a list of all the emails of students that are enrolled to the course. When a resource is published or updated by a teacher, all the course students would get an email about it, so the students will know about new things in the course board without the need to get into it.

Relevant: Every time a resource is published or updated, all course students would get an email about it.

Test: As a student enroll a course x, try without entering email- you are supposed to get an error, then enter an email- now you should get a message that you are enrolled successfully. Then, as a teacher, publish a resource and update it. As the student you should get two emails about the publish and update of the resource.

Changes Justification: Ambiguous- in the original requirement it is not clear how the email of each student in a course should be known to the course- we chose to treat it in the registration of the course. Complete- we should now make sure that the student enters the mail in the registration, so we dealt with it by viewing an error message to the student in such case.

Quizzes:

Requirement 1

Requirement: As a teacher, I can add quizzes to a course board if the quiz contains more than one question so that empty quiz won't be published. If it doesn't, I'll get an appropriate error message.

Relevant: Quizzes can be added to a course, where each quiz must have more than one question before it can be published.

Test: As a teacher, try to add a quiz to a course board. If you cannot add a quiz with more than one question, the requirement is not satisfied. If you can add a quiz with less than one question and don't get an error message, then the requirement is not satisfied. Otherwise- the requirement is satisfied.

Changes Justification: Ambiguous. In the original requirement it was not clear who can add quizzes to a course board. We might want only teachers to be able to do it and not letting a student doing it. Complete- what should happen where there is not at least one question?- we chose to inform the teacher with an error message.

Requirement 2

Requirement: A quiz should have title, description, due date and publish date. So that the students can know what the quiz is about and how much time they have to answer it.

When a teacher publishes a quiz- he should predefine a title, a description and a due date. If he doesn't the system should inform him with an appropriate error message.

Relevant: The quiz has: title, description, due date, and publish date.

Test: As a teacher, try to publish a quiz without a title/description/due date/publish date. If it is possible the requirement is not satisfied, otherwise (appropriate error message)- it is satisfied.

Changes Justification: Complete- the original requirement doesn't inform us about what should happen when a quiz without the necessary field is attempted to be created- we chose to inform the relevant teacher with an error message.

Requirement 3

Requirement: As a teacher, I can edit a quiz only if no student has answered the quiz. If a student already answered the quiz, when I, as a teacher, try to edit the quiz- the system should inform me that I cannot edit the quiz with an appropriate error message.

So that an unfair situation when a student already solved a quiz and now it's been changed is impossible.

Relevant: A quiz can be edited only if no student has answered it.

Test: As a teacher publish a quiz and immediately try to edit it, if you did not succeed- the requirement is not satisfied. Else, as a student answer the quiz and then as a teacher try again to edit it, if you succeed the requirement is not satisfied and otherwise it is satisfied.

Changes Justification: Ambiguous. In the original requirement it was not clear who can edit quizzes. We might want only teachers to be able to do it and not letting a student doing it. Complete- what should happen when a teacher tries to edit a quiz after a student has answered it? - we chose to inform the teacher with an appropriate error message.

Requirement 4

Requirement: As a teacher I should predefine possible attempts number for answering a quiz (which can be one or more attempts) and a limitation of answering time for the whole quiz or for each question.

As a student, I can attempt to answer a quiz at most time as the number the teacher predefined for the quiz. If I reach the maximum possible attempts and I try to attempt answering the quiz again I'll get a suitable error message. If I exceeded the time limit of answering a question in a quiz I won't be able to change my answer for the question and my answer to the question will remain the same as it's been at the moment of time limit exceeding. If I exceeded the time limit of answering a quiz or the last question in a quiz, it will be submitted automatically.

So that a teacher can make "practice quizzes" with many attempts and a limitation with a lot of time, or alternatively "tougher" quizzes with few attempts to answer and not that many time to answer the quiz/questions.

Relevant: The number of times a student can attempt to answer the quiz is predefined by the quiz creator, and so does the answering time for the whole quiz or for each question. Quiz can be open for multiple answering sessions of the same answering attempt or could be limited to one session.

Test: As a teacher, try creating a quiz without predefining the maximum possible attempts of answering the quiz and without a time limitation(for the whole quiz and for each specific question)- if one of these is possible than the requirement is not satisfied. Now create two quizzes:

First- with limitation of time per each question and limitation of 1 possible attempt.

Second- limitation of time for the whole quiz.(and any limitation of possible attempts)

Now, as a student attempt to answer the first quiz and then exceed the limit of each question and check if you really can't change your answer for the question on each time and when you exceed the limit of time in the last question- the quiz should be submitted automatically. Then try to attempt to answer the quiz again, you should get a suitable error message.

Then, also as a student, attempt to answer the first quiz and then exceed the limit of the whole quiz, the quiz should be submitted automatically.

