

**DIT045 / DAT355 Requirements and User Experience
Final Exam**

Aug 19, 2021, 14:00

Examiner/Contact Person

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Authorized Aids

- Textbook: Designing Interfaces, 2nd or 3rd Edition, Patterns for Effective Interaction Design, By Jenifer Tidwell
- Course slides and assignments.

Note: you have an open book exam and can access the internet but accessing random examples or information on the web is not recommended. You may find examples or advice which differs from course material.

Note: although the exam is open book, you are not allowed to collaborate with each other when creating answers. Any written or drawn answer which is very similar to another will be reported for plagiarism.

See announcement for detailed information on how to prepare and submit your file:
https://chalmers.instructure.com/courses/16641/discussion_topics/69559

GU Grading Scale for Exams

% Grade	GU Grading Scale
0-49%	Fail (U)
50-75%	Pass (G)
76-100%	Pass with Distinction (VG)

Chalmers Grading Scale for Exams

% Grade	Chalmers Grading Scale
0-49%	Fail
50-64%	3
65-79%	4
80-100%	5

PLEASE OBSERVE THE FOLLOWING:

- All answers must be in English. Answers must be legible and readable.
- Sort the questions in order before handing them in.
- Put the number of the question on every paper.

Part 1: Multiple Choice and Short-Answer Questions

Question 1: Multiple Choice Questions (11 points)

On your paper, write the name of the question, then the letter(s) of your chosen answer(s), e.g., 1.1: c., 1.3: a, d, e. For each question, there may be more than one correct answer. For full marks, list all the correct answers. Each correct answer listed is +1 point, each incorrect answer is -1 point.

Design Information

1.1 Which of these requirements **captures** design information and are therefore **not** well-formed requirements? In this question there may be more than one answer, list them all.

- a) **The system will use a payment gateway which connects to a merchant account**
- b) The system will allow users to rent a bicycle
- c) The bike will not be unlocked until the payment transaction has completed successfully
- d) **The system will implement an event-based architecture to satisfy rental demands**
- e) **The system will include a lock sensor to detect the presence of bikes**
- f) The system should support payment by common credit and debit cards

1.2 Which of the following definitions is correct? One or more may be correct.

- a) Exploratory creativity involves shifting the idea space (e.g., by questioning assumptions), leading to a new space of ideas
- b) Convergent creativity involves coming up with many new ideas
- c) **Exploratory creativity involves finding new ideas within the same space**
- d) Divergent creativity involves taking existing ideas and converging to an agreed upon set of new ideas
- e) **Combinatorial creativity involves finding new ideas by examining the combination of existing ideas**

1.3 Which descriptions of experimental terminology are correct? There may be more than one correct answer.

- a) **The independent variable is the influencing factor you are changing in order to see if it has an effect to the independent variable.**
- b) The independent variable is the response/effect you are observing to see if it should be attributed to the dependent variable.
- c) **Confounding factors are other influencing factors that, if left uncontrolled, won't let you prove the connection.**
- d) **The dependent variable is the response/effect you are wondering if it should be attributed to the independent variable**

1.4 Which of the following statements is correct? One or more may be correct.

- a) Domain properties are requirements, they are requirements that come from the domain.
- b) **Domain properties are not requirements, they do not have to be satisfied by the system.**
- c) **Users are stakeholders, not all stakeholders are users.**
- d) Stakeholders are users, not all users are stakeholders.
- e) Constraints are not requirements, they are properties of the domain.
- f) **Constraints are requirements, they are requirements that do not come from user needs.**

Question 2: Short-Answer Questions (14 marks)

2.1 Modeling (e.g., context diagrams, use case diagrams, goals models) is used more often as part of requirements engineering (RE) compare to user experience (UX) design. One exception is customer journey maps, which comes from the world of UX. Why are models like context diagrams, use case and goal models more typically used for RE than UX? Think of the types of models we have used in the course and what they contain. Why are customer journey maps often used in UX? (4 marks)

The models we use in the course have a broader view, focusing on who the users are and what they want, what they want to do, what sort of data they need, what qualities the system should have. RE needs this broader view. UX is more about how the users use the system, it often has a narrower, more concrete view. The models may be less appropriate for a focus on UIs.

