Systems and Principles Unit Syllabus

Level 2 Creating an object oriented computer program using C++

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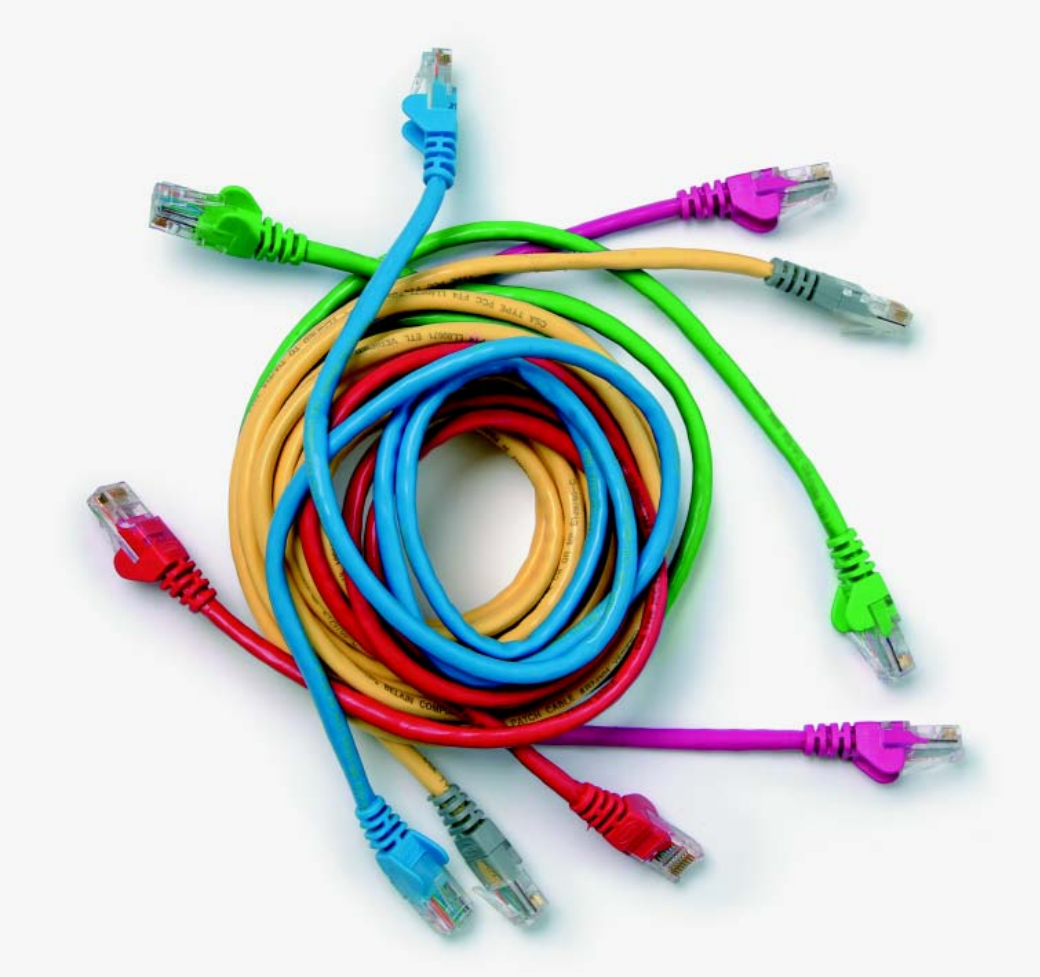

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Unit 004 Creating an object oriented computer program using C++

Syllabus Overview

Unit accreditation number **A/601/3181**

Credit value **7**

Rationale

This unit introduces the fundamental concepts of object oriented computer languages and their use to implement, refine and test a computer program.

Learning outcomes

There are **three** outcomes to this unit. The candidate will:

- Implement software using object oriented programming
- Refine an object oriented program to improve quality
- Test the operation of an object oriented program

Guided learning hours

It is recommended that **60** guided learning hours should be allocated for this unit. This may be on a full time or part time basis.