Changes Justification: Complete. In the original requirement it was not mentioned how the system should behave in the cases of when student exceeds the different limitations the teacher predefined.

Requirement 5

Requirement: As a teacher, I can define a quiz question to be either multiple choice question or an open-ended question

So that the students can practice different kinds of questions in a course.

Relevant: Quiz questions can be multiple choice questions or Open-ended questions.

Test: As a teacher create a quiz with two questions. Try to define the first question as open-ended question and the second as multiple-choice question. If you succeed the requirement is satisfied and otherwise it is not satisfied.

Changes Justification: Ambiguous. In the original requirement it wasn't clear who define quiz question as multiple choice/open ended question. We might want only teachers to be able to do it and not letting a student doing it.

Requirement 6

Requirement: As a teacher, I can limit open-ended questions in a quiz for a fixed number of words. As a student I can answer the question under the limit of words, when I reach the limit- I can't add any word to my answer until I remove one or more words.

So that the teacher needs to check only "concise" answers and the checking time will be reduced.

Relevant: Open-ended questions can be limited to a fixed number of words.

Test: As a teacher, publish a quiz with an open-ended question and limit the answer for a fixed number of words. As a student, answer the quiz and try to exceed the limit of words. If you succeed then the requirement isn't satisfied, otherwise-it's satisfied.

Changes Justification: Ambiguous. In the original requirement it wasn't clear who can limit open-ended questions in quizzes to a fixed number of words. We might want only teachers to be able to do it and not letting a student doing it. In addition, it wasn't clear whose answer is being limited, we might want only the students to answer the quiz.

Requirement 7

Requirement: A multiple choice quiz-question should contain at least 4 options for answer. As a teacher, when I create a quiz and define a multiple-choice question, I should set at least 4 options for answer before publishing the quiz. Otherwise- I should be informed about it with an appropriate error message.

So that multiple-choice questions won't be too easy and the students will have to choose out of more answers.

Relevant: Multiple choice questions contain at least 4 answers.

Test: As a teacher try to create a quiz with a multiple-choice question which has less than 4 options to answer. If you succeed the requirement isn't satisfied and otherwise it's satisfied.

Changes Justification: Complete- the original requirement doesn't inform us about how should the system behave when a teacher doesn't set enough options for a multiple-choice questions. We chose to inform the teacher with an appropriate error message.

Requirement 8

Requirement: As a teacher who has published a quiz, the measurement of the answering time and the changing-answers statistics (which should be done by the system) of each student who answered the quiz will be presented to me after the due date of the quiz.

So that the teacher can know how difficult was the quiz for students- if the quiz took them a lot of time and they changed answers a lot- it was probably difficult. In addition- if a student answered the quiz within few seconds and didn't change answers- he probably cheated.

Relevant: The system should measure the answering time and the changing-answers statistics and present it to the teacher after the due date.

Test: As a teacher, publish a quiz with some open-ended and multiple choice questions and a time limitation(let's say 1 hour). Now as a student attempt to answer the quiz and change your answers to questions before moving on to the next questions. Record all the changes you've done and how much time it took to finish the quiz. Then as a teacher, after the due date of the quiz, check if you can see the changing-answers statistics and the time measurement of the answering attempt above, and if the information which is presented suits the record you made while answering the quiz.

Changes Justification: No change.

Assignments:

Requirement 1

Requirement: When a student wants to submit an assignment, the submission can be via file submission box on the course board. When an assignment is submitted successfully a message will inform the student about it.

So that a student can submit an assignment and make sure his submission succeeded.

Relevant: Assignments can be submitted to the system on a file submission box on the course board.

Test: As a teacher, publish an assignment in course y. As a student enroll to course y and try to submit the assignment using the file submission box on its course board, you should get a message that informs you that the assignment was submitted successfully.

Changes Justification: Ambiguous. An assignment might be submitted by a student. Complete & Testable- what should happen when a student submits an assignment?(we chose to show him a message-which will also enable us to test the requirement).

Requirement 2

Requirement: When a student wants to submit an assignment, the assignment can be submitted by dragging the file into the box or by choosing a file by clicking on the “Choose file” button.

So that students can easily submit their files in the way they prefer.

Relevant: An assignment could be submitted by dragging the file into the box or alternatively by choosing a file from the computer by clicking on the “Choose file” button.

Test: As a student, try to submit an assignment by dragging the file into the box and then try again by choosing a file from the computer by clicking on the “Choose file” button, both of them should work (you should get a message that the assignment is submitted successfully).

Changes Justification: Ambiguous. An assignment might be submitted by a student.

Requirement 3

Requirement: Each assignment has a due date. As a student, I can submit an assignment as many times as I want as long it doesn't exceed the assignments' due date. When I, as a student, try to submit an assignment after its due date- I'll get a suitable error message.

So that a student can edit his submission and so that the graders can check the assignments after the due date.