Customer journey maps have a focus on the various types of user interfaces, the way the customer interacts with the system, so although they can also be broad, they have a more UI/interaction focus.

2.2 Name three design patterns appearing in the following UI. What is each of the three patterns used for/what are the benefits of the pattern in this example? (6 marks)

The screenshot shows a web page for 'Homesite HOME INSURANCE'. At the top, there's a navigation bar with links for 'HOME', 'PRODUCTS & SERVICES', 'CLAIMS', 'GET INSURANCE' (which is highlighted in blue), 'PLANNING & LEARNING', 'ABOUT HOMESITE', and 'QUICK LINKS'. Below the navigation, there's a 'Steps' tab and a 'About You' tab. The main content area contains several input fields for insurance information:

- 'How much personal property coverage would you like?' with a dropdown menu.
- 'Select the property coverage deductible you would like:' with a dropdown menu set to '\$250'.
- 'What limit would you like for personal liability?' with a dropdown menu set to '\$100,000'.
- 'What limits would you like for medical payments?' with a dropdown menu set to '\$1,000'.

Below these fields is a section titled 'General Property Information' with a dropdown menu for 'Number of people living in your household'. At the bottom of the form are two buttons: a grey 'Go Back' button and a yellow 'Continue →' button. In the top right corner, there's a 'McAfee SECURE TESTED DAILY 11 JAN' badge and a 'Need help?' button with a live chat icon.

(image credit: <http://ui-patterns.com/patterns/Wizard>)

Patterns

Wizard – guide the user through the process of getting insurance in clear steps

Module tabs – divide different insurance functionalities on the same site

Few hues many values – lots of red and blue, consistent colors don't overwhelm the user, make the site look more professional

Multi-level help – the live help box, also quick links, contact us. Several ways to get help in one site, gives the user some options that are embedded

Center stage – the needed insurance information is in the middle, large. Makes what you have to do obvious.

Prominent done button – the continue button is yellow, obvious, shows you clearly what to do when you are done.

Cancelability – can go back, to undo this step in the wizard.

Etc.

2.3 What is wrong with the following SRS requirements? Keeping in mind the desired qualities of requirements, list 4 quality issues found in the requirements below. (4 marks)

1. A system interface for both first and second year courses should be created
2. The interface described in requirement 1 should have a login button and should allow users to select a language
3. The system must facilitate multiple Markers marking the same assignment
4. Markers should be able to see what marking they have been assigned
5. Markers should be happy with their experience using the system
6. Markers should be able to see which assignments they have been assigned, but that have not been marked yet

2 Implementation free: contains design information (login button)

2 Singular: this requirement contains two fairly unrelated requirements

3 Ambiguous: the same assignment like all of assignment 1, or the same assignment like assignment 1 submission from group 10?

4 & 6 Consistent: in one requirements markers are assigned assignments, in others they are assigned marking

Complete: obviously the list is not complete

5 Verifiable: how do you test this?

Could be more.

Part 2: Domain Example and Long-Answer Questions

The remaining questions on the exam will relate to a problem in a case, as described below. The scenario describes the situation today and the expectations for the new system. Focus your analysis and modeling on the envisioned (to be) system, but keep in mind the problems with the way of working, trying to avoid some of the issues reported.

Employee Education

Many companies need to manage training and courses for their employees. Various systems are available to support this. Imagine that you work for the supplier of such a system. Your job is to perform requirements analysis and (some) UX design for a new system for planning and recording of courses taken by individual employees for a particular company, X.

The situation today

The current system for company X was abandoned because the system provided a poor overview and was hard to use. As a result, the manager had to plan which employees needed which course and enroll them. The manager maintains a list of all the employees. The list shows the courses taken by the employees and when they were taken. It is hard to get an overview, of course, particularly if there are more than 50 employees. It is also hard to see who needs a course in the near future.

When an employee has taken a course, the manager has to record it. They easily forget. Or they erroneously record that the employee has completed the course, when in fact the employee stayed at home because of illness.

Vision (system to be)

Around every two weeks, the manager plans whom to enroll on the next courses. For this purpose, it must be possible to see who needs the course in the near future. It would also be nice to see the courses offered in the near future to make it easier to distribute the employees over the period. In order to check that an employee has the necessary preconditions, it must be possible to see which courses the employee has completed already.