Connections with other qualifications

This unit contributes towards the learning outcomes and assessment criteria required for the level 2 Diploma in ICT Professional Competence.

Assessment and grading

Assessment will be by means of a **set assignment** covering practical activities and underpinning knowledge.

Unit 004 Creating an object oriented computer program using C++

Outcome 1 Implement software using object oriented programming

Practical activities

The learner will be able to

1 select, declare and initialise variable and data structure types and sizes to meet given requirements
2 define relationships between objects
3 implement object behaviours using control structures
4 declare file structures
5 use standard input/output commands
6 use operators and predefined functions
7 make effective use of an Integrated Development Environment (IDE)

Underpinning knowledge

The learner will be able to

- describe the basic data types char, int, float, char[]
- state the difference between a constant and a variable
- state the difference between a character variable and a character string when using the symbols " " or ' '
- explain the purpose of the null terminator in relation to a character string
- describe a one-dimensional array of type char, int, float
- state the difference between a local and a global variable
- define the components of an object ie data and functions
- explain the methods of using parameters to pass data to a function ie by value, by reference
- describe control structures used for loops ie while, do ... while, for
- describe control structures used for selection ie if, if ... else, switch
- explain the use of stream manipulators
- describe the use of cin and cout for standard input and output and the use of formatters ie endl, \n, \r, \t, \\, \a, \", \'
- describe the relational operators: < (less than), > (greater than), <= (less than or equal to), >= (greater than or equal to), == (equal to), != (not equal to)
- describe the logical operators: ! (not), && (and), || (or)
- describe the predefined functions: getch(), cin.getline(), gets(), toupper(), tolower(), atoi(), atof(), strcpy()
- explain the use of the increment (++) and decrement (--) operators in prefix and postfix mode
- describe the arithmetic operators ie * (multiply), / (divide), - (subtract), + (add), % (modulus)
- state the difference between the assignment operator (=) and the relational operator (==)

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Outcome 2 Refine an object oriented program to improve quality

Practical activities

The learner will be able to

1 follow an agreed standard for naming, comments and code layout
2 implement data validation for inputs
3 implement opportunities for error handling and reporting
4 create on-screen help to assist the users of a computer program

Underpinning knowledge

The learner will be able to

- describe the conventional use of indentation in code layout
- state that meaningful names should be used for variables and functions and that constants are normally identified using uppercase characters and variables using lowercase characters
- state that meaningful comments are inserted in code to aid understanding of the code
- state that data validation is performed on data entered into a program to prevent incorrect data causing incorrect results or a run-time error
- describe the types of data validation that can be performed such as presence check, range check, date check, type check (alphabetic or numeric), character count, check digit (modulus number), format check (eg AG145), use of a lookup table for defined values
- state the importance of trapping errors in a program so that the program does not crash at run-time
- describe how screen prompts are used to provide information to a user about the actions that can be taken

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Outcome 3 Test the operation of an object oriented program

Practical activities

The learner will be able to

1 use the debugging facilities available in the IDE
2 determine expected test results from given test data
3 compare actual results against expected results to identify discrepancies

Underpinning knowledge

The learner will be able to

- state that errors can be located when debugging a program by displaying the values held in variables
- state that test data should contain valid and invalid data
- state that testing is done to determine if a program executes correctly according to its specification and to aid in the location and correction of errors

Unit record sheet

Use this form to track your progress through this unit.

Tick the boxes when you have covered each outcome. When they are all ticked, you are ready to be assessed.

Outcome	✓	Date
1 Implement software using object oriented programming	☐	
2 Refine an object oriented program to improve quality	☐	
3 Test the operation of an object oriented program	☐	

Candidate Signature ..... **Date** .....

City & Guilds Registration Number .....

Quality nominee (if sampled) ..... **Date** .....

Assessor Signature ..... **Date** .....

External Verifier Signature (if sampled) ..... **Date** .....

Centre Name ..... **Centre Number** .....

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