

Requirements and Specification, ESOF 328, Spring 2020
Final, April 21
Email your answers to CSchahczenski@mtech.edu by 11:00am

Honor Code

I understand that this exam is open notes, open book and open Internet, but that I am not allowed to communicate with anyone about this exam for the duration of the exam period, aside from Dr. Celia Schahczenski. I understand that this exam was written to be 90 minutes, but that I have until 11:00am to email my answers to Dr. Celia Schahczenski.

Signature or Typed Name (your typed name will count as your signature)

If you have any questions during this exam I will be on Discord, checking my email and available at 406-494-7095.

1. Administrators of ACID can create outcomes and performance criteria associated with those outcomes for the programs that they administer. (3 pts.)
 - a. Business rule
 - b. User requirement
 - c. Functional requirement
 - d. Non-functional requirement which is not also a quality attribute
 - e. Quality attribute

2. Select the best category for the information: A user's manual shall be delivered with the ACID. (3 pts.)
 - a. Business rule
 - b. User requirement
 - c. Functional requirement
 - d. Non-functional requirement which is not also a quality attribute
 - e. Quality attribute

3. When creating course and activity offerings, a user shall be able to select a semester for which the offerings will be created. This shall not modify the default semester. (3 pts.)
 - a. User requirement
 - b. Functional requirement
 - c. Non-functional requirement which is not also a quality attribute
 - d. Quality attribute
 - e. Design constraint

4. Select the best category for the information: Clients are typically not allowed to receive boxes before 30 days have lapse since their last box. (3 pts.)
 - a. Business rule
 - b. User requirement
 - c. Functional requirement
 - d. Non-functional requirement which is not also a quality attribute
 - e. Quality attribute

5. A context-diagram can also be called a level-0 _____. (3 pts.)
 - a. Sequence diagram
 - b. Entity-Relationship diagram
 - c. State transition diagram
 - d. Data flow diagram
 - e. Dialog map

6. Describe the difference between requirements verification and validation. Give an example activity of each for ACID. (4 pts.)

Verification – Are we building the system right?

Examples in ACID would be:

- Code inspections
- Using test-driven development
- Using continuous integration when items are checked into the repository

Overall, many of the activities we do fall in this category.

Validation – Are we building the right system?

Examples in ACID would be:

- Client meetings, reviewing decisions to see if we are documenting the correct requirements
- Showing the clients a mock-up to get their feedback on what they like and don't like about the system
- Doing a usability test, getting client feedback on whether we are building the right system

7. Each of the user roles (Department ABET Coordinator, Department Chair, etc.) represent stakeholders of ACID. Describe three other stakeholders for ACID. These other stakeholders should be distinct from the user stakeholders and from each other. (6 pts.)

- ACID developers
- ACID testers
- ABET accreditors
- Montana Tech administrators responsible for FERPA
- Students whose grades are stored in ACID

8. At the final client meeting, clients requested an:
“Audit trail for transformations (who, what, time & date)”.
(See the slide labeled “Security Suggestions” from our last client meeting, April 17th.)

Clients had requested this audit trail before. Information about the audit trail has been included in many of our use cases. Rather than repeating information about the audit trail in many use cases, a better solution is to create a single quality attribute for the audit trail. Write a SMART security quality attribute for an audit trail.

(10 pts.)

S0x. Audit trail --- This number and short phrase are not required
Each time a change is made to the data in the system, or when a major change is unsuccessfully attempted (an item or association is deleted for instance) information about that change, including:

- Username,
- Ip address,
- Time and date
- Before and after values,

shall be stored in an audit log, creating an audit trail, so this data can later be queried by a system administrative.

9. Tell what the acronym SMART stands for, and report how the quality attribute written in Question 8 is SMART. (10 pts.)

S- specific, what information is to be retained is precisely given
M – measurable, it will be possible to make a change to the system and check the audit trail to see if that change has been recorded into the system
A – attainable, it is possible to save this information in some type of data store, probably some non-sql data store
R – relevant, having an audit trail will be useful when wondering how data was changed
T – timely, this is to occur each time a change is made to the data in the system

10. At the final client meeting, clients suggested:

“uniform flow”

(See the slide labeled “Usability Suggestions” from our last meeting.)

Write a SMART usability quality attribute to capture the idea of uniform flow.

(10 pts.)

U0x. Uniform flow --- This number and short phrase are not required
In all user interactions with the system, the system shall use a consistent page layout, display uniform dialogs, buttons, input fields, notification messages, error messages, etc. Navigation will be consistent, and users will consistently be shown what changes are about to occur, and allow the user to accept or reject those changes.

11. Throughout the semester, and again at the final client meeting, clients have requested that functionality be available in ACID to upload metric scores directly from Moodle. Moodle allows grades to be exported (and imported) in a number of formats. Here is the Moodle interface for exporting to an Excel spreadsheet.

