Systems and Principles Unit Syllabus

Level 2 Create automated procedures for ICT Operating Systems

7540-234

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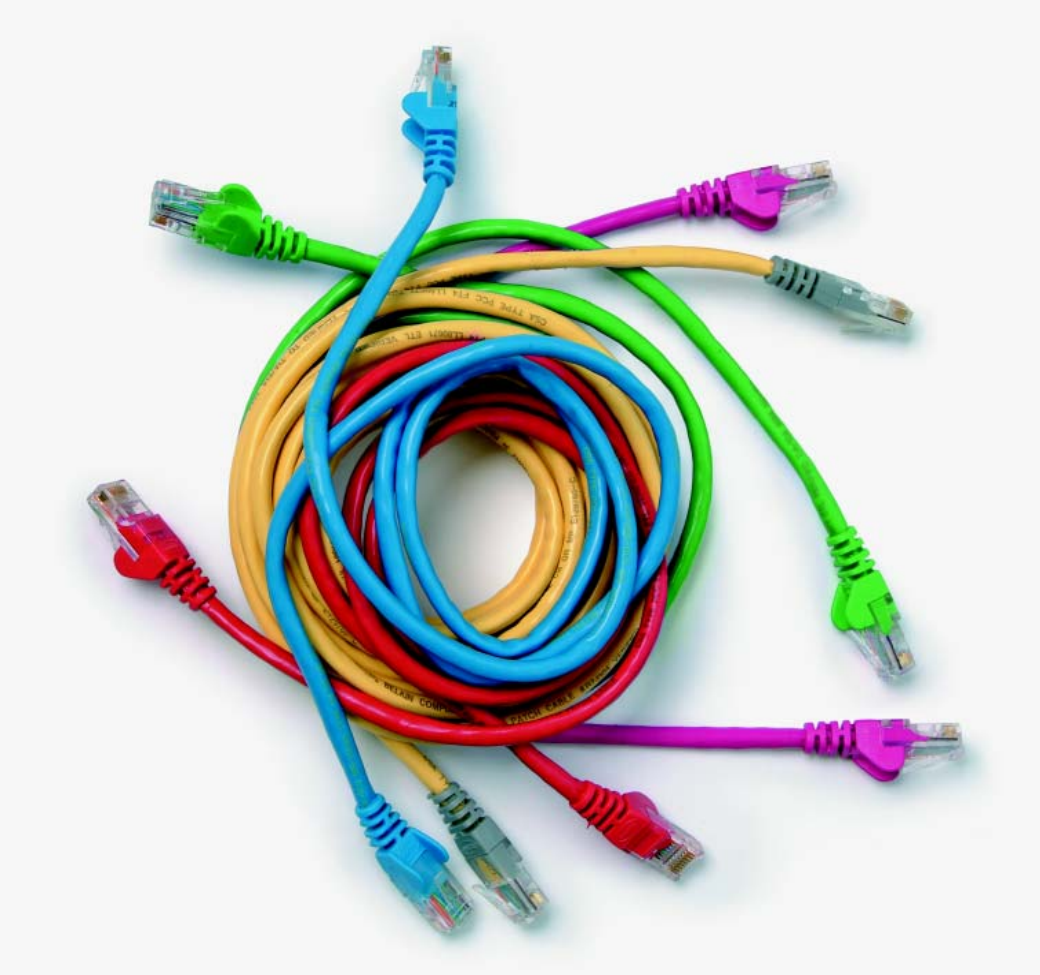
September 2010
Version 1.0



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Unit 234 Create automated procedures for ICT Operating Systems

Syllabus Overview

Unit accreditation number **K/501/3991**

Credit value **5**

Rationale

The aim of this unit is to enable candidates to use operating system facilities and commands to create automated procedures.

Learning outcomes

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

- Explain the functions of an operating system
- Describe multiprogramming/multitasking systems concepts
- Describe file management concepts
- Describe the software development environment
- Create automated procedures

Guided learning hours

It is recommended that **44** 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 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.

Create automated procedures for ICT Operating Systems

Outcome 1 Explain the functions of an operating system

Underpinning knowledge

The candidate will be able to:

1 describe the modes of operation for operating systems
   - a multiprocessing
   - b multiprogramming/multitasking
   - c batch
   - d real-time

2 describe the following functions of an operating system
   - a resources allocation and scheduling
   - b memory management
   - c file management
   - d input/output control, including interrupt handling
   - e user interface eg command language, graphical user interface
   - f security eg passwords, access rights

3 list common utility programs eg text editor, sort, debugger, file/directory management, copy, delete, rename

4 state that a multi-user system allows several users to share access.

