UNIVERSITY
of York

BSc, BEng and MEng Degree Examinations 2019–20

DEPARTMENT OF COMPUTER SCIENCE

Software Engineering Project (SEPR)

Open Group Assessment

Module	Software Engineering Project (SEPR)
Year	2019/20
Assessment	1
Team	The Dicy Cat
Members	Michele Imbriani Dan Yates Luke Taylor Isaac Albiston Marta Cartwright Riju De Sean Corrigan
Deliverable	Requirements (Requirements Engineering Process Introduction and Requirements Tables)

In our context, we identified that there is an important distinction to be made between:

- **Direct Stakeholders** → as the customer who requested the game;
- **Indirect Stakeholders** → as the students in our cohort, prospects students in open-days and their parents, who will eventually play and assess our game.

This distinction is a very important one to make, as some customer requests (from the direct stakeholder) might conflict with the users' needs (indirect stakeholders). As a matter of fact, some of the initial features thought by the team were, as we would later discover, clashing with the client's requirement e.g. one of the early ideas for the project was (the development of) a slow-paced, low-rewarding but coding-efficient turn-based strategy game, which, however, would have considerably diverged from the client's intention of showcasing it to students and parents during open days: hence a fast paced, high-rewarding style of gameplay was agreed to be more suitable.

The team extracted the **SSON** for the project from the product brief provided [1], which was subsequently agreed with the customer to be: "Build a single-player game that involves moving fire engines between the Fire Station and the ET fortresses, avoiding ET patrols on the way, and attacking ET fortresses when the fire engines' water cannons are within shooting range''.

In the early stages of the process the team had a brainstorming session, which served us to give initial high-level, yet clear and detailed nonetheless, direction and shape to the project and to define what features the final product would and would not have, which were then proposed and checked with the customer. The team then met the customer, who did not put forward any particularly restricting additional user requirements. Among the additional user requirements proposed, we report cross-platform development, controller extension, audience-targeted development and budget and hardware constraints; the client also provided a clear prioritisation map of the aforementioned features.

Following the meeting, the team discussed and modified adequately the initial ideas -identifying and removing clashes when found- and created several high-level prototypes of the product. The way **User requirements** were elicited from the product brief was straightforward: the team identified and extracted the key information from the document in a systematic way i.e. find and clarify facts about the game, verify them against the customer's requests, turn them into requirements and finally record them in the User Requirement table.

We then proceeded to deduct **Functional and Non-functional requirements** from the user requirements by following the steps in IEEE's [2] 6.3.1.1 section: the literature provides a thorough explanation to "how the inputs to the software product should be transformed into outputs". However, the team agreed that, considering the nature of this SEPR project, many of the steps and details are not applicable -or, in some cases, it is not advisable to do so- to our context: an instance of this is the 6.3.1.6.1 *Data Base* section or the five categories (*Name, Mnemonic, Specification number, Version number* and *Source*) proposed in 6.3.1.5.3 *Software Interfaces*. Furthermore, the submission constraints of the assessment (max 3 pages) led us to the decision of omitting some potentially polluting details additions such as the *capacity section* in 6.3.1.2 *Performance Requirement*. Throughout the whole process, the team paid great attention to "not describe any design, verification, or project management details, except for required design constraints." Moreover, great emphasis was put into adhering with the fundamental ethical principles that apply to a computing professional's conduct: after completing the requirements tables, the team cross-checked the accuracy and faultlessness by using the ACM Code of Ethics [3]. We unanimously agreed that the result obtained was in line with the standards. The team also understood the importance of observing the basic rules of conduct presented in the BSC Code of Conduct [4] in order to guarantee a suitable environment for team-work and avoid clashes between team member throughout the course of the whole assessment. This not only helped to, but it also allowed the team to have a broader understanding of what working in a multi-faceted and diverse team is about.

For the Use Cases creation process, the team followed the advice presented in both textbooks "Writing Effective Use Cases"[5] and "UML Distilled"[6], but decided to not precisely and systematically stick with their guidelines, as there were many low-level ramifications and details (such as, for instance, the subdivision of use cases into Sea-level, Fish-level and Kite-level) that did not provide any more relevant information for our project. The format used, as suggested in the lecture, is text-based, as this

turned out to be a straightforward, quick, reliable and unambiguous way of listing all the necessary information and did not require the use of an additional software such as, for example, yUML.