The manager must be able to record in the system which employees to enroll in which courses in the near future. Employees can be enrolled for courses by both themselves and managers, but when enrolling themselves, the enrollment must be approved by a manager before the course is taken. The employees can get information about their final enrollment in the system.

Company X has a training department which organizes, hosts, and records who has completed the courses. The training department announces the courses in the company news and online so that employees see them and can enroll.

Company X has a finance department who keeps track of internal costs. The finance division must also know how many employees took what courses and when, and how much money it takes to put on a course. The finance division creates yearly reports for managers which describe total training costs for his/her employees. They also advise on which courses are not economically viable, e.g., those which are expensive and/or who have few enrollments.

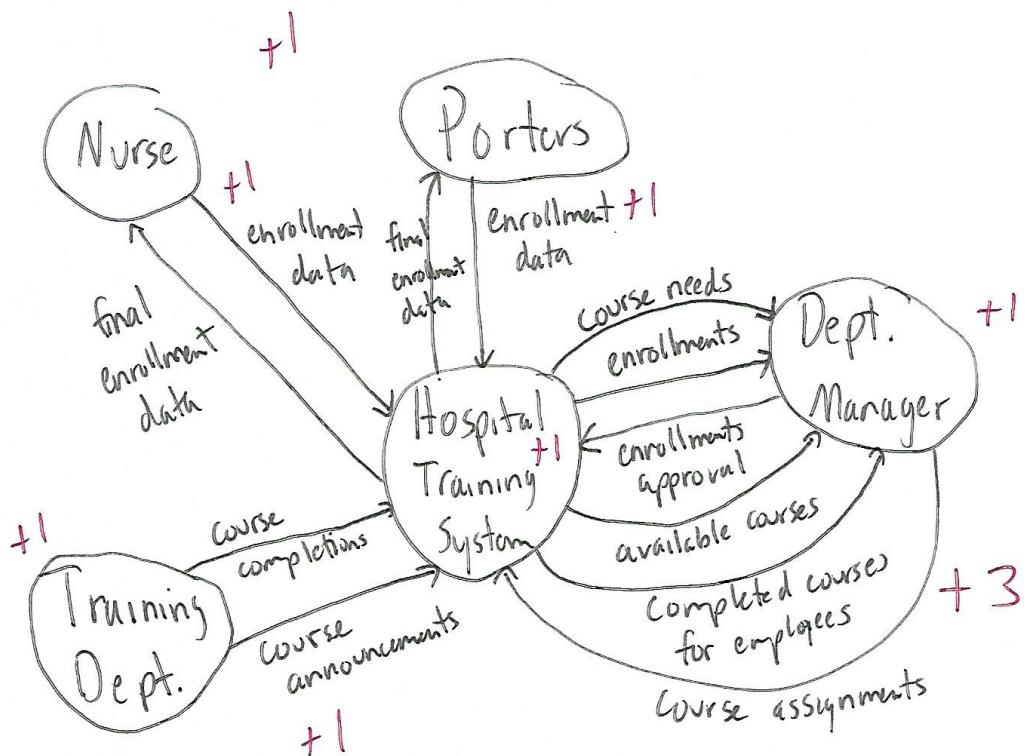
The system should protect the privacy of employees in that other employees, except the managers and training department, can't see who has taken what course.

The new system should be available by the end of 2022. It must work on the computers currently available in the company.

Question 3: Context Diagram (10 points)

For the case, draw a context diagram. Add the system actor, identify the relevant stakeholder/actor entities, and the relationships between the system and these entities, labelled with high-level inputs and outputs. Try to capture 4-5 actors, and appropriate flows. Supplement the diagram with text to explain any ambiguous or unclear parts of the model.

Note: many of the answers which follow are for the hospital staff training case, which is similar but not the same. The nurses and porters should be employees, and the finance department is new. There is a new requirement for user privacy.



