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 use multiple algorithms to solve complex problems. [1]	2.1 analyse expressions in boolean logic to simplify them. [2]	3.1 work collaboratively and persistently to achieve a good computational solution. [3]
1.2 demonstrate how abstractions represent complex data structures and instructions. [4]	2.2 explain the difference between packed and unpacked binary coded decimal. [5]	3.2 explain computational solutions in terms of sequential automated steps. [6]
1.3 consult with relevant industry professionals and academics to improve solutions. [7]	2.3 explain the relationship between binary and hexadecimal numbers. [8]	3.3 identify practical problems suitable for a computational solution. [9]
1.4 iteratively refine solutions to improve efficiency and effectiveness. [10]	2.4 use mathematical functions in practical algorithms. [11]	3.4 find ways of making computational solutions more efficient. [12]
1.5 organise data in terms of logical patterns. [13]	2.5 explain how digital computers can work with a full range of real numbers. [14]	3.5 analyse complex problems into simpler related components. [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 compare the user role in a range of software development models. [17]	2.1 demonstrate quality strategies through small scale projects. [18]	3.1 explain the different demands of large scale and small scale projects. [19]
1.2 explain principles of user interface design. [20]	2.2 establish clear communication channels with critical reviewers. [21]	3.2 specify a documentation strategy. [22]
1.3 describe methods for providing feedback to users from errors in the code. [23]	2.3 identify design techniques to reduce risk. [24]	3.3 compare procedural and object oriented programming. [25]
1.4 receive user feedback and act positively. [26]	2.4 explain and demonstrate the importance of courage and persistence in solving problems. [27]	3.4 describe an open source community project and its methods. [28]
1.5 describe the rationale for release early, release often. [29]	2.5 explain a sound testing strategy. [30]	3.5 compare formal and agile methods. [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 make modifications as a result of feedback. [33]	2.1 test code regularly involving third parties. [34]	3.1 make a final presentation to a critical audience. [35]
1.2 agree and adopt the software development method. [36]	2.2 use logical techniques to debug code. [37]	3.2 gather opinions through peer review. [38]
1.3 meet deadlines. [39]	2.3 produce substantial code that works effectively. [40]	3.3 provide regular updates on progress to a mentor. [41]
1.4 present the proposal to critical experts. [42]	2.4 show courage and determination to overcome problems. [43]	3.4 use IT tools to enhance communication. [44]
1.5 identify an area of interest and scope the project. [45]	2.5 produce source code that has effective embedded documentation. [46]	3.5 analyse issues arising and establish priorities for resolution. [47]

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

1. understand the process of community development.

1.1 describe Sourceforge and its role in community development. [49]

1.2 explain the principles of the Open Source Way. [52]

1.3 explain the importance of distributed revision control systems in community software development. [55]

1.4 explain the relationships between commercial and volunteer interests in a software development community. [58]

1.5 compare and contrast the processes of software development communities. [61]

2. understand licensing and intellectual property.

2.1 explain the terms trademark, copyleft, creative commons, and public domain. [50]

2.2 analyse the effects of digital technologies on the enforcement of intellectual property rights. [53]

2.3 explain the relationship between copyright and licensing. [56]

2.4 describe the advantages and disadvantages of software patents. [59]

2.5 describe and explain the freedoms associated with free and open source software. [62]

3. understand commercial models for software development.

3.1 describe an advertising model to support software development. [51]

3.2 describe the perpetual license model for software development. [54]

3.3 describe the dual licensing model for software development. [57]

3.4 describe the fremium model for software development. [60]