The user selects the items for which they want the grades exported as shown:

Excel spreadsheet

Export to Excel spreadsheet

View Setup Scales Legacy outcomes Letters Import **Export**

OpenDocument spreadsheet Plain text file **Excel spreadsheet** XML file

Grade items to be included

- Chapter 1 Synopsis
- Chapter 2 Synopsis
- Chapter 3 Synopsis
- Chapter 4 Synopsis
- Chapter 20 Synopsis
- Chapter 30 Synopsis
- Chapter 27 Synopsis
- Chapter 28 Synopsis

Giving the results:

	A	B	C	D	E	F	G	H	I	J
1	First name	Last name	Institution	Department	Email address	Chapter 20 Synopsis	Chapter 30 Synopsis	Chapter 27 Synopsis	Last downloaded from this course	
2	Justin	Bak			jbak@mte	100	100	100	1587427175	
3	Kaleb	Bausch			kbausch@	100	100	100	1587427175	
4	Diedrich	Brush			dbrush1@	100	100	100	1587427175	
5	Carson	Fiechtner			cfiechtner@	100	100	100	1587427175	
6	Marcus	Frisbee			mfrisbee@	100	100	100	1587427175	
7	Jacob	Vesco			jvesco1@r	100	100	100	1587427175	

Create a use case “Upload metric scores from Moodle”. A template is given on the following page. (25 pts.)

Use Case Name:	Upload metric scores from Moodle		
Created By:	You	Last Updated By:	You
Date Created:	April 21, 2020	Date Last Updated:	April 21, 2020

Actors:	Department ABET coordinator, Department Admin, Faculty
Description:	User uploads metric scores into a metric offering or an activity offering
Trigger:	User is on a metric or activity offering and indicates desire to upload grades from Moodle
Preconditions:	User is logged in and is within a metric offering or an activity offering The offering contains one or more student names User has permission to add scores to that offering
Postconditions:	Unless the user exits the use case early, scores are added to the offering for one or more students
Normal Flow:	1. User is logged in and has permission to do this action 2. User is in step 2.i of the 'Score metric association' use case
Alternative Flows:	Unless the user exits this use case early, the metric association has been scored and the audit log is updated.
Exceptions:	1.0 Upload metric scores from Moodle 1. User indicates desire to upload metric scores from Moodle. 2. The appropriate 'Upload scores from Moodle' interface appears that allows the user to do the following: i. select a file from which to import the score data ii. to submit the data 3. User is shown a preview of the data they entered and is given the option to accept or discard the changes. 4. The data is shown in the 'Score metric association' interface and the use case exits.
Includes:	1.1 User doesn't submit and no changes were made (branch during step 2) 1. User navigates away from the interface, or indicates a desire to exit the interface, before a file was selected

	<p>2. Use case exits</p> <p>1.2 User doesn't submit after changes were made (branch during step 2)</p> <ol style="list-style-type: none"> 1. User navigates away from the interface or indicates a desire to exit after a file has been selected. 2. User is warned that they have unsaved changes and asked if they wish to proceed 3. User indicates preference 4. If 'yes' use case exits; if 'no' the user remains in the interface (i.e. they return to step 2). <p>1.3 User discards changes after preview (branch during step 3)</p> <ol style="list-style-type: none"> 1. User indicates a desire to discard changes made while uploading metric score from Moodle. 2. User is returned to the interface (i.e. they return to step 2). 3. Use case exits <p>1.4 User enters an invalid file (branch after step 2)</p> <ol style="list-style-type: none"> 1. User provided a file that ACID was unable to read 2. User is informed that ACID could not get the scores from the file and is returned to the interface (i.e. they return to step 2). 3. Use case exits
Priority:	Medium (grades can be uploaded manually)
Frequency of Use:	Frequently for metrics that are scored using student grades
Business Rules:	
Special Requirements:	PI's are always associated with SOs

12. Write one or more functional requirements for the use case “Upload metric scores from Moodle” which you just wrote. (10 pts.)

R01. Add students to offering

Whenever a user with permission to add students to an offering is viewing an offering, and indicates a desire to add students to the offering, the system shall allow the user to add student names to the offering, either one by one or all at once via a csv file.

Rationale: The system needs to know what students are in an offering so that metrics can have scores.

Priority: High

R01. Upload metric scores from Moodle

After the user indicates a desire to upload metric scores from Moodle, the system shall generate an interface that allows them to select a file from which to import metric scores.

Rationale: In order to upload metric scores from Moodle, the user needs a way to select and read from a file that contains score data

Priority: Imperative

R02. Preview uploaded scores

After the user selects a file containing metric scores to be uploaded, the system shall read the data and preview what it read to the user. If the user accepts the data, it can be submitted.

Rationale: The user needs a way to make sure that their scores were read correctly before anything is saved to prevent unnecessary and time-consuming changes.

Priority: Imperative

13. At the final client meeting clients mentioned that, for security reasons, purging old data ought to be discussed.

Suggest a plan for purging old data from the system for our clients. (5 pts.)

There are a couple of aspects to purging data. Firstly, you would need to mark data as either temporary or permanent, as certain data elements (i.e. Student outcomes provided by ABET) likely shouldn't be purged. Secondly, you would need to associate a timestamp with all data that could be referenced to see if it needs to be purged. This could be done through either the audit log or through a field on all data.

Once these are done, you could have the system scan for any purgeable data daily/weekly/monthly and remove it based on a timeframe provided by the given department.

Tell in what section(s) of the SRS you would put information for your plan and why these sections are the best places for your plan. (5 pts.)

Tagging data with a timestamp and a temporary/permanent label could be added to Section 4. Specific Requirements as either functional requirements or quality attributes, depending on how you want to phrase them. Information on data lifespans and scan timelines could be placed in Appendix E as business rules, as these aspects of purging data are set by departments or by the college of engineering.

14. Create a feature tree for ACID.

(10 pts.)