Total

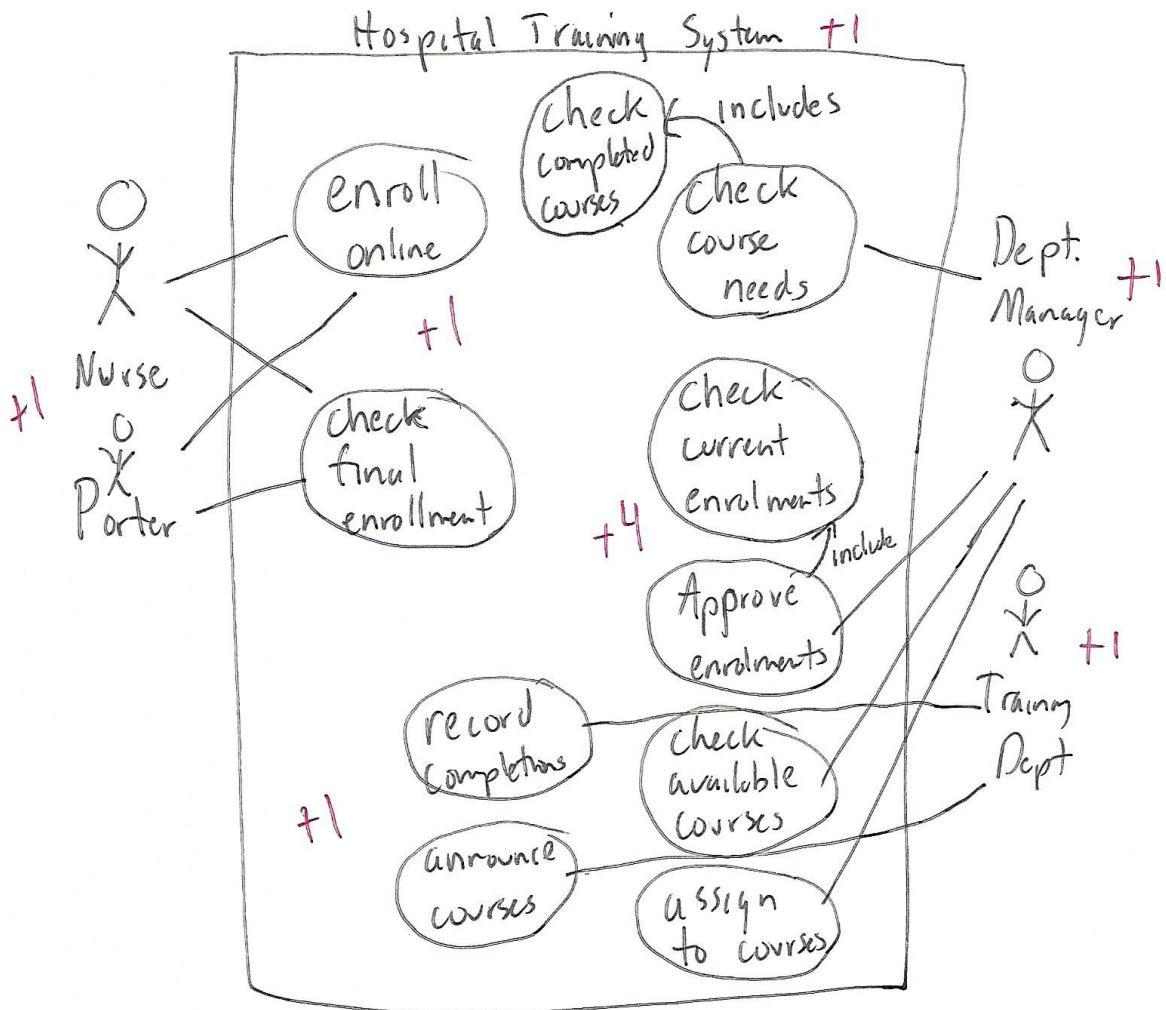
10

- Four marks for four actors + 4
- Ok if Nurse / Porters are merged together
- Six marks for flows
 - must not be in verb form + 6
 - roughly $\frac{1}{2}$ mark per flow

Question 4: Use Case Diagram (10 points)

For the case, draw a use case diagram. Capture the system and other relevant stakeholders. Identify the major use cases and relationships, both between the stakeholders and the use cases, and, if relevant,

between use cases. Try to capture 4-5 actors, and appropriate use cases. Supplement the diagram with text to explain any ambiguous or unclear parts of the model.