References:

[1]University of York, Computer Science Department, "Product Brief: Kroy", https://vle.york.ac.uk/bbcswebdav/pid-3396020-dt-content-rid-8681478_2/courses/Y2019-006404/product-brief%281%29.pdf

[2]IEEE Guide for Software Requirements Specifications. New York, USA: IEEE, 1984. https://ieeexplore-ieee-org.libproxy.york.ac.uk/stamp/stamp.jsp?tp=&arnumber=278253.

[3]ACM Code of Ethics, https://www.acm.org/code-of-ethics, ACM Code 2018 Task Force, June 2018.

[4] BCS Code of Conduct, https://www.bcs.org/membership/become-a-member/bcs-code-of-conduct/, BCS, The Chartered Institute for IT, 2019.

[5]Cockburn, Alistair. Writing Effective Use Cases. Boston; London: Addison-Wesley, 2001. Print. Agile Software Development Ser.

[6]Fowler, Martin. UML Distilled: A Brief Guide to the Standard Object Modeling Language. 3rd ed. Boston: Addison-Wesley, 2004. Print.

USER REQUIREMENTS		
ID	DESCRIPTION	PRIORITY
UR_FIRETRUCKS_UNIQUE_SPEC	Each Fire Engine must have a unique spec	SHALL
UR_FIRETRUCKS_REFILL	Fire Engines need to return to the Fire Station to refill	SHALL
UR_FIRETRUCK_REPAIR	Fire Engines need to return to the Fire Station to repair	SHALL
UR_ET_UNIQUE_SPEC	Each ET fortress must have a unique spec	SHALL
UR_ET_IMPROVEMENT	Over time the ET fortresses improve and they become harder to flood	SHALL
UR_FIRETRUCK_MIN_START	There should be at least four Fire Engines	SHALL
UR_ET_MIN_START	There should be at least six different ET fortresses based (possibly loosely) on real locations in York	SHALL
UR_WIN_CONDITION	The game is won when all ET fortresses have been flooded	SHALL
UR_LOSS_CONDITION	The game is lost when all Fire Engines have been destroyed	SHALL
UR_ET_DESTROYS_STATION	After a fixed amount of time following the first attack to an ET fortress, ETs figure out where the Fire Engines are coming from and destroy the Fire Station. From that point onwards, your Fire Engines cannot be repaired or refilled	SHALL
UR_MINIGAME	There should be an embedded mini-game, completely different in style from the main game, but aligned to the theme of the main game	SHOULD
UR_DIFFICULTY_LEVEL	The game has different difficulty levels for different types of audiences	MAY
UR_CONTROLLER	The game could have controller compatibility	MAY
UR_HIGHSCORE	The game should have a record of high scores	MAY
UR_MOBILE	The game may be cross-platform transferable	MAY
UR_INSTRUCTIONS	The game should have a function at the beginning of the game to explain how it works	SHOULD
UR_GAME_TIMER	The game's length should be decided keeping in mind the target audience i.e. open days attenders, and is based on the timer that is triggered following the first attack to an ET	SHALL
UR_TARGET_AUDIENCE	The game should not have a specific target audience. i.e. Cater to different levels of ability.	SHALL
UR_COLOUR_ACCESSIBILITY	The game may have a feature for different colours schemes for enhanced accessibility e.g. high contrast colours	MAY

SYSTEM REQUIREMENTS		
FUNCTIONAL REQUIREMENTS		
ID	DESCRIPTION	USER REQUIREMENTS
SFR_ALLOWED_TO_REPAIR	Health Point drop by more than 1 shall lead to Fire-engines able to return to the station and repair	UR_FIRETRUCK_REFILL
SFR_ALLOWED_TO_REFILL	Water Tank points dropping by 1 shall lead to Fire-Engines able to return to station to refill	UR_FIRETRUCK_REPAIR
SFR_REFILL_OVER_TIME	Fire engine refills over time	UR_FIRETRUCK_REFILL
SFR_REFILL_CONSTANT	The refill rate shall be constant	UR_FIRETRUCK_REFILL
SFR_REPAIR_OVER_TIME	Fire engine repair over time	UR_FIRETRUCK_REPAIR
SFR_REPAIR_CONSTANT	The repair rate shall be constant	UR_FIRETRUCK_REPAIR

