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| **Qualification** | NCFE Level 3 Certificate | | | | | |
| **Unit** | 603/5793/9 - Coding Practices | | | | | |
| **Assessor(s)** | Lawrence Olusanya | | | | | |
| **Date issued** | 03/02/2023 | **Final deadline** | As per interim dates | | | |
| **Assignment Title** | Coding requirements, planning and design | | | **No.** | | 1 of 2 |
| **Learning aims covered** | Understand software development lifecycles, methodologies, coding standards, principles, and practices. | | | | | |
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| **Scenario** | A medium-sized company in the UK has offered you work experience with the opportunity to participate in a new software project to be developed in-house. The company specializes in organizing short-term holiday cruises in the UK and abroad for its customers. Potential holidaymakers make enquiries and reservations face-to-face, over the phone, or by sending email messages. Customers could choose from one of the six available holiday destinations, including sailing ports and twelve possible time blocks – one per calendar month. The company allows for individual and group reservations, but customers must indicate the number of people per reservation when making group bookings.  After successful reservations, customers pay via their debit, credit, or master cards. Once payment is confirmed, the company emails receipt and trip's details to the customers. The company uses a spreadsheet to store customers information and successful bookings. Recently, the company decided to automate all its business processes. As part of that initiative, the organization instructs its IT Team to develop a state-of-the-art application that customers could use remotely to make bookings and for staff to track customers' reservations. | | | | | |
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| **Task 1** | **(Tasks 1a, 1b , 1c & 1d - Completed / Outstanding)**  **Task 1a: Coding requirements & planning**  Your team manager recalled you had informed the organization, during your interview for work experience, you studied Coding Practices in college and learned about Agile Software development. As a result, you have been asked to present to the team, Agile methodologies, principles, practices, methods, and implementations.  Prepare PowerPoint slides, including speaker's note, applied to the above scenario only which:   1. Summarises the key features of a suitable Agile methodology of your choice. 2. Describe the similarities and differences between your chosen software methodology in (a) and at least two alternative suitable project methodologies. 3. Explains the strengths and weaknesses of each methodology. 4. Identifies the circumstances each above described or explained methodology become more suitable or otherwise   **This provides evidence for assessment criteria unit 01 - 1.1, 1.2,1.3,1.4**  **Task 1b: requirements gathering Completed / Outstanding**  The project team is impressed with your presentation and has informed you to help use some of the ideas in your presentation for requirement capturing.  Add to your PowerPoint slides the following information, applied to the scenario:   1. Relevant storyboards obtained from at least two customers to guide the team determines the project requirements. These customers could be your classmates, and evidence of receipt must be included. 2. Description of the terms: storyboard, epic, backlog, grooming and refinement as they relate to the scenario. 3. Explanation of alternative ways of documenting the project structure. 4. Description of the roles and responsibilities of team members during requirements capture 5. Description of the different types of business, functional, non-functional requirements relevant to the scenario above.   **This provides evidence for assessment criteria unit 01 - 2.1,2.2,2.3**  **Task 1c – Risk assessment and mitigation Completed / Outstanding**  The initial requirements have now been defined. However, the organization is concerned the software may not meet customers' needs, and inherent risks may be unmitigated. You have been tasked to address these concerns.  Create a report (Word document) which:   1. Explains what is meant by risk management in software development. 2. Describes the potential risks that could affect the project delivery. 3. Describes how to mitigate the identified risks considering the probability and impacts of risk occurrence. You may assume the probability of occurrence are not likely (20%), possible (20-40%), probable (40-60%), likely (60-80%), very likely (80-100%), and impact is either high or low. 4. Explains what is meant by a project's critical path.   **This provides evidence for assessment criteria unit 01 - 3.1,3.2,3.3,3.4**  **Task 1d – Team collaboration and conflict management - Completed / Outstanding**  The team understand that positive working relationship and conflict management are essential to resolving technical issues that may arise between project members.  As part of your Word document report,   1. Explain the importance of developing working relationships with other teams 2. Identify the benefits of developing positive working relationships with other teams and departments 3. Explain conflict management techniques that may be used for effective team collaboration 4. Explain the potential impact of ineffective working relationships with other teams and departments 5. Explain how team members can reflect on progress and identify improvements   **This provides evidence for assessment criteria unit 01 - 4.1,4.2,4.3,4.4, 4.5** | | | | | |
