

Past-paper walk-through

Operating Systems ■ 5.1

eXercise

Questions in this set

- 9618/11 N25 Q5 ■ 10 marks
- 9618/11 N24 Q4 ■ 17 marks
- 9618/12 J24 Q6 ■ 4 marks

Reading the mark scheme

- **B1** a mark that stands on its own – the point is either made or not.
- **M1** a *method* mark: the right approach, even if the number is wrong.
- **A1** an *answer* mark, and it usually needs its M mark first.
- **C1** a working mark on the way to the answer.
- **//** separates answers the examiner accepts equally.
- **ecf** = error carried forward: a later part is marked on your own earlier answer.
- **owtte** = “or words to that effect” – the wording need not match.

Question 5

9618/11 N25 ■ Q5 ■ 10 marks

The Operating System (OS) is responsible for hardware and security management in a computer system.

(a)(i) State **two** tasks that are performed by hardware management.

1. 2. [2]

(a)(ii) State **two** tasks that are performed by security management.

1. 2. [2]

(b)(i) Describe **one** benefit of using library routines when developing software. [2]

(b)(ii) Describe **one** drawback of using library routines when developing software. [2]

(c) Identify **two** presentation features found in a typical Integrated Development Environment (IDE).

1. 2. [2]

Solution 5

(a)(i)

Mark scheme

- 1 mark per bullet point, max 2 marks
- ■ Installs driver software for devices connected to external ports
- ■ Manages communication between devices
- ■ Manages hardware interrupts

Solution 5

(a)(ii) Mark scheme

- 1 mark per bullet point, max 2 marks
- ■ Prevents unauthorised access
- ■ ... by providing authentication // by validating users and processes
- ■ Implements access rights and permissions
- ■ Makes provision for recovery of lost data
- ■ Carries out Operating System security updates as available
- ■ Carries out auditing and keeps logs of activity

Solution 5

(b)(i) Mark scheme

- One mark for benefit, one mark for appropriate matching expansion e.g.
- ■ Less code needs to be developed as code is pre-written
- ■ ... thereby reducing the time to write a program
- ■ The library routine will be pre-tested and documented
- ■ ... reducing the time taken to test a program // giving confidence that the routine works as it should
- ■ The code for the library routine can be written in a different programming language
- ■ ... which allows the use of special features of that language

Solution 5

- ■ The user's source code is more readable
- ■ ... as the library routine is simply called in the source code rather than being written out in full
- ■ The library could contain the code for complex routines
- ■ ... thus allowing the programmer to include modules they might not be able to code

Solution 5

(b)(ii) Mark scheme

- 1 mark for drawback, 1 mark for appropriate matching expansion e.g.
- ■ Compatibility issues
- ■ ... the library routine may not work with current program
- ■ Not guaranteed to be thoroughly tested
- ■ ... there could be unexpected problems (bugs/virus)
- ■ The library routine may not match needs exactly // The library routine may give unexpected results
- ■ ... so it will need to be edited and tested

Solution 5

- ■ If the library routine is later edited or changed (by someone else)
- ■ ... there could be unexpected errors or results
- 2
- October/November
- 2025

Solution 5

(c) Mark scheme

- 1 mark per bullet point, max 2 marks
- ■ Prettyprint
- ■ Expanding and collapsing code blocks
- ■ Automatic / smart indentation / formatting
- 2
- October/November
- 2025

Question 4

9618/11 N24 ■ Q4 ■ 17 marks

A student uses a laptop to write a program that is saved as a text file.

(a)(i) Describe the file management tasks carried out by an OS. [2]

(a)(ii) Explain the need for back-up software. [2]

(b)(i) Explain the benefits to the teacher of the attachment being a compressed file. [3]

(b)(ii) Describe **one** lossless method of compressing a text file. [3]

(c) The student used a program library when writing their program.

Explain the benefits to the student of using library files when writing a program. [3]

(d)(i) One presentation feature found in a typical IDE is prettyprint.

Identify and describe **one other** presentation feature found in a typical IDE. [2]

(d)(ii) One debugging feature found in a typical IDE is single stepping.

