# **Coursework 1 (CW1)**

# **Software Development and Ethics**

**Due date:** **Friday 12th November @ 17:00 (UK time)**

**Submission:** Via Blackboard (Assessment and Feedback >> CW1)

**Weight:** 50%

## Plagiarism, Late Submission and Marking

This is an **individual assignment**. To avoid plagiarism or collusion, you **should not be working together** on this coursework. Any plagiarism or collusion will result in a serious penalty. <https://www2.le.ac.uk/offices/sas2/assessments/plagiarism/penalties>.

**Late submission will result in a penalty** as per the senate regulations. <https://www2.le.ac.uk/offices/sas2/assessments/late-submission>.

**Marking will be anonymous**. Please do not include your name in your submission. The marking rubric, also available on Blackboard, details the marking process. Please read the rubric to see how you can gain (or lose) marks.

## Introduction

You should use your knowledge of the software development process and of ethical issues in CW1. Throughout this coursework, please think of real-world examples of software and potential ethical issues that the developers may have faced. Use evidence when possible to justify the claims you make, with evidence referenced and cited correctly. For more information on this CW and referencing, please attend the CW1 unpacking session in Week 13 (or watch the recording available on Blackboard).

*When providing evidence for each question, resources found online and used should be referenced correctly, using the IEEE reference style (*[*click here for an in-depth guide*](https://ieeeauthorcenter.ieee.org/wp-content/uploads/IEEE-Reference-Guide.pdf)*). References should be listed at the end of each answer, with correct citations within the text. References do not count in the word count for each question.*

***(30%) Q1 (400-500 words):*** **Describe and explain one ethical issue that you (as a software developer) could potentially face during the “Requirements”, “Design” or “Development” phase of the production of your chosen software.**

Choose one example of software (desktop application, mobile application, website) that interests you: this could be something you have used or just something you are aware of (read ahead for details about what you will need to discuss regarding this software – this may help you to choose a suitable example).

Imagine you are a software developer working on the production of the software you have chosen. Please decide which software development methodology (either Waterfall or Agile) you are using and clearly state this. Consider the following points when writing your answer.

* Clearly state the software and development methodology you have chosen
* What is the ethical issue you may face and why is this a concern (think about the possible impact of this issue)? Recall the “code of ethics” discussed in our lectures.
* Link clearly to the development methodology you have chosen, including how your issue can be handled within that methodology (such as interaction with the client, fellow developers etc.). Good understanding of the phase of development should also be demonstrated, including how this ethical issue is **most appropriate to the phases listed above.**
* What actions could you (a developer) take to increase/decrease the impact of this issue?
* DO NOT use data privacy as your ethical issue (this is covered later in the module.

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| Me and my team are assigned to develop a social platform that will connect music artists with their listeners. The platform will be provided as software as a service to which listeners will pay a monthly fee in order to keep listening to the artists’ published songs. Moreover, the team decided to approach the Agile development methodology as it is best suitable for the project. Also, several ethical issues that are bound to be raised, can easily be resolved in agile’s early stages of lifecycle. The most concerning issue that is inevitable to any artist to audience model platform is the agreement of the distribution of wealth that is obtained by the users between the platform owners and the artists. The employers could get greedy and attempt to manipulate the artists into getting a much less pay than what they provide for, or vice versa. Furthermore, this issue contravenes the second code of ethics, “CLIENT AND EMPLOYER – Software engineers shall act in a manner that is in the best interests of their client and employer consistent with the public interest” [1]. The aforementioned issue can be addressed in the design stage of agile’s lifecycle. The employers should meet a number of artists that have a high chance of using the platform and all together should agree on the distribution of wealth. For example, a fair division could be 25 per cent for the employers to 75 per cent for the artists, the whole 75 per cent sum should be given to the artists accordingly based on the amount of plays they are getting on their songs, because the more the plays the larger the number of users that get attracted to the application. In addition, a contract should be agreed between both parties on how these percentages could change in the future as the platform gains more users. To illustrate, the application has the potential to reach millions of users in which at some point the stakeholders could not care about artists leaving their platform as there is already many users to fund the platform’s maintenance. Furthermore, they could vote in making the distribution amount more into their favour and keep exploiting less known artists who will stay on the platform no matter how much they earn. An agreement at the emergence of the application could prevent that and the distribution percentages stay ethical. Multiple copies of the contract should be archived and owned by both parties and the maintenance team, to make sure that the agreements are not broken.  D. Gotterbarn, K. W. Miller, S. Barber, S. Rogerson “Software Engineering Code of Ethics and Professional Practice” researchgate.net  <https://www.researchgate.net/publication/278417404_Software_Engineering_Code_of_Ethics_and_Professional_Practice> (Accessed Oct. 24, 2021) [1] |

***(30%) Q2 (400-500 words):*** **Now repeat Q1 (above), but this time** **describe and explain an ethical issue that you may expect to face in the “Testing” or “Maintenance” phase of the production of your chosen software.** Consider the same points listed above in Question 1 (go back and read them again now) when writing your answer to Q2.

