Systems and Principles Unit Syllabus

Level 3 Creating a procedural computer program using COBOL

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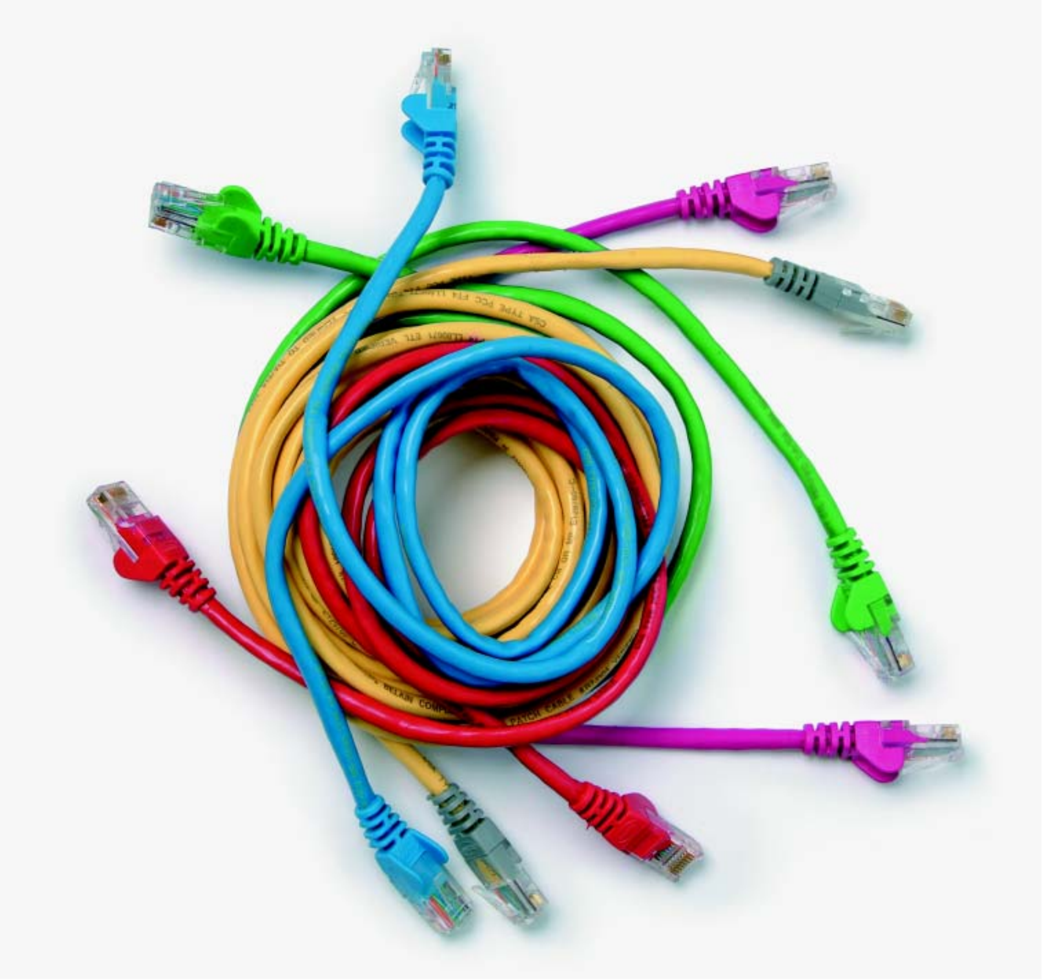

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Syllabus Overview

Unit accreditation number R/601/3171

Credit value 12

Rationale

This unit covers more advanced concepts of procedural computer languages and their use to implement, refine and test computer programs.

Learning outcomes

There are **four** outcomes to this unit. The candidate will be able to:

- Implement a software design using procedural programming
- Refine a procedural program to improve quality
- Test the operation of a procedural program
- Document a computer program

Guided learning hours

It is recommended that **90** 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 3 Diploma in ICT Professional Competence.

