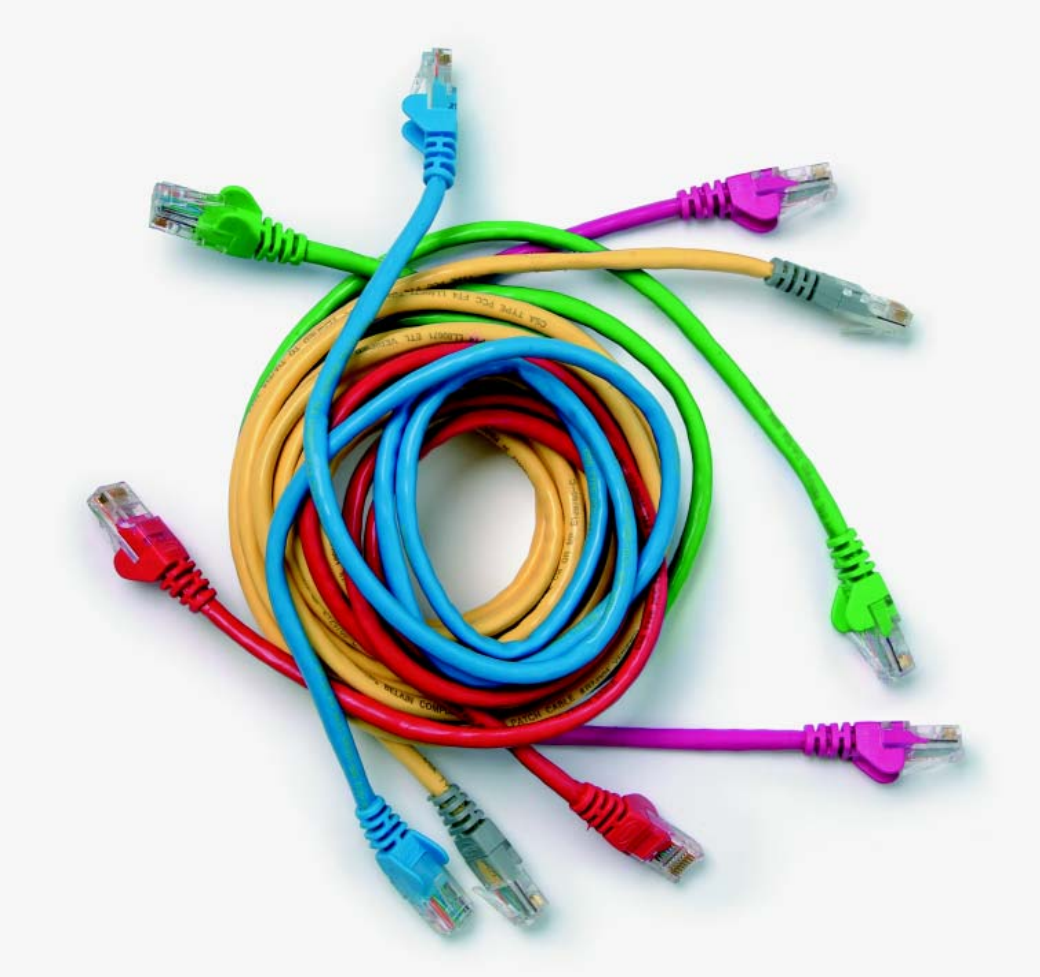
Systems and Principles Unit Syllabus

Level 2 Creating a procedural computer program using COBOL

7540-005

www.cityandguilds.com
October 2010
Version 2.0



About City & Guilds

City & Guilds is the UK's leading provider of vocational qualifications, offering over 500 awards across a wide range of industries, and progressing from entry level to the highest levels of professional achievement. With over 8500 centres in 100 countries, City & Guilds is recognised by employers worldwide for providing qualifications that offer proof of the skills they need to get the job done.

City & Guilds Group

The City & Guilds Group includes City & Guilds, City & Guilds Institute, ILM (the Institute of Leadership & Management) which provides management qualifications, learning materials and membership services, NPTC which offers land-based qualifications and membership services, and HAB (the Hospitality Awarding Body). City & Guilds also manages the Engineering Council Examinations on behalf of the Engineering Council.

