School of Engineering Science
Software Engineering
CT10A7004 - Sustainability and IT
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Final Task

Create four exam questions and argue why connection with the course

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1. What are the differences between sustainability in ICT and sustainability by ICT?
   (a) What kind of situation can be called “sustainability in ICT”?
   (b) What kind of situation can be called “sustainability by ICT”?
   (Give the “real world” case of implementation for answering questions **(a)** and **(b)**)

   The idea of using Information and Communication Technologies (ICT) to address sustainability issues has been investigated in a number of interdisciplinary fields that combine ICT with environmental and/or social sciences. The contribution of ICT in other fields may be classified either as decreasing footprints of ICT, or increasing handprints of ICT (by decreasing footprints of other fields).

   Therefore, this question is related to the book in the sense of being a reflection for students about the differences between these two concepts, and how to implement them in the "real world".

   The part of giving real world examples will encourage critical thinking and analysis, as students will have to compare and contrast the different approaches to sustainability in ICT and sustainability by ICT. Additionally, it will require students to apply their understanding of the concepts presented in the book, which can enhance their comprehension of the material.

2. List the principles of the Agile Manifesto and how each principle can contribute to or guide sustainability?

   Agile ways of software development have become one of the modern standards of software development. Two of the most influential Agile Manifesto communities, the Agile Alliance and the Scrum Alliance's vision, have promised sustainability through agile development. Thus, the ninth chapter of the book is dedicated to the steps of how the Agile Manifesto contributes to sustainability.

   This rationale comes from the advantage of agile for breaking down problems and using an inspect and adapt approach to simplify them. Because taking all three dimensions of sustainability (social, economic, and environmental) into account leads to higher complexity, so, an Agile approach will be useful for addressing this complexity.

   Therefore, this question is related to the book in the sense of reflecting students on how they can apply the Agile Manifesto for fulfilling sustainability functionality in the system they will build in the future.

3. Recall one Software Engineering course that you have taken before that has final projects as the grading criteria.
   Give a short description of the project that you did, and then reflect how you can integrate sustainability into these final projects.
   Do a simple impact analysis for the projects and compare the impact before and after you change it. (You may follow the framework discussed in the book, another framework (such as SusAF), or you may make a simple descriptive analysis by yourself)

   Sustainable software is defined as software with minimal direct and indirect negative influences on the economy, society, human beings, and environment. However, sustainability is still considered as an additional feature, one of not so important non-functional requirements. This view makes the skill of sustainable software development rarely taught as a basic course in software engineering classes.

   Therefore, asking students to compare the impact of the same system, which is built with and without sustainability in mind, will raise students' understanding of the importance of sustainability. So, students will understand that sustainability is a key factor, not an additional feature, and should be placed in the software development process.

   Additionally, asking them to do a simple impact analysis will invoke their critical thinking on how their software products may impact sustainability. As the goal of this question is only for students to understand the importance of sustainability early-on and how sustainability can be integrated into every course of software engineering, even fundamental ones, no certain framework was stipulated. This is decided due to the assumption that the time limit of the exam may be short and students do not have time to follow completely the methodologies provided by the book or standard framework of sustainability (SusAF).

4. What is software sustainability?
   And, how can software sustainability bring a positive impact for businesses (List some of the benefits of the presence of sustainable software in helping business processes) ?

   This course aims to produce software engineers that understand the importance of sustainability for the future and current generations. Therefore, they need to have an understanding of how software can impact sustainability.

   With the assumption that at least some of the graduates will enter the business sector, this open-ended question will invoke students' mindset of why software sustainability is important in the business sector.