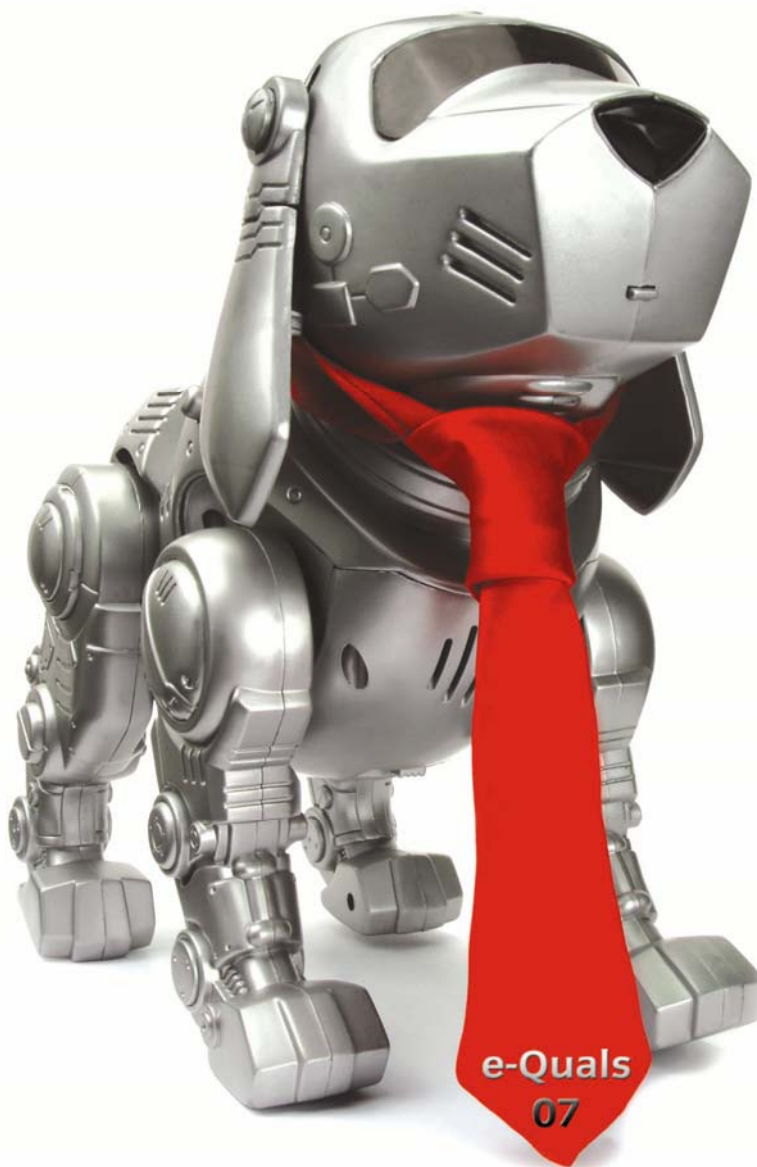


e-Quals Unit Syllabus

Level 2 Create software components using
COBOL

7266/7267 – 203



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Rationale

The aim of this unit is to enable candidates to understand the principles required to create software using the COBOL programming language. Candidates will develop the skills required to create and test software components or small software systems to solve a given problem.

Learning outcomes

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

Manage the development environment

Identify the structure of a COBOL program

Create code for a specified software component

Manage files for input and output

Test a software component and produce printed output

Guided learning hours

It is recommended that 60 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 knowledge and understanding required for the following qualifications:

Outcome	This award contributes to the knowledge and understanding of the following Areas of Occupational Competence in the City & Guilds NVQ for IT Practitioners (4324)
1,2,3,4,5	211 Software development – component creation 2

Key Skills

This unit contributes towards the Key Skills in the following areas:

Communication	C3.2
Application of Number	N1.1
Information technology	None
Working with others	None
Improving own learning	LP3.1, LP3.2, LP3.3
Problem solving	PS3.1, PS3.2, PS3.3

Assessment and grading

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

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Outcome 1

Create software components using COBOL

Manage the development environment

Practical skills

The candidate will be able to:

- 1 access and exit the development environment
- 2 use the features of the development environment:
 - a help
 - b menus
 - c toolbar
 - d debugging tools
- 3 create, edit and save source code files
- 4 compile and execute a program
- 5 identify and correct syntax errors.

Underpinning knowledge

The candidate will be able to:

- 1 state the purpose and benefit of compiling source code
- 2 list the types of error that can cause the compiler to flag a syntax error.

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Outcome 2

Create software components using COBOL

Identify the structure of a COBOL program

Practical skills

The candidate will be able to:

- 1 create a program from a given program design
- 2 create and use meaningful user-defined names
- 3 code DIVISION and SECTION entries
- 4 code DATA DIVISION entries for group and elementary items
- 5 create data items with the PICTURE clause to represent:
 - a alphabetic
 - b alphanumeric
 - c numeric (signed and unsigned and assumed decimal point)
 - d numeric edited
- 6 set up initial values for a data item
- 7 create user screens for input and output
- 8 use the REDEFINES clause to change the definition of an area of storage.

