**INTI International College Penang School of Computing**

**3+0 Bachelor of Science (Hons) in Computer Science, in collaboration with Coventry University, UK 3+0 Bachelor of Science (Hons) in Computing, in collaboration with Coventry University, UK**

# Coursework cover sheet

**Section A - To be completed by the student.**

|  |  |
| --- | --- |
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| CU Student ID Number: P23014826 | |
| Semester: 2 | |
| Session:  **April 2023** | |
| Lecturer:  **Puteri Nursyawati Azzuri (puteri.azzuri@newinti.edu.my)** | |
| Module Code and Title:  **4067CEM Software Design** | |
| Assignment No. / Title:  **Continuous Assessment** | % of Module Mark:  **50** |
| Hand out Date:  **12 May 2023** | Due Date:  **Task 1: 02 June 2023, by 11.59pm.**  **Task 2: 07 July 2023, by 11.59pm**  **Task 3: 23 June 2023, by 11.59pm.**  **Task 4: 23 June 2023, by 11.59pm.**  **Task 5: 23 June 2023, by 11.59pm.** |
| Penalties: No late work will be accepted. If you are unable to submit coursework on time due  to extenuating circumstances, you may be eligible for an extension. Please consult the lecturer. | |
| Declaration: I/we the undersigned confirm that I/we have read and agree to abide by the University regulations on plagiarism and cheating and Faculty coursework policies and procedures. I/we confirm that this piece of work is my/our own. I/we consent to the appropriate storage of our work for plagiarism checking.  Signature(s): *STEVENTEO* | |

# Section B - To be completed by the module leader

|  |  |  |
| --- | --- | --- |
| Intended learning outcomes assessed by this work:   1. Understand and apply appropriate concepts, tools, and techniques to each stage of the software development. 2. Understand and apply design patterns to software components in developing new software. 3. Demonstrate an understanding of project planning and working to agreed deadlines, along with professional, interpersonal skills and effective communication required for software production.   5. Demonstrate an awareness of, and ability to apply, social, professional, legal, and ethical standards as documented in relevant laws and professional codes of conduct such as that of  the Malaysian National Computer Confederation. | | |
| Marking scheme | Max | Mark |
| 1. User Story Mapping | 20 |  |
| 2. Setting up a GitHub |  |
| Repository | 10 |
| 3. Creating a Class diagram and |  |
| design pattern selection | 30 |
| 4. Creating a Prototype User |  |
| Interface and Usability Testing | 20 |
| 5. Discuss the ethical issue |  |
| related to the software | 20 |
| Total | 100 |  |

**The 4067CEM assessment should be completed as a full individual work over the course of the module. The assessment output are only judged at the end of the module and not by the expectations during that week. The assessment should be undertaken individually. All submissions will be checked against each other and the internet for possible plagiarism.**

Activities – These activities consist of **50%** of your coursework marks. It will be run throughout the semester and there will be a final submission at the end of the semester. These activities consist of activities that will be done in a software design phase.

# System

Student Business System for College.

# Task 1 – User Story Mapping (20 marks)

The first thing that you need to do is ask the user what they wished for in a system. The user here can be your friends as the system is related to them. Get at least 10 real users to get their feedback. Document their feedback. Use software like Trello to complete this activity.

Output – All the user stories, and backlog with goals, activities, and tasks. In Word format, uploaded it to GitHub.

Due – Week 9 of the semester. 02 June 2023, by 11.59 pm.

# Task 2 – Setting up a GitHub Repository (10 marks)

This is where the output of the tasks will be stored, Make sure you register an account, create a repository and your files are uploaded here and it is in an organized manner and can be easily found.

Output – GitHub Repository with Task 1, Task 3, Task 4 and Task 5 documents. Take note the date of the files will be shown so you must follow the due date of each task.

