University of South Australia

UniSA STEM

INFS 1026 – Systems Requirements and User Experience (SRUX)

Assignment 1: Requirements for a Paramedical Emergency Response System

Length: 2000 words or equivalent, **Weighting:** 40%,
Due Date: 11PM Friday 8 April 2021

Introduction

In this individual assignment, you will simulate gathering the requirements for an paramedical emergency response system. The requirements you gather will save lives! You will create a selection of artefacts from the requirements gathering process for the paramedics scenario presented in Appendix 1. Specifically, you will create:

- A set of categorised stakeholders;
- An interview outline;
- A set of user stories;
- A set of functional and nonfunctional requirements;
- A detailed use case; and
- An activity diagram.

This assignment will develop your skills by allowing you to put into practice what has been taught during the first 5 weeks of the course. If any aspect of the assignment specification are unclear, please seek clarification.

Learning outcomes

After completing this assignment, you will have learnt to:

- Identify project and system stakeholders for a given problem statement;
- Prioritise requirements from a stakeholder perspective;
- Describe requirements using appropriate standards; and
- Write formal use cases following appropriate standards.

Assignment and submission requirements

1. The assignment must be submitted via LearnOnline.
2. The assignment must be submitted in PDF format with a file-size less than 1024KB.
3. The assignment must be referenced where applicable following the UniSA Harvard referencing manual.
4. The assignment must document and justify any decisions and assumptions made.
5. The assignment submission must not include the scenario or question text from the specification.

Marking criteria

The marking rubric for this assignment will be available on the course website. Use the rubric to ensure you adequately address all aspects of the marking criteria. The word limit will not be checked for this assignment. The assignment will be assessed on the following criteria:

1) Completeness of solutions;
2) Clarity of expression;
3) Consistency within and between tasks;
4) Technical correctness of the methods used; and
5) Presentation, spelling, and grammar.

Task 1 – Identifying stakeholders

> *Week 1 of the course focusses on the knowledge and skills necessary to complete this task.*

1.1. Given the provided scenario, identify the **project stakeholders** and **system stakeholders**.

Not all stakeholders are listed in the scenario. Higher marks are awarded for identifying stakeholders beyond the scenario description.

1.2. For each of the system stakeholders, identify if they are **first degree**, **second degree**, or **third degree** stakeholders.

Task 2 – Interview outline

> *Week 3 of the course focusses on the knowledge and skills necessary to complete this task.*

2.1. Given the provided scenario, design an **interview outline** for an interview with the Call Takers to learn how the current process works and what some of the information requirements for the new information system would be.

Your interview outline should include the two types of questions discussed in the textbook. Specifically, it should have:

- **six** closed-ended questions, and
- **five** open-ended questions.

Ensure your interview outline follows the template presented in textbook (Figure 6–2). Ensure to address the Interviewee, Location/Medium, Objectives, and Agenda elements of the template. You do not need to fill the interview outline with mock answers. For an HD, there should be at least one question examining efficiency.

Task 3 – User stories

Week 3 and 4 of the course focusses on the knowledge and skills necessary to complete this task.

3.1. Write a set of user stories for the following users:

- Call Taker,
- Dispatcher, and
- Paramedic.

Write the set of **user stories** in the form:

> As a [role], I want to [goal] so that [benefit]

Ensure that your stories meet the INVEST criteria. Aim for at least 5–6 user stories per user.

Task 4 – Formal requirements identification

Week 2 of the course focusses on the knowledge and skills necessary to complete this task.

4.1. Identify the **functional requirements** of the system for the following aspect of the scenario presented in Appendix 1:

- Response

Consider carefully all the interactions between the user and the system. The functional requirements should be written in the form:

> FR1. The system shall […]

Ensure your requirements meet the SMART criteria.

4.2. Identify the **nonfunctional requirements** of the system for the following aspect of the scenario presented in Appendix 1:

- Response

Categorise the nonfunctional requirements by using FURPS and ensure that they meet the SMART criteria. These requirements should be written in the form:

> NFR1. The system must […]

Hint: Carefully consider issues around safety, fatigue, and accountability in this task.

4.3. **Prioritise** your functional and nonfunctional requirements using a method of your choosing. Order your requirements by your prioritisation and include a description of what method you used to prioritise the requirements. Include any completed tools used (e.g. value cost risk matrix) as an appendix to your submission.

Task 5 – Use case modelling

Week 4 of the course focusses on the knowledge and skills necessary to complete this task.

5.1. Write a fully developed "sea level" **use case** for the use case "Dispatch a case". You should formulate this use case from the Dispatch aspect of the scenario in Appendix 1. It should cover a Dispatcher receiving a case and acting upon it.

Ensure you follow the format for use cases presented in the course textbook (Figure 7-32). Ensure to address the use case from a "sea level" perspective (i.e. address what the user is trying to achieve in interacting with the system).

Task 6 – Activity diagram

Week 5 of the course focusses on the knowledge and skills necessary to complete this task.

6.1. Develop an activity diagram based on the following scenario description:

> *A Call Taker receives an emergency call from a Person. The Call Taker creates a case for the Person. The Person reports their symptoms and the Call Taker assesses the case based on those symptoms. If the case is a Category 1 or Category 2, the case is passed to a Dispatcher. Otherwise, the case is marked as a non-emergency and the scenario description ends.*
>
> *When the Dispatcher receives the case, they will assess the available Ambulance Crews. If an Ambulance Crew is available, then the Ambulance Crew will receive the case. If no Ambulance Crew is available, the Dispatcher will put a call-out to all Ambulance Crews notifying the emergency and at the same time continue to check Ambulance Crew availability. Once the dispatcher has put a call-out and an Ambulance Crew is available, the Ambulance Crew will receive the case.*
>
> *The Ambulance Crew will accept the case and then signal when en route to the case.*

Your diagram should be represented at a sufficient level of detail to capture all aspects of the above scenario. You diagram should follow the style of Figure 7-39 in the textbook. In particular, it should:

- Use swimlanes to represent the actors in the scenario description;
- Use branch and merge nodes to show branches in the scenario description;
- Use fork and join nodes to show parallel activities.
- Adhere to the UML notation presented in the textbook.