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

Links
[1] https://theingots.org/community/cpl3u1ctx#1.1
[2] https://theingots.org/community/cpl3u1ctx#2.1
[3] https://theingots.org/community/cpl3u1ctx#3.1
[4] https://theingots.org/community/cpl3u1ctx#1.2
[5] https://theingots.org/community/cpl3u1ctx#2.2
[6] https://theingots.org/community/cpl3u1ctx#3.2
[7] https://theingots.org/community/cpl3u1ctx#1.3
[8] https://theingots.org/community/cpl3u1ctx#2.3
[9] https://theingots.org/community/cpl3u1ctx#3.3
[10] https://theingots.org/community/cpl3u1ctx#1.4
[11] https://theingots.org/community/cpl3u1ctx#2.4
[12] https://theingots.org/community/cpl3u1ctx#3.4
[13] https://theingots.org/community/cpl3u1ctx#1.5
[14] https://theingots.org/community/cpl3u1ctx#2.5
[15] https://theingots.org/community/cpl3u1ctx#3.5
[16] https://theingots.org/community/cpl3u1cti
[17] https://theingots.org/community/cpl3u2psex#1.1
[18] https://theingots.org/community/cpl3u2psex#2.1
[19] https://theingots.org/community/cpl3u2psex#3.1
[20] https://theingots.org/community/cpl3u2psex#1.2

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[24] https://theingots.org/community/cpl3u2psex#2.3
[25] https://theingots.org/community/cpl3u2psex#3.3
[26] https://theingots.org/community/cpl3u2psex#1.4
[27] https://theingots.org/community/cpl3u2psex#2.4
[28] https://theingots.org/community/cpl3u2psex#3.4
[29] https://theingots.org/community/cpl3u2psex#1.5
[30] https://theingots.org/community/cpl3u2psex#2.5
[31] https://theingots.org/community/cpl3u2psex#3.5
[32] https://theingots.org/community/cpl3u2psei
[33] https://theingots.org/community/cpl3u3dspx#1.1
[34] https://theingots.org/community/cpl3u3dspx#2.1
[35] https://theingots.org/community/cpl3u3dspx#3.1
[36] https://theingots.org/community/cpl3u3dspx#1.2
[37] https://theingots.org/community/cpl3u3dspx#2.2
[38] https://theingots.org/community/cpl3u3dspx#3.2
[39] https://theingots.org/community/cpl3u3dspx#1.3
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[41] https://theingots.org/community/cpl3u3dspx#3.3
[42] https://theingots.org/community/cpl3u3dspx#1.4
[43] https://theingots.org/community/cpl3u3dspx#2.4
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[46] https://theingots.org/community/cpl3u3dspx#2.5
[47] https://theingots.org/community/cpl3u3dspx#3.5
[48] https://theingots.org/community/cpl3u3dspi
[49] https://theingots.org/community/cpl3u4oscdx#1.1
[50] https://theingots.org/community/cpl3u4oscdx#2.1
[51] https://theingots.org/community/cpl3u4oscdx#3.1
[52] https://theingots.org/community/cpl3u4oscdx#1.2
[53] https://theingots.org/community/cpl3u4oscdx#2.2
[54] https://theingots.org/community/cpl3u4oscdx#3.2
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[61] https://theingots.org/community/cpl3u4oscdx#1.5
[62] https://theingots.org/community/cpl3u4oscdx#2.5
[63] https://theingots.org/community/cpl3u4oscdx#3.5
[64] https://theingots.org/community/cpl3u4oscdi
[65] https://theingots.org/community/cpl3u5csmx#1.1
[66] https://theingots.org/community/cpl3u5csmx#2.1
[67] https://theingots.org/community/cpl3u5csmx#3.1
[68] https://theingots.org/community/cpl3u5csmx#4.1
[69] https://theingots.org/community/cpl3u5csmx#1.2
[70] https://theingots.org/community/cpl3u5csmx#2.2
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[72] https://theingots.org/community/cpl3u5csmx#4.2
[73] https://theingots.org/community/cpl3u5csmx#1.3
[74] https://theingots.org/community/cpl3u5csmx#2.3
[75] https://theingots.org/community/cpl3u5csmx#3.3
[76] https://theingots.org/community/cpl3u5csmx#4.3
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[82] https://theingots.org/community/cpl3u5csmx#2.5
[83] https://theingots.org/community/cpl3u5csmx#3.5
[84] https://theingots.org/community/cpl3u5csmx#4.5
[85] https://theingots.org/community/cpl3u5csmi