Due – It will be accessed on Week 14 of the semester. 07 July 2023, by 11.59 pm

# Task 3 – Creating a Class diagram and design pattern selection (30 marks)

Create a simple Class diagram which should consists of the Classes that might be used to represent the system and the association between them. You don’t have to declare the attributes and operations for this activity. You do have to explain the class responsibility of each class declared. You can use software like StarUML to complete this activity.

Output – A class diagram containing classes and associations. In Word format, uploaded it to GitHub.

Consider the problem and select a suitable design pattern that can be implemented on the problem. Give justification on why the design pattern was chosen. Draw the UML diagram representing your class diagram as a design pattern UML. Include all the abstract class/interface, concrete class, and inheritance (if any) used to represent the problem.

Output – UML diagram representing the design pattern. In Word format, uploaded it to GitHub. Due – Week 12 of the semester. 23 June 2023, by 11.59 pm.

# Task 4 – Creating a Prototype User Interface and Usability Testing (20 marks)

Create a Prototype User Interface (hand drawn/digital) of TWO (2) important functions of the proposed system. Come up with usability testing questions. You don’t have to carry out the test, just prepare the questions. You should indicate what you are testing for in the Usability Testing.

Output – A Prototype and Usability Testing Questions. In Word format, uploaded it to GitHub. Due – Week 12 of the semester. 23 June 2023, by 11.59 pm.

# Task 5 – Discuss the ethical issue related to the software (20 marks)

Discuss and do a critical analysis of your software in these areas, privacy concerns, intellectual property rights, and effects on society.

Output – A report in Word format, uploaded to GitHub.

Due – Week 12 of the semester. 23 June 2023, by 11.59 pm.

# Submission

All tasks needed to be documented in Word format and submitted for SafeAssign checking (Links will be provided before the due date).

Upload the document and the SafeAssign report to your GitHub repository by each task due date. Due – It will be accessed on Week 14 of the semester. 07 July 2023, by 11.59 pm

# Marking Rubric for Continuous Assessment

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **Marks Below 40%** | **Marks in the range 40 – 49%** | **Marks in the range 50 – 59%** | **Marks in the range 60 – 69%** | **Marks 70% and above** |
| **User Story** | User Story Mapping | User Story Mapping | User Story Mapping | User Story Mapping | User Story Mapping done and does capture most important activities of the system. The breakdown of the user story mapping is excellent and uses software that can assist that process (For example Trello compared to Ms.  Word). |
| **Mapping** | not done or User | done at a minimum | done and does | done and does |
| **(20 marks)** | Story copied/does  not match the exact | level and does not  capture the | capture several  important activities of | capture several  important activities of |
|  | system. | important activities of | the system. The | the system. The |
|  |  | the system. | breakdown of the | breakdown of the user |
|  |  |  | user story mapping | story mapping is good |
|  |  |  | can be improved. | and uses software that |
|  |  |  |  | can assist that |
|  |  |  |  | process (For example |
|  |  |  |  | Trello compared to |
|  |  |  |  | Ms. Word). |
| **Setting up a** | GitHub repository | GitHub repository | GitHub repository | GitHub repository exist | GitHub repository |
| **GitHub** | does not exist or | exist and some of | exist and most of the | and all of the required | exist and all of the |
| **Repository** | cannot be accessed | the required files are | required files are | files are available at | required files are |
| **(10 marks)** | or the required files  are not available at | not available at the  time of access. | available at the time  of access. However | the time of access.  However the dates for | available at the time  of access. The dates |
|  | the time of access. |  | the dates does not | some files does not | on the files follows |
|  |  |  | follow the required | follow the required | the required |
|  |  |  | deadline. | deadline. | deadline. |
| **Creating a** | The Class diagram | The Class diagram | The Class diagram | The Class diagram | The Class diagram |
| **Class diagram** | does not represent | and design pattern | and design pattern | and design pattern | and design pattern |
| **and design pattern selection (30 marks)** | the required solution (contains generic or non- related classes  such as admin), the design pattern | represent the required solution but in a very general and incomplete way.  Required classes in | represent the required solution in a partial way. A few  required classes in the design are not | represent the required solution in a satisfactory way. Most  required classes are declared. | represent the required solution in an excellent way. All  required classes are declared. |
|  | suggested is not | the design are not | declared. |  |  |
|  | suitable for the given | declared. |  |  |  |
|  | problem. |  |  |  |  |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Creating a Prototype User Interface and Usability Testing**  **(20 marks)** | No prototype were available or the measurement for the usability testing is not clear. | The prototype cover minimalist and trivial design (such as login) and the measurements for the usability testing are not clear. | The prototype cover adequate design and several measurements for the usability testing are not clear. | The prototype cover good design and most measurements for the usability testing are clear. | The prototype cover excellent design and all measurements for the usability testing are clear. |
| **Discuss the ethical issue related to the software**  **(20 marks)** | There is no discussion on the ethical issue or only the theories are pasted back for this component. | There is an attempt to discuss on the ethical issue but no critical  analysis was done | There is an attempt to discuss on the ethical issue with some critical analysis was done | There is an attempt to discuss on the ethical issue with good critical analysis. | There is an attempt to discuss on the ethical issue with excellent critical analysis. |