Relevant: Student can submit an assignment as many times as she wants as long it does not exceed the submission time limit.

Test: As a student, try to submit an assignment (before its due date) a couple of times and make sure it's possible (get an appropriate message that informs you the assignment was submitted successfully). Then try to submit the assignment after the due date and check if you get a suitable error message.

Changes Justification: Ambiguous and complete. An assignment might be submitted by a student (ambiguous). In the original requirement it wasn't mentioned how the system should behave in the case of submitting an assignment after its due date (complete).

Requirement 4

Requirement: When an assignment is submitted by a student, its “submission status” should be updated to “Submitted” or “Resubmitted” respectively.

Relevant: After submitting a file the “submission status” field is updated to “Submitted” or “Resubmitted” respectively.

Test: As a student, try to submit an assignment at the first time and check if its submission status was changed to “submitted”. Then submit the assignment again and check if its submission status was updated to “resubmitted”.

Changes Justification: No change.

Requirement 5

Requirement: When an assignment is submitted by a student on the first time, his submission should appear in the submission box.

When an assignment is resubmitted by a student, the new submission replaces the previous submission in the submission box, so that only the last submission appears in the submission box.

So that only the last and updated file which was uploaded will be graded.

Relevant: The final submission is the only one that appears in the submission box.

Test: As a teacher, publish an assignment in course y. As a student enroll to course y and submit the assignment. Your submission should appear in the submission box. Now resubmit the assignment and check if now the new submission is the only submission that appears in the submission box.

Changes Justification: No change.

Requirement 6

Requirement: As a teacher I can enable submitting in groups of an assignment before publishing it. As a student, if I have an assignment to submit and submitting in groups is permitted I should choose my submission group out of list of groups before I can submit the assignment. When some students choose the same submission groups their submission box would be shared between all of them.

So that students can practice work in a team and so that the graders can check less submissions.

Relevant: Assignments can be submitted in groups, the groups members are predefined for each assignment.

Test: As a teacher, publish an assignment in course y and enable submitting in groups. Enroll to the course y as student "a" and as student "b" and choose the same submission group by both of students "a" and "b". Then submit the assignment as student "a" and check if as student "b" you can see the submitted assignment in the submission box and that the status of the assignment is "submitted". Then resubmit the assignment as student "b" and check as student "a" that the submission in the submission box is the new submission and that the submission status of the assignment has been change to "resubmitted".

Changes Justification: Ambiguous- we might want the teacher to decide whether an assignment can be submitted in groups or not. In addition- the original requirement doesn't inform us what does it mean "submitting in groups", so we made it clear and described the procedure that is needed to happen in order to submit in groups.

Requirement 7

Requirement: Each assignment submission contains a grade status. When an assignment grade is not published yet, its grade status should inform the student about it. After the assignment is checked, the grade status will be updated to the actual grade.

So that students can know their grades on the assignments.

Relevant: After the assignment is checked, the grades would be published in the system.

Test: As a student submit an assignment. At first, its grade status should inform you that the grade is not published yet. As a teacher check the assignment and set a grade. As a student again check if the assignment grade status is updated to the actual grade. If it's still informs you that the grade is not published/it's a wrong grade then the requirement isn't satisfied, otherwise it's satisfied.

Changes Justification: Complete. Testable. In the original requirement it wasn't mentioned how the system should behave while an assignment grade isn't published yet. That makes the requirement incomplete. It also makes the requirement untestable because we cannot know what the system should present if the grade hasn't been published yet.

Requirement 8

Requirement: As a student I can file an appeal at most one time for each assignment grade. When I've already filed an appeal once and try to file an appeal once again, I'll get a suitable error message.

So that students can't "spam" the appeal requests.

Relevant: Students can file an appeal at most one time for each assignment grade.

Test: As a student, try to file an appeal for an assignment grade for the first time- it should be possible. Then, try to file an appeal again- you should get a suitable error message.

Changes Justification: Complete. The way the system should react to the case of when a student files an appeal more than once for the same assignment grade was not mentioned in the original requirement.

Non-Functional Requirements:

Requirement 1(from resources)

Requirement: In the course board, a resource contains a title which should be in a bold font. That is to make the user understand what each resource is.

Relevant: Each resource should contain a title **in a bold font**.

Changes Justification: Added a reason for the requirement.

Requirement 2(from resources)

Requirement: In the course board, course resources appear under the relevant subtitle. That is to make the course board easier to read and use.

Relevant: course resources appear under the relevant subtitle.

Changes Justification: Added a reason for the requirement.

Requirement 3(from assignments)

Requirement: Assignment's checking should be integrated with plagiarism-checking tools, to prevent cheating/copying of the submitters.

Relevant: Assignment's checking should be integrated with plagiarism-checking tools.

Changes Justification: Added a reason for the requirement.