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| **TSC Category** | Development and Implementation | | | | | |
| **TSC Title** | Applications Development | | | | | |
| **TSC Description** | Develop applications based on the design specifications; encompassing coding, testing, debugging, documenting and reviewing and/or refining it across the application development stages in accordance with defined standards for development and security. The complexity of the application may range from a basic application to a context-aware and/or augmented reality application that incorporates predictive behaviour analytics, geo-spatial capabilities and other appropriate algorithms. The technical skill includes the analysis and possibly the reuse, improvement, reconfiguration, addition or integration of existing and/or new application components. | | | | | |
| **TSC Proficiency Description** | **Level 1** | **Level 2** | **Level 3** | **Level 4** | **Level 5** | **Level 6** |
|  |  | **ICT-DIT-3002-1.1** | **ICT-DIT-4002-1.1** | **ICT-5002-1.1** |  |
|  |  | Develop basic applications with secure features, run routine application tests, and conduct debugging to resolve errors | Plan the application development process, program applications and secure features, applying suitable debugging techniques to resolve complex errors | Lead large-scale or business-critical application development projects and explore the incorporation of analytics and advanced capabilities to enhance the application |  |
| **Knowledge** |  |  | * Application development tools and methodologies * Syntax and structures of commonly-used programming languages and their respective Application Programming Interfaces (API) * Clean coding methods and best practices * Tools and techniques required for performing coding and/or programming * Organisational standards in application development and documentation * Process of embedding user interface templates * Software tests and process for executing unit testing * Application development standards * Commonly-encountered application errors * Basic debugging tools and techniques * Security threats and vulnerabilities facing software and applications * Functional requirements of security features * Virtual machines and containerisation of application code set-up for consistant deployment and utilisation | * Software development life cycle models for applications * Broad range of application development frameworks, tools and methodologies, and their various uses * A range of programming languages and effectiveness in different contexts * Code refactoring techniques and best practices * Types of software or application testing techniques, and pros and cons of various tests * Internal and external quality, safety and security standards or benchmarks in application development * Quality assurance practices for application development review * Range of tests and testing techniques for applications * Multiple debugging techniques and tools and suitability for different contexts * Feasibility analysis for reconfiguration, integration or portability of applications * Emerging security threats and impact on software and applications * Evaluation guidelines for software and applications security * Types of security and secure features for software and applications | * Long term vision and immediate objectives of the application * Key characteristics, pros and cons of different application development methodologies * New and emerging trends in application development * Advanced programming languages and tools, and their uses in different contexts for different application features * Applicability and reusability of externally developed codes and components * Relative criticality or importance of different application components or properties * Various debugging processes and suitability for different contexts * Feasibility analysis for incorporating new, complex or advanced features or capabilities * Measures of software complexity * Industry best practices in secure software and applications development * New and emerging secure software and applications development techniques, tools and approaches * New and emerging techniques for seamless software deployment |  |
| **Abilities** |  |  | * Develop and/or program simple applications or components according to agreed specifications * Write codes that are clean, testable and maintainable * Re-use externally developed components in creation of applications * Identify possible security features required to address potential security risks and vulnerabilities * Embed user interface templates into applications according to design guidelines and specifications * Run routine software tests to identify defects, errors and/or security vulnerabiltiies * Perform unit testing of each unit of the codes to ensure that the code works according to application requirements * Apply basic debugging tools and techniques to reproduce, simplify and resolve application errors or problems * Make simple revisions and modifications to existing application * Add new application components or features, according to endorsed recommendations * Document the internal design of the application for future maintenance and enhancement * Write application programming interfaces (APIs) * Perform bundling of application code and relevant files to enhance the deployment and utilisation of the application code | * Create a project plan to guide the application development process * Determine the server, scripting and mark-up languages required to develop applications * Determine key security requirements, standards and features for the application * Develop applications in line with design specifications, utilising a range of tools, methodologies, programming, and externally developed codes * Guide team to adopt clean coding practices to ensure that codes are clean, testable and maintainable * Design templates for reusable user interface patterns for applications * Assess suitability of various software security and software testing techniques and select appropriate tests, according to the application properties of interest * Evaluate test results against desired performance, standards, and usability outcomes * Analyse application and/or security issues encountered, and determine actions required to resolve identified issues * Resolve functional, performance, and security issues in applications * Plan a series of steps which potentially includes reconfiguration, integration, removal or addition of application components to enhance the application's functionality, usability and security * Plan bundling of application code and relevant files to enhance the deployment and utilisation of the application code * Set up virtual machine instances and containerisation for the deployment and utilisation of the application code across multiple infrastructures | * Evaluate implications of new and emerging trends on application development * Plan large-scale or business-critical application development projects * Determine application development methodologies, tools, and programming languages * Manage interdependencies of multiple work streams and complexity in applications development * Establish best practices in clean coding * Establish an efficient and effective application testing process that includes vulnerability assessments and secure testing * Oversee application development approaches and plans to ensure achievement of quality, safety and security standards * Establish debugging process for application issues encountered * Review recommendations to improve the overall functionality, usability and security of applications, against cost, efficiency and viability considerations * Evaluate new technologies, secure coding and practices that will enhance security capabilities in applications development * Evaluate feasibility and incorporate predictive behaviour or data analytics, geo-spatial capabilities and other advanced features in application development |  |
| **Range of Application** | N/A | | | | | |