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| I am currently working in a well knows AI company and I’m assigned to create the software for the Neuralink. The Neuralink is a tiny device which is implanted into the client’s brain during a procedure by specialised surgeons. Moreover, if the procedure goes as planned, a chipset is placed into the client’s skull to which several wires are connected to the device’s electrodes. The purpose of this device can be as severe as curing terminal diseases such as Alzheimer’s or just the automation of everyday tasks like making a phone call [1]. The team decided to approach the agile methodology to develop this software. The purpose of the agile methodology is breaking a project down to several phases. In addition, constant clear interaction between the developers and the clients is essential [2]. During the testing phase of the lifecycle, an ethical debate arises. The team’s manager claims it’s for the team’s and employer’s best interests to implant the devices to non-human animals such as chimpanzees. Furthermore, the manager’s claim disobeys the fifth code of ethics; “Software engineering managers and leaders shall subscribe to and promote an ethical approach to the management of software development and maintenance” [3]. Agile suggests strong communication between fellow developers and thus, if the team manages to communicate efficiently and value all member’s opinions no matter their position, coming into common ground would not be an issue. To give an example, an ethical approach to testing such device would be testing the device on paid humans that give their consent. A number of people that have been suffering from diseases such paralysis and Parkinson’s are already getting in touch with the stakeholders to perform clinical studies on them. Although performing tests them could raise legal complications with organisations such as the USFDA which is a is a federal agency developed by the US government to ensure the wellbeing of newly developed food and medication before they are released to the public [4]. In addition this example solution would need to be discussed with Neuralink’s stakeholders as the budget provided to pay testing candidates would be determined by them and not the developers. Agile also suggests frequent meetings between the developers and the clients, thus the methodology is more suitable for coming into a solution for that matter. To decrease the impact of the issue, me as a developer in the team should be vocal about my personal beliefs but also evaluate other member’s opinion the least biased that one could possibly do.  R. Kennedy “What Is Neuralink? How Does The Technology Work And What Can A Person Do With It?” republicworld.com  <https://www.republicworld.com/technology-news/other-tech-news/what-is-neuralink-how-does-the-technology-work-and-what-can-a-person-do-with-it.html> (Accessed Oct. 25, 2021) [1]  “What Is Agile Methodology in Project Management?” wrike.com  <https://www.wrike.com/project-management-guide/faq/what-is-agile-methodology-in-project-management/> (Accessed Oct.25, 2021) [2]  D. Gotterbarn, K. W. Miller, S. Barber, S. Rogerson “Software Engineering Code of Ethics and Professional Practice” researchgate.net  <https://www.researchgate.net/publication/278417404_Software_Engineering_Code_of_Ethics_and_Professional_Practice> (Accessed Oct. 25, 2021) [3]  W. Kenton “Food and Drug Administration (FDA)” Investopedia.com  <https://www.investopedia.com/terms/f/fda.asp> (Accessed Oct. 25, 2021) [4] |

***(20%) Q3 (300-400 words):*** Think about the actions you would take during the development lifecycle when faced with an ethical issue. **In your opinion, would you prefer to be developing software under the Waterfall or Agile (such as Scrum) methodology when handling an ethical issue? Why would you prefer this?**

* Your answer should link specifically to the handling of ethical issues, and NOT whether in general you prefer one methodology.