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**INTRODUCTION**

Ethics, originating from the Greek term "ethos" signifying "way of living," is a subdivision of philosophy focused on human behavior, particularly the actions of individuals within society. This field explores the logical basis for our moral assessments, delving into concepts of right and wrong, justice and injustice. (Treasury Board of Canada Secretariat, 2015) Adhering to a strict code of ethics in software engineering is crucial for several reasons. Firstly, it ensures that software engineers create products that benefit the public, considering the impact of their work on people's lives and avoiding intentional harm. Secondly, it helps software engineers meet professional standards and encourages them to critically assess the ethical implications of their projects, fostering a sense of responsibility and accountability. Lastly, following ethical guidelines ensures the provision of high-quality software that meets specifications, safeguards privacy, and does not harm the environment, benefiting society as a whole. Overall, software engineering ethics are essential for creating software that positively impacts individuals and upholds professional standards. (BrierCook, 2022) In this assignment, the topics of privacy concerns, intellectual property rights, and their impact on society will be examined.

**PRIVACY CONCERNS**

In today's world, social media apps have become a daily habit for many people. While these apps are free, users actually pay with their personal information. For example, Snapchat collects data such as user names, location, and friend connections, which is stated in their privacy policy. This data is used for targeted advertising, as it allows advertisers to reach specific audiences with personalized ads. It's important for users to understand the implications of sharing their information and to review privacy settings regularly. Striking a balance between personalized experiences and user privacy is a challenge, but with awareness and proactive decision-making, individuals can navigate social media while safeguarding their privacy.

The significance of data privacy has risen considerably in the realm of software development. With the intersection of consumer rights and the rising occurrence of data breaches, it has become crucial for businesses to handle customer information appropriately to ensure success. Failing to comply with data privacy regulations can result in financial losses, wasted time, damaged to reputation, and numerous other negative consequences for your business. (MercuryWorks, 2022) In this Student Business System, data collection from the user includes personal information, financial data, and other relevant details. The collection of personal information is necessary during the signup process, while financial data is required for payment purposes. The potential privacy risks associated with the collection and utilization of this data can pose harm to the user. For instance, if financial data were to be leaked, it could result in monetary losses for the user.