Assessment and grading

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

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Outcome 1 Implement a software design using procedural programming

Practical activities

The learner will be able to

1 identify the program modules and data and file structures required to implement a given design
2 select, declare and initialise variable and data structure types and sizes to implement design requirements
3 select and implement control structures to meet the design algorithms
4 select and declare file structures to meet design file storage requirements
5 select and use standard input/output commands to implement design requirements
6 make effective use of operators and predefined functions
7 correctly use parameter passing mechanisms

Underpinning knowledge

The learner will be able to

- describe the PICTURE clause required for a given data item: alphanumeric, alphabetic, numeric. numeric edited
- define the relationships between group and elementary data items
- describe the use of literals and figurative constants
- describe how a one-dimensional and two-dimensional array can be declared, initialised and accessed
- describe the operations that can be performed on a table (array)
    - move data between tables
    - set up initial values in a table
    - search the data items in a table using a sequential search
    - use the SEARCH statement to search a table
    - sort the data items in a table using the PERFORM statement with the VARYING clause
- describe the operation of the COMPUTE statement
- describe control structures used for selection ie IF, IF ... ELSE, EVALUATE
- explain the meaning of each clause within the SELECT statement in the ENVIRONMENT DIVISION for an indexed sequential file or a relative file
- describe how an indexed sequential file or a relative file can be opened for INPUT, OUTPUT, I-O or EXTEND
- describe the process of inserting, amending and deleting a record in an indexed sequential or relative file
- explain the access modes SEQUENTIAL, RANDOM AND DYNAMIC that can be used for an indexed sequential or relative file
- explain the purpose of the START statement when an indexed sequential or relative file is in SEQUENTIAL access mode
- state the purpose of the INVALID KEY clause for input and output operations on an indexed sequential or relative file
- describe the use of the ACCEPT and DISPLAY statements for standard input and output
- describe the relational operators < (less than), > (greater than), <= (less than or equal to), >= (greater than or equal to), = (equal to), NOT= (not equal to)
- describe the logical operators AND, OR, NOT
- describe the arithmetic operators ie ADD, SUBTRACT, MULTIPLY and DIVIDE

- describe the use, in arithmetic statements, of the following clauses: ON SIZE ERROR, ROUNDED
- explain how the STRING statement can be used to combine two or more data items
- explain how the UNSTRING statement can be used to separate one data item into multiple data items

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Outcome 2 Refine a procedural program to improve quality

Practical activities

The learner can

1 use an agreed standard for naming, comments and code layout
2 define user functions to replace repeating code sequences
3 implement data validation for inputs
4 identify and implement opportunities for error handling and reporting

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
- state that meaningful comments are inserted in code to aid understanding of the code
- explain the use of the PERFORM statement to provide the execution of loops
- 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
- state the types of error that can cause a run-time error eg division by zero, reading past end of file, reading from or writing to a file that has not been opened
- describe how screen prompts are used to provide information to a user about the actions that can be taken when an error occurs

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Outcome 3 Test the operation of a procedural program

Practical activities

The learner will be able to

1 make effective use of available debugging tools
2 prepare a test strategy
3 select suitable test data and determine expected test results
4 record actual test results to enable comparison with expected results
5 analyse actual test results against expected results to identify discrepancies
6 investigate test discrepancies to identify and rectify their causes

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
- explain the purpose of a test plan is, for each test to be performed, to identify the type of test, the test data required and the expected results of the test
- state that test data should contain valid and invalid data
- explain the purpose of a test log is to record the actual results of each test in the test plan, comment on any discrepancies between the actual results and the expected results and record if any amendments are made to correct an error
- 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

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Outcome 4 Document a computer program

Practical activities

The candidate will be able to

1 create documentation to assist the users of a computer program

2 create documentation for the support and maintenance of a computer program

Underpinning knowledge

The learner will be able to

- state that the purpose of end user documentation is to help the user to operate the software
- state that the purpose of technical documentation is to help the software developer support and maintain the software
- describe the contents of technical documentation ie program specification program listing, test plan and test results

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 a software design using procedural programming	□	
2 Refine a procedural program to improve quality	□	
3 Test the operation of a procedural program	□	
4 Document a computer 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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