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| When coming across an ethical concern in software engineering, in my opinion it is much more uncomplicated to deal with when it happens if the software is being built based on the agile methodology for various reasons. First of all, identifying any ethical problem in a system is much more likely to happen because of the well-established communication between the development teams and the system’s stakeholders. Moreover, this enables the team or the clients to get to a solution for the problems faster. For example, during scrum which is a form of the agile methodology, the product owner, and the team work very tight with each other. Also, frequent scrum meetings take place as well as sprint reviews in which the team can convey the issues to the stakeholders to further discuss them [1]. In addition, in scrum, a working prototype will be produced much sooner than traditional waterfall and thus, tests can be performed on the prototype which enables the team to identify any ethical issues sooner [2]. Furthermore, fixing issues like that is much more cost effective in agile. Due to the collaboration of users in agile and the early recognition of the problems as mentioned before, the fixing cost is significantly less [3]. On the other hand, It is more difficult for all parties to handle such issues by using the Waterfall methodology. To explain, end users are required to provide a concept of the product as soon as the requirements phase, which makes it impossible for them to visualise the stakeholders’ desirable result, much less, identify ethical issues in the product. Moreover, the clients and the users do not receive a prototype unless larger parts of the project are established. This means any issues found at that point of time will cost multiples of what it would have cost to fix if found earlier on in the project development [2].  M. C. Layton “Ten Benefits of Agile Project Management” dummies.com  <https://www.dummies.com/careers/project-management/ten-benefits-of-agile-project-management/> (Accessed on Oct. 27, 2021) [1]  D. Kayser “Agile vs Waterfall: What's Best for Your Projects? [Infographic]” forecast.app  <https://www.forecast.app/blog/agile-vs-waterfall#pros-and-cons-of-agile> (Accessed on Oct. 27, 2021) [2]  M. Danziger “Why Is Agile Cost-Effective?” linkedin.com  <https://www.linkedin.com/pulse/why-agile-cost-effective-marc-danziger> (Accessed on Oct. 27, 2021) [3] |

***(20%) Q4 (300-400 words):*** **Technology has affected society. In your opinion, is this effect more positive than negative, more negative than positive, or equally positive and negative?** Use examples (recent or historical examples – remember the “History of Computation” topic) and resources to justify your conclusion. Link your answer to Technological Determinism and/or Social Constructivism.

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| There is no doubt that technology has had a huge impact on shifts in society, both negatively and positively. In my opinion, the changes our society has made due to technology have been uniformly positive and negative.  First, what I would personally consider the largest benefit of today’s technological advancements, is how easy it has become to learn any skill. To give an example, Google is now offering certificates for computer science jobs such as Android developing. For one to obtain such certificate, they must complete a six-month course. The courses cost around 240$ depending on how quick you finish the course. In addition, google partnered with several conglomerates to ensure a large number of job positions ready for graduates to claim. Moreover, these certificate programs give opportunity for people who cannot afford a university degree financially to land their dream job in any sector. Thus, more talent is introduced to sectors such as engineering and information technology in which they advance humanity [1]. The above example supports the ideology of technological determinism, an ideology which claims that technology shapes the structure of our society [2].  Secondly, there is no uncertainty to the huge negative impact social media has caused on our society and each of us as individuals. Several studies have concluded that overconsumption of social media daily causes an increment in the risk of mental diseases on people such as depression, anxiety and suicidal thoughts. Moreover, what I believe causes these mental issues from social media is the consumer’s shattering of self-image from other people’s images and the raise of what is called fear of missing out. Furthermore, even though most of us know that the majority of the pictures on the internet are altered in order to obtain a certain liking in other people’s view, most humans get feelings of envy and worthlessness from viewing them. Finally, the phenomenon of fear of missing out also known as FOMO is highly observed in social media platforms as people like to brag about their achievements and lifestyle luxuries. This phenomenon causes people to feel like they are missing out on important experiences and opportunities leading to anxiety triggers and diminished self-esteem on individuals [3].  To conclude, technology has had a toll on society’s individuals’ mental condition but also, technology also opened many paths for people struggling in their careers by ptoviding more career opportunities and ways of qualification.  J. Bariso “How Google's New Career Certificates Could Disrupt the College Degree (Exclusive)” inc.com  [https://www.inc.com/justin-bariso/inside-googles-plan-to-disrupt-college-degree-exclusive.html](https://www.inc.com/justin-bariso/inside-googles-plan-to-disrupt-college-degree-exclusive.html%20) (Accessed on Oct. 28, 2021) [1]  J. Hallstrom “Embodying the past, designing the future: technological determinism reconsidered in technology education” link.springer.com  <https://link.springer.com/article/10.1007/s10798-020-09600-2> (Accessed on Oct. 28, 2021) [2]  L. Robinson, M. Smith “Social Media and Mental Health” helpguide.org  <https://www.helpguide.org/articles/mental-health/social-media-and-mental-health.htm>l (Accessed on Oct. 28, 2021) [3] |