Equal opportunities

City & Guilds fully supports the principle of equal opportunities and we are committed to satisfying this principle in all our activities and published material. A copy of our equal opportunities policy statement is available on the City & Guilds website.

Copyright

The content of this document is, unless otherwise indicated, © City & Guilds Limited and may not be copied, reproduced or distributed without prior written consent.

However, approved City & Guilds centres and candidates studying for City & Guilds qualifications may photocopy this document free of charge and/or include a locked PDF version of it on centre intranets on the following conditions:

- centre staff may copy the material only for the purpose of teaching candidates working towards a City & Guilds qualification, or for internal administration purposes
- candidates may copy the material only for their own use when working towards a City & Guilds qualification

The *Standard Copying Conditions* on the City & Guilds website also apply.

Please note: National Occupational Standards are not © City & Guilds Limited. Please check the conditions upon which they may be copied with the relevant Sector Skills Council.

Publications

City & Guilds publications are available on the City & Guilds website or from our Publications Sales department at the address below or by telephoning +44 (0)20 7294 2850 or faxing +44 (0)20 7294 3387.

Every effort has been made to ensure that the information contained in this publication is true and correct at the time of going to press. However, City & Guilds' products and services are subject to continuous development and improvement and the right is reserved to change products and services from time to time. City & Guilds cannot accept liability for loss or damage arising from the use of information in this publication.

City & Guilds
1 Giltspur Street
London EC1A 9DD
T +44 (0)844 543 0000 (Centres)
T +44 (0)844 543 0033 (Learners)
F +44 (0)20 7294 2413

www.cityandguilds.com
learnersupport@cityandguilds.com

Contents

Unit 005 Creating a procedural computer program using COBOL

Syllabus Overview		2
Outcome 1	Implement software using procedural programming	3
Outcome 2	Refine a procedural program to improve quality	4
Outcome 3	Test the operation of a procedural program	5
Unit record sheet		7

Unit 005 Creating a procedural computer program using COBOL

Syllabus Overview

Unit accreditation number **L/601/3167**

Credit value **7**

Rationale

This unit introduces the fundamental concepts of procedural 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 procedural programming
- Refine a procedural program to improve quality
- Test the operation of a procedural 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 005 Creating a procedural computer program using COBOL

Outcome 1 Implement software using procedural 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 implement control structures
3 declare file structures
4 use standard input/output commands
5 use operators and predefined functions
6 correctly use parameter passing mechanisms

Underpinning knowledge

The learner will be able to

- describe the structure of a program: divisions, sections, paragraphs, sentences and statements
- 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 array can be declared, initialised and accessed
- explain the use of the REDEFINES clause change the definition of a storage area
- describe the operation of the PERFORM statement to execute one or several paragraphs: once, a set number of times, dependent on a condition
- state the purpose of the EXIT statement
- describe control structures used for selection ie IF, IF ... ELSE
- define the terms: character, field, record and file
- explain the meaning of each clause within the SELECT statement in the ENVIRONMENT DIVISION for a sequential file
- state the importance of testing for end of file
- describe how a sequential file can be opened for INPUT, OUTPUT, I-O or EXTEND
- explain the use of FILLER as a data name with the VALUE clause and the figurative constant SPACES to space items across a print line.
- 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: GIVING, REMAINDER
- describe the effect of using the MOVE statement to move the contents of one data item to another data item of different size (numeric or alphanumeric)

Unit 005 Creating a procedural computer program using COBOL

Outcome 2 Refine a procedural 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 error handling and reporting
4 create documentation 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
- 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
- describe the use of ALPHABETIC, NUMERIC, POSITIVE AND NEGATIVE to test the contents of a data item
- 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
- state that the purpose of end user documentation is to help the user to operate the software

Unit 005 Creating a procedural computer program using COBOL

Outcome 3 Test the operation of a procedural program

Practical activities

The learner will be able to

1 use available debugging tools
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 procedural programming	☐	
2 Refine a procedural program to improve quality	☐	
3 Test the operation of a procedural 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** .....

Published by City & Guilds
1 Giltspur Street
London
EC1A 9DD
T +44 (0)844 543 0000 (Centres)
T +44 (0)844 543 0033 (Learners)
F +44 (0)20 7294 2400
www.cityandguilds.com

City & Guilds is a registered charity established to promote education and training