| **Checklist of evidence required** | **PowerPoint slides with detailed speaker note**  **Report** | | | | | |
| **Criteria covered by this task:** | | | | | | |
| **To achieve the criteria you must show that you are able to:** | | | | | **Criterion reference** | |
|  | | | | | **Unit 01** | |
| Summarise the key features of software methodologies in project management | | | | | 1.1 | |
| Describe the similarities and differences between software methodologies in project management | | | | | 1.2 | |
| Consider the strengths and weaknesses of each methodology | | | | | 1.3 | |
| Give an example of when each methodology is most suitable | | | | | 1.4 | |
| Identify the process of requirements capture | | | | | 2.1 | |
| Describe relevant terms | | | | | 2.2 | |
| Explain alternative methods of documenting requirements | | | | | 2.3 | |
| Explain what is meant by risk management | | | | | 3.1 | |
| Describe potential risks that could affect project delivery | | | | | 3.2 | |
| Describe how to reduce risk and follow risk mitigation | | | | | 3.3 | |
| Explain what is meant by a project’s critical path | | | | | 3.4 | |
| Explain the need to develop working relationships with other teams | | | | | 4.1 | |
| Identify the benefits of developing positive working relationships with other teams and departments | | | | | 4.2 | |
| Explain conflict management techniques that may be used for effective team collaboration | | | | | 4.3 | |
| Explain the potential impact of ineffective working relationships with other teams and departments | | | | | 4.4 | |
| Explain how team members can reflect on progress and identify improvements | | | | | 4.5 | |

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| **Task 2** | **Task 2a:** **Coding standards and coding principles - Interim submission 03/02/2023**  The project progresses as planned, but the team recognizes standardization is essential for collaboration. The project team decided to adopt the Google Java Coding Standard and a set of coding principles widely used in the industry today, knowing individual team members code differently. To ensure members will conform to the code format, members must demonstrate their understanding of the Google Java Coding Standard and Keep It Simple Stupid (KISS) coding principle to the project coordinator.  In a Word document report,   1. Identify the importance of this coding standard to project development. 2. Explains the potential implications of project team members following their methods instead of tried and tested coding standards. You may refer to various sections in the Google Java Coding Standard on variable naming, column length, etc., to support your explanation. 3. Explains the processes and tools (manual and automatic) that can assist the project Development team in ensuring the coding standards are followed. 4. Identify the key features of the KISS coding principles. 5. Explain the importance of the KISS coding principle, its impact on the code, and how it can benefit team members—support explanation with sample codes to evidence understanding. 6. Conclude the positive and negative implications of team member adherence to the KISS coding principle versus not following.   **These provides evidence for assessment criteria Unit 02 - 1.1, 1.2, 1.3, 2.1, 2.2,2.3**  **Task 2b: Coding review Interim deadline: Submit 10/02/2023**  The team members are additionally required to submit a report on the benefits, advantages, and disadvantages of different types of code reviews.  Extend the report to:   1. Identify different types of review that can be used within the software development team. 2. Explain the impact the code review can have on the quality and the productivity of a software development team. 3. Explain clearly why code review is an important step in the development process 4. Explain the difference between submitting and performing a coding review 5. Explain the importance of both giving and receiving feedback and the actions during and after code review activities. 6. Explain the advantages and disadvantages of pair programming & mob programming, how they can be integrated into the development process   **These provides evidence for assessment criteria Unit 02 - 3.1,3.2,3.3,3.4, 3.5,3.6**  **Task 2c: Back-end database Interim deadline: Submit 03/03/2023**  You have been asked to evidence your understanding of relational databases and query language features.  Create a PowerPoint Presentation, including speaker notes for additional explanations, which:   1. Explains 'structured data' and 'unstructured data including how structured data is organized and 'unstructured data' is stored. 2. Describes what a 'database' is, the different types of databases, the data they can store, the difference between NoSQL and relational databases, and the difference between storing data online (cloud-based) or on-premises. 3. Describes database terms: 'record', 'field' and 'key'. 