

Project Description - SEP Group X2

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1. Background Description

Farmerama is a small farm right outside Horsens Kommune that deals with raising pigs in an ethical way in order to deliver the best quality meat in the local area. However, the owner has been facing issues with managing his livestock, as the pigs are often agitated and restless, with bad influences on weaning and their behaviour. The main goals of the farm's owner are to improve the health of the animals living in the farm as well as improve their welfare. Furthermore, because the farm is located close to the highway, the pigs are exposed to considerable amounts of noise pollution and exhaust gases that also lead to the pigs' agitation, thus reducing their quality of life.

The owner of Farmerama has repeatedly expressed that there are several concerns that interfere with the pigs' wellbeing, among the ones mentioned in the previous paragraph. Regarding the issues occurring inside of the barn, increased levels of CO₂ caused by lack of ventilation can lead to an increase in temperature, which in turn leads to higher levels of humidity. Higher levels of humidity lead the hay inside the barn to mould faster, which prompts losses on the owner's side as they need to change the hay more often than desired.

Moreover, the farm is currently ventilated by manually operating the windows which influences the temperature, with the changes in the temperature being too abrupt more than often, as well as light level inside the pig pen. The employees are in charge of the ventilation of the farm which is a matter of concern as they are not properly aware of the pigs' ideal needs regarding the level of CO₂. The current situation does not permit further checking on the noise level in the barn which could be problematic in regards to the pigs' welfare.

Farmerama is interested in knowing whether or not there might be a correlation between the temperature, CO₂ level and/or light level in the pig pen and the noise level. If the farm had a way to properly monitor and gather relevant data, it would be easier for their employees to take care of the animals living at the farm. In this way, the farm can provide the best living conditions such that the quadrupeds can develop and grow in a stress-free environment which can supply better first-hand products such as fresh meat and other prime materials to be exported for other resources such as the production of certain plastics, floor waxes, crayons, chalk, adhesives and fertiliser (Farm Credit of Virginias, 2016).

2. Problem Statement

The issues that Farmerama is currently dealing with relate to their inability to properly evaluate the living conditions of their livestock, thus leading to lower quality of life for the pigs and a reduced production quality.

The following questions are to be considered in order to provide a solution to the issue:

- What can be done in order to organise the amount of data in an efficient way?
- What can be done in order to differentiate between the employees, the business partners and the sustainability companies interested in the process?
- What can be done in order to monitor the conditions and welfare of the animals in the farm?
- What can be done in order to provide background information used for reports, charts and other data used by business users?

3. Definition of Purpose

The purpose of this project is to help Farmerama effectively measure the environmental conditions in terms of noise, temperature, humidity and CO₂ at the barn with the aim of giving detailed analyses that allow Farmerama to make the right decisions in order to improve the pigs' wellbeing.

4. Delimitation

The system has been agreed upon to have the following delimitations:

- not handling the logistics and inventory of the produce, including the farm's finances
- not dealing with the management of employees of the farm
- not dealing with the hygiene of the pig-pen
- not providing medical advice regarding the pigs' health

5. Methodology

Scrum:

Throughout the entire development process the SCRUM framework will be used in order to manage the workflow. Appropriate user stories will be created to make the task easier in order to monitor the life conditions of the pigs at Farmerama. The Scrum Master and the Product Owner are required to properly fulfil their responsibilities. In case they do not comply with the rules, roles will be reassigned to other individuals in order to improve the project's flow.

The Product Owner, Stefania Tomuta, is responsible for ensuring that all important features are included in the product backlog and will establish the product's direction. The Scrum Master, Khaled Hammoun, will make sure that the project process proceeds as planned and is responsible for the integration of the team. Each sprint will be of a 3-day format and will conclude with either the approval or declination by the Product Owner.