In Malaysia, the Personal Data Protection Act (PDPA) 2010 plays a pivotal role in protecting user privacy. It sets out several key principles that organizations must adhere to when processing personal data. These principles include:

1. General Principle: The PDPA outlines the rights and obligations of data users when processing personal data.
2. Notice and Choice Principle: Data users are required to inform individuals in writing about the processing of their personal data. This includes informing individuals about the purposes of data collection and processing, their rights to access and correct their data, contact information for inquiries or complaints, third parties with whom the data may be shared, and the option to limit data processing.
3. Disclosure Principle: Data users must obtain consent from individuals before disclosing their personal data to third parties, except for the original purpose for which the data was collected.
4. Security Principle: Data users must implement practical measures to protect personal data from unauthorized access, disclosure, modification, or destruction.
5. Retention Principle: Personal data should not be retained for longer than necessary for the purpose it was collected.
6. Data Integrity Principle: Data users are responsible for ensuring the accuracy, completeness, and up-to-date nature of the personal data they process.
7. Access Principle: Individuals have the right to access their personal data held by data users and request corrections if needed.

The development of the Student Business System for a college should address privacy concerns by incorporating principles from the Personal Data Protection Act (PDPA) 2010. These principles include the General Principle, which emphasizes lawful and fair processing of personal data with explicit consent. The Notice and Choice Principle necessitates informing individuals about data collection purposes, rights to access and correct data, and options to limit data processing. The Disclosure Principle requires obtaining consent before sharing personal data with third parties. The Security Principle focuses on implementing measures to protect data from unauthorized access or disclosure. The Retention Principle states that personal data should not be retained longer than necessary, reducing privacy risks. The Data Integrity Principle underscores the responsibility to maintain accurate and up-to-date data. The Access Principle grants individuals the right to access and correct their personal data. By adhering to these principles, the Student Business System can address privacy concerns by implementing transparent privacy notices, obtaining explicit consent, securing data, limiting data sharing, conducting regular data reviews, ensuring data accuracy, and providing access and correction options. Such measures foster trust, accountability, and compliance with legal obligations, safeguarding the privacy of students and users of the system.

**INTELLECTUAL PROPERTY RIGHTS**

Software intellectual property, referred to as software IP, encompasses computer code or programs that are legally safeguarded against unauthorized copying, theft, or any other prohibited usage. The ownership of software IP lies with the company that either developed it or obtained the rights to the code or software. Any unauthorized utilization of software IP by another party is deemed illegal. (thalesgroup) In the realm of intellectual property, there are four primary types of protection:

1. Patents: Software inventions that meet the criteria of novelty, non-obviousness, and industrial applicability may be eligible for patent protection. This grants the owner exclusive rights to the invention for a specified period, typically 20 years.
2. Copyrights: Software code, being an original work of authorship, automatically receives copyright protection. This grants the owner the exclusive rights to reproduce, distribute, display, and modify the code for a specific period, generally the author's lifetime plus 70 years.
3. Trademarks: Software products or brands can be protected by trademarks, which are distinctive symbols, names, or logos used to identify and distinguish the software in the marketplace. Trademark protection helps prevent unauthorized use of similar marks that may cause confusion among consumers.
4. Trade Secrets: Software companies can also protect valuable trade secrets related to their software, such as algorithms, formulas, or proprietary processes. Trade secret protection relies on maintaining the secrecy of the information through confidentiality measures and non-disclosure agreements.

These four types of intellectual property protection play a crucial role in safeguarding software innovations and creations, enabling companies to protect their investments, maintain a competitive edge and encourage further advancements in the software industry.

Developing a comprehensive Student Business System for College involves considering the importance of intellectual property rights. As the creators of this innovative system, it is crucial for the college to protect its intellectual property. This includes safeguarding the unique software code, design elements, and functionalities that make up the system. By applying for patents where applicable, the college can ensure that its novel technological solutions and processes are protected from unauthorized use or replication by other institutions. Copyright protection can safeguard the originality of the system's documentation, user interface and any other creative elements. Additionally, trademarks can be employed to protect the branding and name associated with the Student Business System, preventing confusion among users and distinguishing it from similar offerings. By understanding and leveraging intellectual property rights, the college can safeguard its investment in developing the Student Business System, foster innovation and establish a competitive advantage in the education technology sector.