6.2. Identify the diagramming tool you used to develop the activity diagram.

Workplan

The assignment covers topics from weeks 1–5 of the course. Each task in the assignment clearly marks which week to refer to in order to complete it. A suggested workplan is:

1) Read the scenario text in Appendix 1 at least twice and make notes;
2) Perform further online research to better understand the domain the scenario addresses (paramedical response);
3) Attempt Task 1 and Task 4; and
4) Complete the remaining tasks as you reach the relevant topic in the course.

As you attempt a task, refer to that week's material. To achieve an HD, you should be revising all your artefacts (i.e. stakeholders, user stories, etc) as you progress and gain a better understanding of the domain; this will ensure your assignment is complete and consistent.

Extensions

Late submissions will not be accepted for this course unless an extension has been approved by the course coordinator. Late submissions that have not been approved will receive a mark of zero. Refer to the course outline for further information regarding extensions.

Academic Misconduct

This is an individual assignment. Your submitted files will be checked against other student's submissions, and other sources, for instances of plagiarism. Students are reminded that they should be aware of the academic misconduct guidelines available from the University of South Australia website.

Deliberate academic misconduct such as plagiarism is subject to penalties. Information about Academic integrity can be found in Section 9 of the Assessment policies and procedures manual at: http://www.unisa.edu.au/policies/manual/

Appendix 1 — Assignment Scenario

Figure 1: This scenario was collected from a Paramedic based in SA Ambulances. Source: Wikimedia Commons.

The following scenario was collected from a Paramedic based in SA Ambulances. HD assignments will research beyond the following scenario description. Ensure if you do use additional sources to reference those sources of information correctly:

You have been tasked by SA Ambulance to develop the requirements for an ambulance emergency response system. SA Ambulance reports to SA Health. SA Health is responsible for general health strategy within the state.

The system will be composed of multiple terminals and computers across a wide area network. Some of these terminals will be placed within an Ambulance. The system will be responsible for handling calls coming into 000, for triaging cases, and for dispatching Ambulance Crews to cases. The system will also need to provide policies and procedure information to Paramedics on a case.

Triage

When a person calls 000 with a medical emergency, a Call Taker at a centralised call centre receives the call. A Call Taker is responsible *triaging* the calls—this is the process of assigning the degrees of urgency to decide how to handle the case. A Call Taker is not medically trained. Call Takers must follow a decision tree (which are if-this-then-that guidelines) to triage patients. The Call Taker can also give first aid advice at various points in the call based on the decision tree. The outcome of the decision tree will be a categorisation of the case between Category 1 to Category 5. Category 1 cases are urgent (e.g. choking or cardiac arrest)—these a known colloquially as “lights and sirens” cases. Category 1 cases must be addressed within 8 minutes. Category 2 cases cover, e.g., old-person with chest pains; these cases must be addressed within 18 minutes. The rest of the categories reduce in severity and urgency.

Dispatch

Once the Call Taker has categorised the case, the case will be sent to a Dispatcher. The case should appear on the Dispatcher’s computer to be assigned to an Ambulance Crew. The Dispatcher is responsible for finding an available Ambulance Crew that can take the case.

The Dispatcher must consider the urgency of the case (e.g. Category 1 versus Category 2) as well as the closeness of the Ambulance Crew. If no one is available, the Dispatcher must ask Ambulance Crews of who can be available.

Dispatchers are centralised to Headquarters spread around the state. There are dispatcher Headquarters that handle central Adelaide, Northern, Southern, and Hills regions. Cases will be sent to the nearest Headquarters. On average, there will be 20 Ambulance Crews within a Headquarter's area.

Response

Two Paramedics form an Ambulance Crew. An Ambulance Crew is assigned an Ambulance for their shift. The Ambulance Crew will generally be on the road for their entire shift. Each ambulance will be equipped with a Mobile Data Terminal (MDT). The MDT will run the system you are developing. The MDT will receive an assigned case from dispatch and tell the Ambulance Crew where the case is. It should give an indication of the type of case (e.g. "Category 2: chest pain").

One of the Paramedics in the Ambulance Crew will acknowledge the case. They will also signal when they are on route to the case. Paramedics will assess the cases on site.

If the case is serious, the Ambulance Crew will transport the Patient to Hospital. They will turn on lights and sirens if the case is Category 1. The Ambulance Crew must assess with their general knowledge which Hospital can take the case. The system will need to inform them of various issues at the hospital; whether a hospital is ramping (increasing , delayed, CT machine is getting repaired). The system will also need to show the paramedics the latest policies and procedures when required. For example, what are the policies and procedures around handling COVID-19.

All dates and times when key events happen must be permanently recorded for accountability and for Freedom of Information Act requests.

Paramedics work in shifts. There are four shifts a day (A, B, C, and D shift) to cover 24/7 support. Accordingly, there is no station manager. Instead, Team Leaders work in the shifts and are responsible for operations during that shift. Any system must consider the tiredness of the users in these critical cases. Team Leaders need reports of Ambulance Crew usage during the shift.