Daily meetings will be held within the team where the team communicates to the Scrum Master the difficulties they had and what they are working on. Work reflections are going to be made for future improvements. (Axosoft, 2012)

Unified Process:

Unified Process is based on the enlargement and refinement of a system through multiple iterations with cyclic feedback and adaptation. The system is developed incrementally over time, iteration by iteration, and thus this approach is also known as iterative and incremental software development. Thus, all the 4 phases will be followed. (Janis Osis, Uldis Donins, 2017)

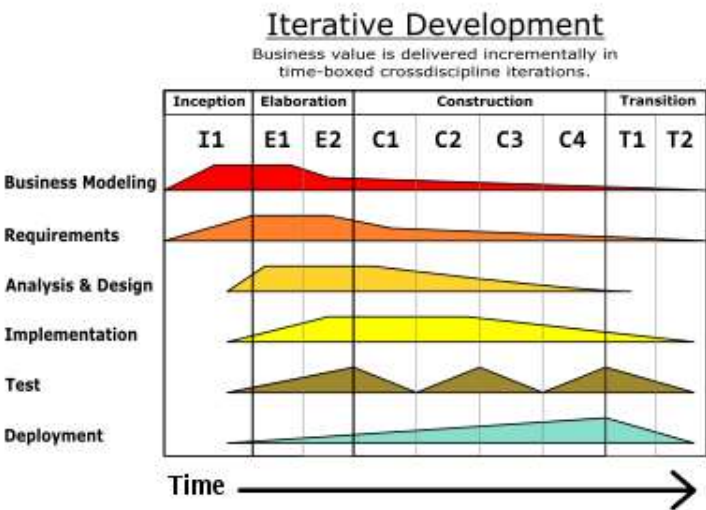


Figure 1 - Iterative Development

6. Time Schedule

Based on the project’s requirements, a period of 1680 hours (5 ECTs · 28 hours · 12 students) is assigned to the completion of the project. The time is split among 16 weeks in order to meet the deadlines and ensure the project is delivered by the 2nd of June, 2022. Furthermore, the Easter break is taken into account so there will be no time allocated to the development during week 16.

As it can be seen, the time schedule (Figure 2) follows the Unified Process phases. Taking into consideration flexibility and the possibility of unforeseen events, the schedule is designed in such a manner to allow slight modifications through the development process. Therefore, 5 weeks are reserved for Project Planning and Inception, 2 sprints for Elaboration, 3 sprints for Construction and 1 sprint for Transition. The 3-days sprint format allows the development to have a total of 6 sprints and 1 extra day.