SFR_CANCEL_REPAIR	The repairing can be stopped at any point during the process	UR_FIRETRUCK_REPAIR
SFR_CANCEL_REPAIR_RESPONSE	"Fire engine is repairing" shall lead to "Cancel" option. i.e. Leaving the station.	UR_FIRETRUCK_REPAIR
SFR_CANCEL_REFILL	The refilling can be stopped at any point during the process. i.e. Leaving the station.	UR_FIRETRUCK_REFILL
SFR_CANCEL_REFILL_RESPONSE	"Fire engine is refilling" shall lead to "Cancel" option. i.e. Leaving the station.	UR_FIRETRUCK_REFILL
SFR_MOVE_WHILE_EMPTY	The fire engines shall be able to move even with empty water tank	UR_FIRETRUCK_REFILL
SFR_MOVE_WHILE_DAMAGED	The fire engines shall be able to move with HP < 100%.	UR_FIRETRUCK_REPAIR
SFR_ET_IMPROVE_CONSTANT	The ET fortresses shall improve by a constant amount of HP and damage.	UR_ET_IMPROVEMENT
SFR_ET_IMPROVE_	The ET fortresses shall increase in HP and damage dealt over time.	
SFR_HEALTH_BAR	The health bar of the fire engine that is being used should be visible at all times. It should be visual rather than jargon to be understandable to all audiences.	UR_FIRETRUCKS_REPAIR
SFR_WATER_SUPPLY_BAR	The amount of water currently contained in the tank of the fire engine that is being used should be visible at all times. Again, similar to the health bar should be visual and avoid jargon.	UR_FIRETRUCKS_REFILL
SFR_ET_LOCATIONS_NOT_CHANGEABLE	The locations of the fortresses cannot be changed by the user	UR_ET_MIN_START
SFR_FIRETRUCKS_STATS	The user will choose the type of fire truck at the beginning of the game	UR_FIRETRUCKS_MIN_START
SFR_FIRETRUCKS_SELECTION	The user will have four trucks (lives) to complete the game	UR_FIRETRUCKS_MIN_START
SFR_DESTROYED_TRUCKS	The user cannot repair trucks that have already been completely destroyed	UR_LOSS_CONDITION
SFR_MINIGAME	The minigame should be a platform-based game inspired by SuperMario and Flappy Bird	UR_MINIGAME
SFR_ETS_DESTROY_STATION	The ETs cannot be stopped from destroying the Fire Station	UR_ET_DESTROYS_STATION

NON-FUNCTIONAL REQUIREMENTS			
ID	DESCRIPTION	USER REQUIREMENTS	FIT CRITERIA
SNFR_INSTRUCTIONS	At the beginning of the game, the user should be prompted with the game instructions	UR_INSTRUCTIONS	Instructions should cover all features of the game and how they work
SNFR_TIMER	The game should be long enough to allow the user to complete it in a reasonable time withouth reaching boredom	UR_GAME_TIMER	The game should be approximately 15 minutes long
SNFR_TIME_TO_DEFEAT_ET	The ET fortresses should take increasingly more time to flood and defeat	UR_ET_IMPROVEMENT	N.A.
SNFR_TARGET_AUDIENCE	The game should have the features that	UR_TARGET_AUDIENCE	Game should be

	make it playable by a wide variety of users, including users with no previous gaming experience			easy, fast-paced, entertaining and fun enough to be
SNFR_JARGON	All user-facing messages shall be in plain English and will not use technical video-games jargon		UR_TARGET_AUDIENCE	N.A.
SNFR_HIGHSCORES	The game should support the High Scores feature		UR_HIGHSCORE	The game should have a local record of the top high scores
SNFR_ACCESSIBILITY	The game may have a way to modify the colour pallet to enhance accessibility	UR_COLOUR_ACCESSIBILITY		N.A.
SNFR_MOBILE	The game (style, movement, map visualisation) should be designed with the aim of developing a mobile version		UR_MOBILE	N.A.

CONSTRAINT REQUIREMENTS				
ID	DESCRIPTION	RISKS	ALTERNATIVES	ENVIROMENTAL ASSUMPTIONS
SCR_RUNNABLE	Game shall be runnable on every computer i.e. low-end computer	User's computer not able to support game	N.A.	User's computer can run the game
SCR_CONTROLLER	The game should be playable both with keyboards and controller	User does not have controller	Use keyboard instead	User possesses a keyboard
SCR_NO_BUDGET	The project's budget is 0	Some technologies, software, libraries might have a price to be accessed and used	Ask for University's financial support or change the technology used	All technology used is free and accessible
SCR_CLIENT_MEETING	The team should not assume that the client is available every week for meeting, and time between meeting request and date of meeting might vary	Client is never available for meeting and/or client response time is delayed	We can contact the client by email to specify certain functions the game should include.	Client will be available at least once a week to ask questions about the game
SCR_GROUP_MEETINGS	The team should be able to regularly meet up to agree on design decisions and collate work done.	Group members are not able to attend.	Set up a voice chat channel to allow for all members to discuss development when they are free for a voice chat.	Each group member has a viable way to voice chat.