Level 3 - Open Systems in Computing

Level 3

Level 3, Unit 1 - Computational Thinking (10 credits)

1. understand the computational problem solving process.	2. be able to apply number systems and logic to computing problems.	3. analyse problems to create computational solutions.
1.1 consult with relevant industry professionals and academics to improve solutions. [1]	2.1 explain how digital computers can work with a full range of real numbers. [2]	3.1 find ways of making computational solutions more efficient. [3]
1.2 iteratively refine solutions to improve efficiency and effectiveness. [4]	2.2 analyse expressions in boolean logic to simplify them. [5]	3.2 analyse complex problems into simpler related components. [6]
1.3 organise data in terms of logical patterns. [7]	2.3 explain the difference between packed and unpacked binary coded decimal. [8]	3.3 work collaboratively and persistently to achieve a good computational solution. [9]
1.4 use multiple algorithms to solve complex problems. [10]	2.4 explain the relationship between binary and hexadecimal numbers. [11]	3.4 explain computational solutions in terms of sequential automated steps. [12]
1.5 demonstrate how abstractions represent complex data structures and instructions. [13]	2.5 use mathematical functions in practical algorithms. [14]	3.5 identify practical problems suitable for a computational solution. [15]

Level 3, Unit 2 - Principles of Software Engineering (10 credits)

1. understand the role of the target audience.	2. understand strategies for maintaining quality.	3. adopt suitable methods to match circumstances.

1.1 describe methods for providing feedback to users from errors in the code. [17]	2.1 explain a sound testing strategy. [18]	3.1 describe an open source community project and its methods. [19]
1.2 receive user feedback and act positively. [20]	2.2 demonstrate quality strategies through small scale projects. [21]	3.2 compare formal and agile methods. [22]
1.3 describe the rationale for release early, release often. [23]	2.3 establish clear communication channels with critical reviewers. [24]	3.3 explain the different demands of large scale and small scale projects. [25]
1.4 compare the user role in a range of software development models. [26]	2.4 identify design techniques to reduce risk. [27]	3.4 specify a documentation strategy. [28]
1.5 explain principles of user interface design. [29]	2.5 explain and demonstrate the importance of courage and persistence in solving problems. [30]	3.5 compare procedural and object oriented programming. [31]

Level 3, Unit 3 - Delivering a Software Project (10 credits)

1. plan a suitable project.	2. carry out a significant practical software project.	3. communicate project outcomes to others.
1.1 meet deadlines. [33]	2.1 produce source code that has effective embedded documentation. [34]	3.1 use IT tools to enhance communication. [35]
1.2 present the proposal to critical experts. [36]	2.2 test code regularly involving third parties. [37]	3.2 analyse issues arising and establish priorities for resolution. [38]
1.3 identify an area of interest and scope the project. [39]	2.3 use logical techniques to debug code. [40]	3.3 make a final presentation to a critical audience. [41]
1.4 make modifications as a result of feedback. [42]	2.4 produce substantial code that works effectively. [43]	3.4 gather opinions through peer review. [44]
1.5 agree and adopt the software development method. [45]	2.5 show courage and determination to overcome problems. [46]	3.5 provide regular updates on progress to a mentor. [47]

Level 3, Unit 4 - Open Systems and Community Development (10 credits)

1. understand the process of community development.

1.1 explain the importance of distributed revision control systems in community software development. [49]

1.2 explain the relationships between commercial and volunteer interests in a software development community. [52]

1.3 compare and contrast the processes of software development communities. [55]

1.4 describe Sourceforge and its role in community development. [58]

1.5 explain the principles of the Open Source Way. [61]

2. understand licensing and intellectual property.

2.1 describe and explain the freedoms associated with free and open source software. [50]

2.2 explain the terms trademark, copyleft, creative commons, and public domain. [53]

2.3 analyse the effects of digital technologies on the enforcement of intellectual property rights. [56]

2.4 explain the relationship between copyright and licensing. [59]

2.5 describe the advantages and disadvantages of software patents. [62]

3. understand commercial models for software development.

3.1 describe the fremium model for software development. [51]

3.2 describe the software as a service model. [54]

3.3 describe an advertising model to support software development. [57]

3.4 describe the perpetual license model for software development. [60]

3.5 describe the dual licensing model for software development. [63]

Level 3, Unit 5 - Computer Systems Management (10 credits)

1. set up systems.

2. support system storage and security.

3. maintain systems.

4. understand key internet systems.

1.1 solve problems in systems setup and configuration. [65]	2.1 devise and implement a backup strategy. [66]	3.1 install and remove applications. [67]	4.1 explain the role of an internet service provider. [68]
1.2 customise the display to personal preference. [69]	2.2 describe a range of storage methods and their strengths and weaknesses. [70]	3.2 set up cron jobs to automate regular procedures. [71]	4.2 explain the importance of TCP/IP. [72]
1.3 install and set up an operating system. [73]	2.3 set up and understand how to customise a firewall for network connection. [74]	3.3 provide effective support for system users. [75]	4.3 describe the terms HTML, W3C and HTTP. [76]
1.4 set up network connections. [77]	2.4 format and partition storage devices. [78]	3.4 set up a secure virtual connection to manage a system from a remote location. [79]	4.4 explain the effects of proprietary standards and lock-in. [80]
1.5 set and customise boot sequence and options. [81]	2.5 write a risk assessment for system security including passwords and malware. [82]	3.5 install software updates and dependencies. [83]	4.5 explain the function of a web server. [84]

Links
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[19] https://theingots.org/community/cpl3u2psex#3.1

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