- Similar to marks for context diagram
- Four marks for actors
 - must have system boundary
 - can merge Nurse/porter
- Roughly half mark for each use case
 - must have association link
 - includes are optional, could use association

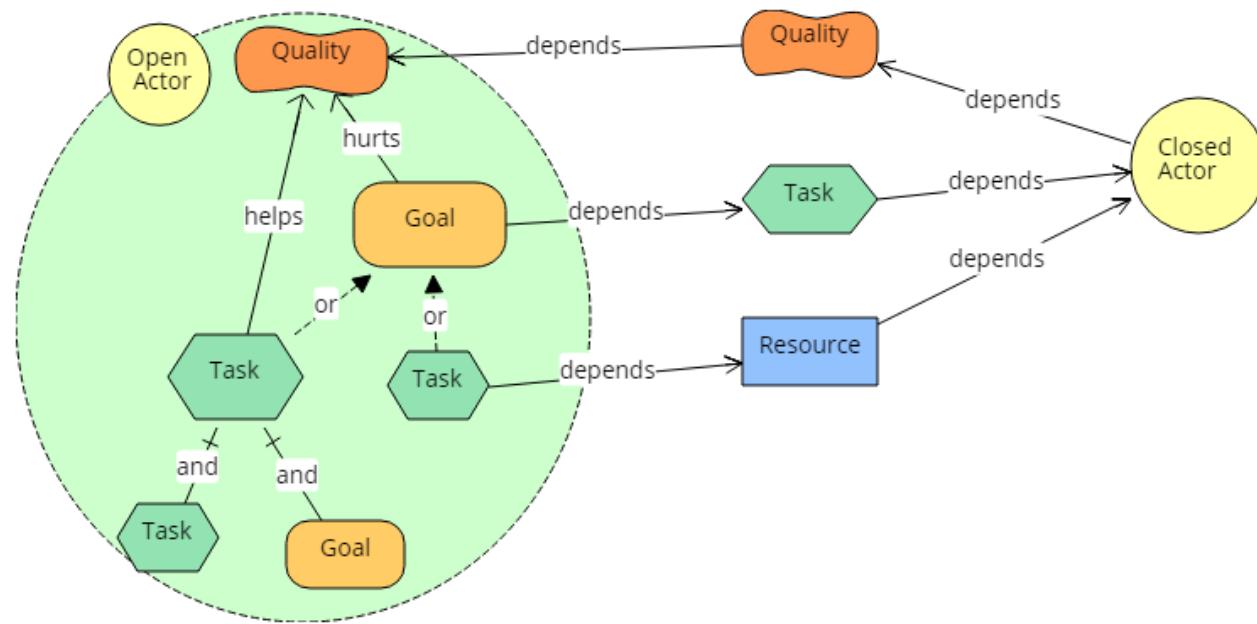
Question 5: Goal Model (15 points)

For the given case, draw a goal model. Identify the relevant actors, including the system actor. Try to capture four actors, and important dependencies between actors. Show the internal goals/tasks/resources/qualities for at least one actor, the others can be "closed" showing only dependencies to and from the actors. See the legend below for open and closed actors. For the open actor,

capture the desired goals, tasks, resources, and qualities. Add some internal relationships between these elements.

There are many elements that can be included in the model. Aim for: four actors including one open actor with an actor boundary, at least one goal, quality, resource, task, four dependency links, two contribution links and two AND/OR links. In other words, the model does not have to be complete as per the case description. It's helpful to use the information already captured in the other diagrams; however, we won't mark you on consistency between diagrams. Supplement the diagram with text to explain any ambiguous or unclear parts of the model.

Goal Model Legend (note, can use alternative shapes and labels as long as the mapping to the original concepts is clear)



Question 6: Textual Requirements (15 points)

Record requirements for the case. List four functional requirements in SRS form, two non-functional requirements in SRS form, two domain assumption in SRS form, and two constraints in SRS form. In addition, list five user stories. The user stories should be unique, i.e. not a repeat of one of the SRS requirements. Remember the desired characteristics of user stories and SRS requirements when recording your requirements.

Sample Answers, one point for each of the above required. Marks not given if the requirement does not conform to appropriate quality standards for SRS requirements or users stories.