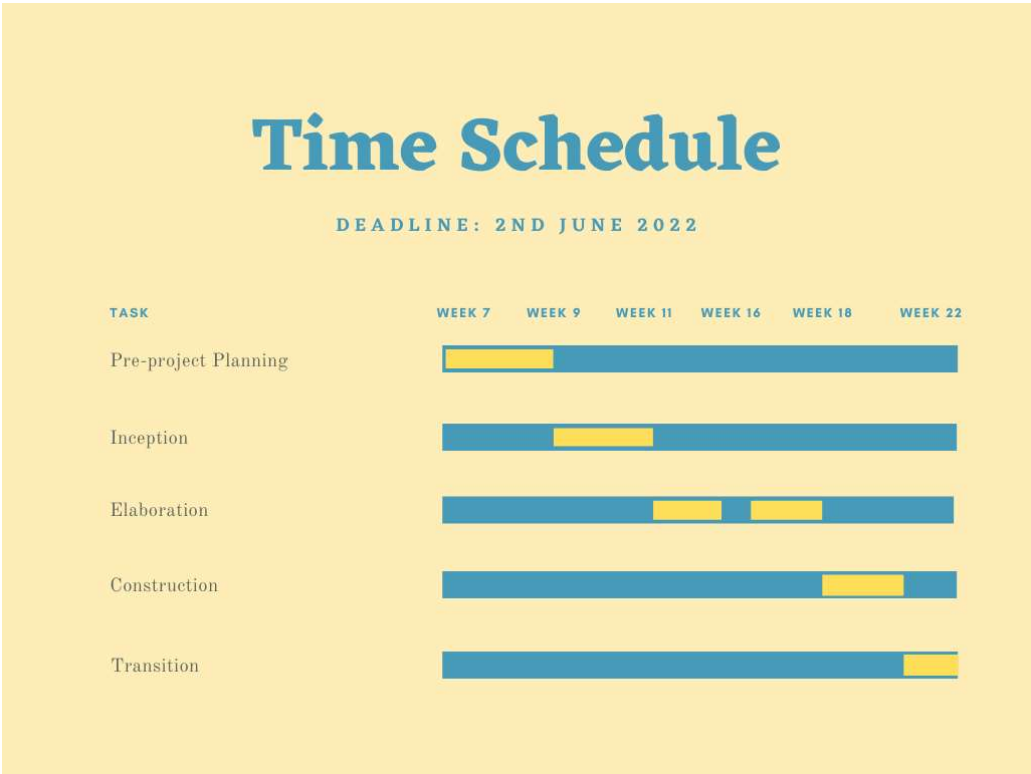


Figure 2 - Time Schedule

7. Risk Assessment

Risk	Detailed	Likelihood Scale: 1-5 5 = high risk	Severity Scale: 1-5 5 = high risk	Product of the likelihood and severity	Risk mitigation e.g. Preventive - & Responsive actions	Identifiers	Responsible
Risk 1	War	4	5	20	The team members affected should receive more support from the team	Some team members are emotionally affected because of the war	Ioan - Vlad Dirlea
Risk 2	Lockdown	5	4	20	The team will work on different online platforms (Discord, Zoom, Teams)	The lockdown will be announced by the Government	Tabita Roxana Varlan
Risk 3	The methodology is not followed	4	5	20	The team plans meetings with the supervisors	The sprints are not followed	Adriana Grecea
Risk 4	The data-gathering sensors are placed in bad positions in the farm therefore the measurements are not correct	3	5	15	Create a simple plan for correct sensor placements	Visually the sensors are being placed too close to each other or inconsistently or next to heating systems	Tomas Ondrejka
Risk 5	The business model is not understood	2	5	10	Constant feedback from the product owner	Various user stories are added in the project without the client's agreement	Agostina Mezzabotta

Risk 6	Lack of quality	2	4	8	Strong communication between the team members, especially between the developing groups	The final product does not satisfy the client's quality expectations	Morten Hansen
Risk 7	Pigs have external issues that can impact measurements . E.g. different pig illnesses can affect the pig and its environment	2	4	8	Farmers already have measurements taken against different diseases	Big changes of the gathered data in a short amount of time	Georgiana Ion
Risk 8	The LoRaWAN network used for uploading the data from IoT devices is problematic	1	5	5	Contact the responsible person of the LoRaWAN network to resolve the issue	No data is being received from the IoT device	Khaled Djamal Hammoun
Risk 9	The IoT device is out of battery and not gathering data anymore	1	5	5	Check the devices and it's stats after a period of time	The IoT device is not sending any data	Adrian - Gabriel Vaitis
Risk 10	Bugs in the system	1	4	4	Test each implemented feature	The system behaves in an unexpected way	Luis Fernandez

Table 1 - Risk assessment

8. Sources of Information

Axosoft, 2012. *Intro to Scrum in Under 10 Minutes*, 2012. [online] Available at:

<<https://www.youtube.com/watch?v=XU0IIRItyFM>>

[Accessed 2 March 2022]

Janis Osis, Uldis Donins, *Topological UML Modelling*, 2017. [online] Available at:

<<https://www.sciencedirect.com/topics/computer-science/unified-process>>

[Accessed 2 March 2022]

Farm Credit of Virginias, *Everything But the Oink...*, 2016. [online] Available at:

<<https://www.farmcreditofvirginias.com/knowledge-center/blog/everything-oink>>

[Accessed 2 March 2022]