Underpinning knowledge

The candidate will be able to:

- 1 describe the structure of a program: divisions, sections, paragraphs, sentences, statements and words
- 2 state the primary functions of each DIVISION
- 3 state the major SECTIONS of each DIVISION
- 4 describe the PICTURE clause required for a given data item: alphanumeric, alphabetic, numeric, numeric edited
- 5 state the amount of storage space required for a given data/record definition
- 6 define the relationships between group and elementary data items
- 7 state the characters that can be used for a user-defined name and recognise invalid user-defined names.

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Outcome 3

Create software components using COBOL

Create code for a specified software component

Practical skills

The candidate will be able to:

- 1 use consistent indentation and presentation of code to improve readability
- 2 use suitable comments in code
- 3 use the continuation character to continue a line of code
- 4 use literals (numeric and non numeric) and figurative constants
- 5 use arithmetic statements: ADD, SUBTRACT, MULTIPLY and DIVIDE
- 6 use the following clauses in the appropriate arithmetic statements:
 - a GIVING
 - b REMAINDER
- 7 use relational operators: =, <, >, **NOT** =, <=, >=
- 8 use logical operators: AND, OR, NOT
- 9 use the MOVE statement
- 10 use the PERFORM statement to execute one or several paragraphs: once, several times or until a condition is met
- 11 use the EXIT statement
- 12 create statements for selection: IF, IF...ELSE
- 13 use ALPHABETIC, NUMERIC, POSITIVE and NEGATIVE to test the contents of a data item
- 14 use the ACCEPT statement for keyboard input
- 15 use the DISPLAY statement for screen output
- 16 use the STOP RUN statement to terminate a program.

Underpinning knowledge

The candidate will be able to:

- 1 state the syntax for comments
- 2 describe the use of literals and figurative constants
- 3 state the result of arithmetic statements using: ADD, SUBTRACT, MULTIPLY and DIVIDE
- 4 describe the use, in arithmetic statements, of the following clauses: GIVING, REMAINDER
- 5 describe the relational operators: =, <, >, **NOT** =, <=, >=
- 6 describe the logical operators: AND, OR, NOT
- 7 state the precedence rules for logical operators when combined in one statement ie NOT, AND, OR
- 8 state limitations on the use of reserved words
- 9 describe the effect of moving the contents of one data item to another data item of different size (numeric or alphanumeric)

- 10 describe the operation of the PERFORM statement to execute one or several paragraphs:
 - a once
 - b a set number of times
 - c dependent on a condition
- 11 state the purpose of the EXIT statement
- 12 describe the operation of selection statements: IF, IF...ELSE
- 13 describe the use of ALPHABETIC, NUMERIC, POSITIVE and NEGATIVE to test the contents of a data item
- 14 describe the different types of validation check that can be performed on input data eg range, type, check digit.

Practical skills

The candidate will be able to:

- 1 create the ENVIRONMENT and DATA DIVISION entries to enable a file to be used
- 2 create the statements required to open and close a file
- 3 create the statements required to read from a sequential file (READ/READ INTO)
- 4 create the statements required to write to a sequential file (WRITE/WRITE FROM)
- 5 create the statements required to write to a printer file
- 6 design and define headings, sub-headings and the layout for a printed report
- 7 use FILLER as a data name in conjunction with the VALUE clause and the figurative constant SPACES to enable spacing of data items in a print line
- 8 use a line count to paginate a printed report
- 9 produce sub-totals at a defined control break eg change of area code
- 10 accumulate totals and print the totals at the end of a printed report.

Underpinning knowledge

The candidate will be able to:

- 1 define the terms: character, field, record and file
- 2 explain the meaning of each clause within the SELECT statement in the ENVIRONMENT DIVISION for a sequential file
- 3 explain the difference between an external filename and an internal filename
- 4 describe the attributes of a sequential file and why this type of access is slow if very few records in a file need to be accessed
- 5 state the importance of testing for end of file
- 6 explain that a sequential file can be opened as INPUT, OUTPUT, I-O or EXTEND
- 7 state why output to a printer must be designed differently from output to a disk file.

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Outcome 5

Create software components using COBOL

Test a software component and produce printed output

Practical skills

The candidate will be able to:

- 1 create test data
- 2 use test data to determine the expected results from a software component
- 3 compare the expected results to the actual results and correct any errors
- 4 resolve logical and run-time errors found during testing
- 5 provide evidence that the program complies with the specification
- 6 print a listing of code.

Underpinning knowledge

The candidate will be able to:

- 1 list 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
- 2 state that a logical error may cause a program to execute incorrectly
- 3 describe how test data must include valid, invalid and boundary data
- 4 state that test data should be prepared which tests that the logic of the code is correct
- 5 describe how comparing expected results to actual results can help to find any 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 Manage the development environment	<input type="checkbox"/>	
2 Identify the structure of a COBOL program	<input type="checkbox"/>	
3 Create code for a specified software component	<input type="checkbox"/>	
4 Manage files for input and output	<input type="checkbox"/>	
5 Test a software component and produce printed output	<input type="checkbox"/>	

Candidate Signature Date

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