Create automated procedures for ICT Operating Systems

Outcome 2 Describe multiprogramming/multitasking systems concepts

Underpinning knowledge

The candidate will be able to:

1 state that multiprogramming/multitasking is a term used to describe the technique of having more than one program in the computer's memory at the same time

2 state that the operating system allocates memory to the currently running program

3 describe virtual memory management techniques, including

- a transfer of blocks of code to and from disk
- b paging
- c allocation map, showing location of blocks of virtual storage
- d storage protection methods

4 state that storage protection prevents a program from corrupting the code or data of another program

5 describe the advantages of pre-emptive allocation of resources by an operating system

6 state that deadlock occurs if a system is waiting for an event that will not occur

7 describe how a logical error in a program can cause a system to deadlock or crash eg an infinite loop sending output to the printer or accidental corruption of another programs area of memory

8 state that data can be lost when the system has to be rebooted after a system crash or deadlock

9 describe spooling

10 describe how shared data is locked to prevent multiple updates occurring at the same time eg record, file, database

Create automated procedures for ICT Operating Systems

Outcome 3 Describe file management concepts

Underpinning knowledge

The candidate will be able to:

1 describe how files are organised into directory structures

2 list the typical information held by an operating system for a file

- a file or subdirectory name
- b indication of whether it is a file or directory
- c size of the file in bytes
- d date and time last used
- e address at which the data is stored
- f access rights

3 state that an operating system keeps a 'free space list' for each disk which contains entries for all the free areas on a disk

4 state that contiguous storage means that the whole file must fit into a single space

5 describe the management of non-contiguous storage of files on disk

6 state that as files are added and deleted a disk becomes fragmented with a lot of small spaces and that this slows down the access times to the disk

7 describe the access methods for files

- a sequential
- b random
- c streams

8 list the advantages of using random access files

9 describe the structure of files including

- a fields
- b records
- c fixed length records
- d variable length records
- e record delimiters
- f end of file markers
- g blocks

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Outcome 4 Describe the software development environment

Underpinning knowledge

The candidate will be able to:

1 identify the differences between high level and low level programming languages

2 state that each programming language has a set of grammatical rules (syntax) defining how keywords, symbols, expressions and statements may be structured and combined

3 state that source code is created using a text editor and contains program instructions written in a programming language

4 describe how a compiler translates the source code into object code and identifies all syntax errors found

5 state that a linker is used to link the object code with any library routines or other modules to create executable code

6 identify the differences between a compiler and an interpreter

7 state that a compiled program cannot be run until all syntax errors have been removed

8 describe the portability problems associated with running software on computers with different architectures

- a non-standardisation of programming languages eg C, C++
- b machine instruction set
- c recompilation of software with a different compiler
- d need to retest software

9 describe how debug tools are used to trace program execution and display the values in variables at run time

10 list the advantages of an Integrated Development Environment that contains all the tools required for the development of software.

Create automated procedures for ICT Operating Systems

Outcome 5 Create automated procedures

Practical skills

The candidate will be able to:

1 interpret a problem specification

2 select and use

- a commands from a command language eg print, type, ls, re-direction, piping
- b constructs for iteration eg loop, for, while
- c constructs for selection eg if, case

3 test for error conditions before running a subsequent job

4 use wildcards to identify a group of files

5 accept and use parameters typed at the command prompt

6 use comments to document the code

7 create automated procedures to run one or more processes

8 test the operation of an automated procedure and print a listing.

Underpinning knowledge

The candidate will be able to:

1 state that operating system commands can be used as a programming language for communicating with the operating system

2 explain the format and structure of operating system commands

3 list common uses for automated procedures including

- a compiling, linking and conditionally executing a program
- b file management eg back-up of files
- c menu interface
- d running several programs one after the other.

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 **Explain the functions of an operating system**	☐	
2 **Describe multiprogramming/multitasking systems concepts**	☐	
3 **Describe file management concepts**	☐	
4 **Describe the software development environment**	☐	
5 **Create automated procedures**	☐	

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

City & Guilds Registration Number .....

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

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

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

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