Identify and describe **one other** debugging feature found in a typical IDE. [2]

Solution 4

(a)(i) Mark scheme

1 mark for each bullet point (max 2)

e.g.

- Secondary storage space is divided into file allocation units
- Space on secondary storage is allocated to particular files
- Maintains/creates directory structures
- Specifies the logical method of file storage e.g. FAT or NTFS
- Provides file naming conventions
- Controls user access // implements access rights //implements password protection // Makes file sharing possible
- Controls access to the file by other software

Solution 4

- Specifies tasks that can be performed on a file e.g. open, close, delete, copy, create, move, etc
- Allows searching for a file

Solution 4

(a)(ii)

Mark scheme

1 mark for each bullet point (max 2)

- To allow data to be retrieved / restored when lost
- To automatically make a duplicate copy of data...
- ...so the user does not have to remember to backup data
- To make regular duplicate copies of data

Solution 4

(b)(i) Mark scheme

1 mark for each bullet point (max 3)

e.g.

- Less of the teacher's storage space is used
- ...so more student work can be stored
- Transmission time is reduced
- ...so the teacher does not have to wait as long for it to arrive
- Bandwidth usage is reduced
- ...so other transmissions are not adversely affected
- Less data allowance is used on the teacher's email system

Solution 4

(b)(ii)

Mark scheme

1 mark for each bullet point (max 3)

- Run-Length Encoding // RLE
- Repeated sequences of the same characters are replaced by
- ...a single copy of the character
- ...and a count of the number of characters

Solution 4

(c) Mark scheme

1 mark for each bullet point (max 3)

e.g.

- It saves development time for the student
- ...by using pre-written code
- There is less testing to do // the routines are more likely to work correctly
- ...because they have already been tested and are error-free
- It results in a more robust program
- Subroutines can be used that they do not have the skill to write
- ...which enables a more complex program to be written

Solution 4

(d)(i)

Mark scheme

One mark for correct name, one mark for matching description

- Expand/collapse code blocks...
- ...sections of source code that are part of the same block can be expanded to see the content or collapsed so that the overall code is seen
- Auto-indentation // auto-formatting...
- ...automatically indents/formats code as the user types so that the structure is clear // aids readability

Solution 4

(d)(ii)

Mark scheme

One mark for correct name, one mark for matching description

- Breakpoints ...
- ...stops the code running on a set line to view the current status/variable contents/program flow
- Report window // variable watch window ...
- ...shows the values in variables/data structures and how they change when each line is run

Question 6

9618/12 J24 ■ Q6 ■ 4 marks

A computer has an Operating System (OS). Memory management and process management are two OS tasks. Explain how the OS carries out each of these tasks. **[4]**

Solution 6

Worked steps

Four marks, up to three for either task — so cover both, and make each point a **mechanism** rather than a restatement of the name.

Memory management

- Keeps the data of several running programs in memory at once, allocating each a region.
- Moves data between main memory and backing store (virtual memory) when there is not enough RAM, so a program larger than memory can still run.
- Keeps each program's region separate, so one cannot overwrite another's data.

Process management

- Decides which process uses the processor and for how long — scheduling.

Solution 6

Worked steps

- Switches between processes so several appear to run at once on one core, saving and restoring each one's registers.
- Assigns priorities, and resolves competition for resources so that no process is left waiting for ever.

“It manages the memory” scores nothing: the mark is for saying **how**, and the words that carry it are allocate, virtual memory, schedule and switch. [Mark scheme](#)

- 1 mark each to max 4
- Max 3 marks for each management task:
- Memory management: Max 3 marks

Solution 6

Worked steps

- ■
- Stores data from all currently running programs concurrently in RAM
- ■
- Stops the data from overwriting each other in RAM/primary storage
- ■
- Decides which processes should be in main memory
- ■
- Makes efficient use of memory
- Process management: Max 3 marks

Solution 6

Worked steps

- ■
- Allows one process to be paused whilst another process can be actioned
- ■
- Decides which process is to be run next
- ■
- Switches between processes to allow them to share the use of the
- processor
- ■
- Identification/description of scheduling

Solution 6

Worked steps

- 4
- 9618/12
- May/June 2024