4. Explains database primary and foreign keys, the differences between them, their relationship to one another, the qualities they possess and their purpose. Include an explanation of database constraints and relational integrity, why primary keys must be unique and what the term 'auto-increment' means. 5. Explain what query language is, the concept of querying a database, and describe the different ways (and places from) a query can be executed using CRUD (create, read, update, and delete) operations and stored procedures.   **This provides evidence for assessment criteria unit 02 - 4.1,4.2,4.3,4.4,4.5,4.6**  **Task 2d: Secure front-end user interface - Interim deadline: Submit 17/03/2023**  The application requires a secured front-end user interface. You have been asked to evidence your understanding of user experience (UX), user interface (UI), and security designs.  Include in the PowerPoint presentation, and the speaker notes, information which:   1. Identifies UX design elements and why they are essential whilst designing and building user interfaces. 2. Explains the difference between user experience and user interface. 3. Explains the critical skills of creative problem-solving and the role of creativity in creating good user experiences. 4. Describes tools and processes that may help during the creative process and testing new ideas. 5. Identifies UX design elements and why they are essential whilst designing and building user interfaces. 6. Explains the difference between (UX and UI) including the core concepts within each. 7. Explains the critical skills of creative problem-solving and the role of creativity in creating good user experiences. 8. Describes tools and processes that may help during the creative process and testing new ideas. 9. Explains the meaning of HCI (human-computer interaction) and why it is essential, including good and bad AI (artificial intelligence) and give sound reasoning as to why. 10. Explains the principles of interface design and how a poorly designed interface can affect a product 11. Describes what is meant by security by design and how it differs from the standard SDLC (Software Development Life Cycle), why security should be considered as early as possible, and the potential impacts of not doing so. 12. Explains methods that can be used to secure software, including data encoding, input validation, Hypertext Transport Protocol Secure), adequate password policy, handling errors correctly. 13. Identifies some of the most common security issues and threats   **This provides evidence for assessment criteria unit 02 - 5.1,5.2,5.3,5.4,5.5,5.6,6.1,6.2.6.3** | |
| **Checklist of evidence required** | PowerPoint slides with detailed speaker note.  Report. | |
| **Criteria covered by this task:** | | |
| **To achieve the criteria you must show that you are able to:** | | **Criterion reference** |
|  | | **Unit 02** |
| Identify the importance of coding standards | | 1.1 |
| Explain the consequences of not following coding standards | | 1.2 |
| Explain the processes and tools that could be used to promote coding standards | | 1.3 |
| Identify good coding principles and practices used by Software Developers | | 2.1 |
| Explain why it is important to follow good coding principles and practices | | 2.2 |
| Draw conclusions from the use of coding practices and principles | | 2.3 |
| Identify different types of coding review | | 3.1 |
| Explain why code is reviewed | | 3.2 |
| Explain why it is important to undertake a coding review | | 3.3 |
| Explain the importance of effective feedback in a coding review | | 3.4 |
| Distinguish the difference between submitting and performing a coding review | | 3.5 |
| Explain the advantages and disadvantages of pair programming & mob programming | | 3.6 |
| Explain structured data & unstructured data | | 4.1 |
| Describe what is meant by databases | | 4.2 |
| Describe the structure and key components of a database table | | 4.3 |
| Explore the use of primary and foreign keys | | 4.4 |
| Describe techniques for querying databases | | 4.5 |
| Explain the purpose of database indexing | | 4.6 |
| Identify the elements of UX (User Experience) design | | 5.1 |
| Describe the differences between UX and UI (User Interface) | | 5.2 |
| Explain the key skills required for creative problem-solving | | 5.3 |
| Describe the key methods and techniques used in creative problem-solving | | 5.4 |
| Explain the importance of information architecture and UX | | 5.5 |
| Explain the principles of good user interface design | | 5.6 |
| Describe what is meant by building security by design into software at the development stage | | 6.1 |
| Explain methods used to ensure software is secure | | 6.2 |
| Identify types of security issues and threats that can impact software development | | 6.3 |

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| **Sources of information** | <https://www.agilealliance.org/agile101/agile-basics/agile-planning-project-management/>  <https://www.agilealliance.org/agile101/agile-glossary/>  <https://www.freecodecamp.org/news/keep-it-simple-stupid-how-to-use-the-kiss-principle-in-design/>  <https://developer.apple.com/design/human-interface-guidelines/ios/overview/themes/>  <https://google.github.io/styleguide/javaguide.html> |

* **In addition: Submit your Python Code by 24/03/2023**