**EFFECTS ON SOCIETY**

In today's dynamic and competitive world, empowering students with entrepreneurial skills and providing them with opportunities to engage in commerce is crucial. The development of a Student Business System for colleges not only streamlines administrative processes but also has far-reaching effects on society. This chapter explores the societal impact of a Student Business System and highlights its contributions to entrepreneurship, economic growth, skill development, collaboration, and social responsibility.

The implementation of a Student Business System encourages an entrepreneurial culture within the college community. By providing a platform for students to register their businesses, it becomes a catalyst for innovation and creativity. Students are inspired to explore their entrepreneurial potential and transform their ideas into viable ventures. This fosters a spirit of innovation that extends beyond the classroom and contributes to the growth of a vibrant startup ecosystem within the college.

The Student Business System plays a significant role in stimulating economic growth and creating job opportunities. As students establish and operate their businesses through the platform, it leads to economic activity within the college's vicinity. These student-led ventures contribute to the local economy by generating revenue, attracting investments, and creating employment opportunities. This economic growth has a ripple effect, benefiting the wider community and contributing to overall prosperity.

Engaging in business activities through the Student Business System offers students invaluable practical experience and skill development. By running their ventures, students gain hands-on experience in various aspects of business, such as marketing, finance, customer service, and project management. These real-world experiences complement theoretical knowledge acquired in classrooms, equipping students with practical skills that enhance their employability and prepare them for future careers or entrepreneurial endeavors.

The Student Business System serves as a hub for networking and collaboration among students. It brings together aspiring entrepreneurs, mentors, and potential partners or investors within the college community. Students can leverage the platform to connect with like-minded individuals, share experiences, and form partnerships. This collaborative environment nurtures knowledge-sharing, mentorship, and the exchange of ideas, promoting a culture of collaboration and innovation within the college.

The businesses registered through the Student Business System have the potential to make a positive social impact. Students may develop ventures that address social or environmental challenges, contribute to local community development, or support charitable causes. The platform provides an avenue for students to integrate social responsibility into their business models, fostering a sense of ethical entrepreneurship. This focus on social impact creates a culture of giving back within the college and inspires students to create ventures that drive positive change in society.

As students graduate and transition into professional life, the Student Business System continues to support their entrepreneurial journey. It serves as a platform for alumni to stay connected, share experiences, provide mentorship, and offer business opportunities. The strong alumni network facilitated by the system contributes to the long-term sustainability and growth of the college's entrepreneurial ecosystem. Alumni support and engagement foster a sense of community and collaboration, nurturing a supportive network for aspiring entrepreneurs beyond their college years.

The societal impact of a Student Business System in college is profound. By fostering entrepreneurship, stimulating economic growth, developing essential skills, promoting collaboration, and encouraging social responsibility, the system empowers students and contributes to the overall advancement of society. It nurtures a culture of innovation and equips students with the tools they need to succeed in the ever-evolving business landscape. As colleges embrace and implement such systems, they pave the way for a brighter future, where young entrepreneurs thrive and make meaningful contributions to their communities and beyond.

**CONCLUSION**

In conclusion, this report has explored the importance of ethics in software engineering, specifically focusing on privacy concerns, intellectual property rights, and the societal impact of a Student Business System in colleges. It highlights the need for software engineers to adhere to ethical guidelines to create products that benefit the public and meet professional standards. Privacy concerns emphasize the significance of understanding the implications of sharing personal information and implementing principles from the Personal Data Protection Act (PDPA) 2010 to safeguard user privacy. Intellectual property rights play a crucial role in protecting software innovations, and colleges can leverage patents, copyrights, trademarks, and trade secrets to establish a competitive advantage and foster innovation. The societal impact of a Student Business System is profound, as it encourages entrepreneurship, stimulates economic growth, develops essential skills, promotes collaboration, and encourages social responsibility. By implementing such systems, colleges empower students and contribute to the overall advancement of society.

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