Functional Requirements

1. The system shall allow dept. managers to check which employees have currently asked to enroll in which courses.
2. The system shall allow dept. managers to approve or disapprove requested course enrollments for employees.
3. The system shall allow dept. managers to enter a reason for the disapproval of requested course enrollments for employees.
4. The system shall allow dept. managers to check which courses are available in the system.
 - 4.1 The system shall allow dept. managers to check which courses are available in the system during a certain time frame.

5. The system shall allow training department employees to record that an employee has completed a course

Non-functional requirements

6. Enrolling in a course should be easy for nurses and porters, 80% of these employees should be able to find their desired course and enroll within 2 minutes.

(or, the function should score about 80% on a SUS test performed with 10 random users, or...)

7. Enrolling in a course should be attractive for nurses and porters, in a survey 80% of these employees should say that the new enrollment is better than the previous system.

8. Employees should get notifications of final course enrollments quickly, within 2 days of the enrollment approval by the dept. manager.

Domain Assumptions

We assume the system has access to the internet.

We assume that the rules about course prerequisites and employee course needs are known and exist.

We assume that employees have access to email.

We assume that employees read the newsletter or enters the online system.

We assume that the training dept. records course completion accurately and honestly.

Constraints

The new system should be available by the end of 2018.

The new system must work on the computers currently available in the hospital.

User stories

As a nurse, I would like to enroll in a course so that my training is improved.

As a porter, I would like to check the final status of my course enrollments, so I know what courses I am approved for and can show up.

As a dept. manager, I want to check which courses an employee has completed, so I can evaluate what courses they need.

As a dept. manager, I want to assign employees to courses so that they can have improved skills.

As a training dept. employee, I want to announce available courses, so managers and employees will know they are available and can enroll.

Question 7: UI Design & Patterns (20 points)

Draw two UI screens for the domain solution. Screens can include pop-up windows, just be clear how and why they appear. Each screen should use at least two different patterns from the Tidwell book, four different patterns in total. Each screen should implement at least two functional requirements. For each screen write: the two requirements implemented (and how, if not obvious), the two patterns implemented, and why the patterns are a good choice for the screen and its functions.

Grading: for each screen, four points for patterns (right pattern and why), four points for requirements, and two for the screen itself (readable, sensible).

Screen 1: Requirements 1, 2 - List shows which courses have been requested for each employee. Check boxes allow approval.

		R Sign Out
Employee Name	Role	
John Smith	Nurse	
Jane Smith	Porter	App Design
Courses Requested:		
DIT045 RE & UX		<input type="checkbox"/> <input checked="" type="checkbox"/>
ABC123 Injections		<input checked="" type="checkbox"/> <input type="checkbox"/>
(previous) [1] [2] [3] ... [32] [next]		+2

List Inlay

List of employees as rows in columns, open requested courses in place. Saves space all on one screen

Sign In tools

Top right sign out button for security

Pagination: for many employees

Screen 2: Requirements 4, 4.1, and var Story 4

(assign employees to courses)

Course Name	PIT045
Date Range: Start:	[]
	End: []
	<input type="button" value="Search"/>
Course Name	Start Date
DIT045 RE & UX	04/01/18
ABC123 Injections	08/02/18
ABC333 Viruses	07/03/18
:	

Employees	Add >	Enrolled
J. Smith	[]	H. Smith
R. Smith	[]	B. Smith
O. Smith	[]	
<input type="button" value="Done"/>		

Patterns: List builder to add employees to course.

Forgiving format for course name, will take number or part of name.

(cut off text) Also prominent done button in list builder.

Question 8: User Testing Tasks (5 points)

Come up with a list of five test tasks for the users to perform during usability tests for the two designed screens. Each screen should be used in at least one task. The tasks should cover some of the main use cases or requirements of your system which are implemented in the two screens. Tasks should conform to the desirable qualities of user test tasks as discussed in the lecture.

You are a nurse and would like to enrol in course ABC123: injections, try to do so with the system.

You are a porter and would like to check if your requested enrollment for DIT045 went though, try to do so with the system.

You are a department manager and would like to see which courses are available in the next two weeks, try to do so with the system (screen 2).

You are a department manager and would like to see if John Smith has requested to take ABC123, try to check this with the system (screen 1).

You are a department manager and would like to add R. Smith to course ABC 333, try to do so with the system.