

Exercise walk-through

Protecting Applications and Data: Managerial Controls and Access Controls ■ 5.2

eXercise

You must be able to

- choose the right access model (RBAC, RuBAC, DAC, MAC) from a scenario
- read and write Linux permissions using read 4 / write 2 / execute 1
- apply the **principle of least privilege** 最小权限原则

Method — Choosing the model

RBAC follows your role; RuBAC follows a condition (like time); DAC lets the owner decide; MAC uses central levels. Match the scenario's decider to the model.

Method — Linux permissions

Each group's number adds read (4) + write (2) + execute (1). `chmod 640` = owner read+write (6), group read (4), others none (0).

Practice 2.1 ■ 1 mark

“Access allowed only during business hours” - name the access-control model.

Solution 2.1

Worked steps

RuBAC / rule-based access control **B1**.

Practice 2.2 ■ 2 marks

Write the chmod number that gives the owner read+write, the group read, and others nothing.

Solution 2.2

Method: Linux permissions

Worked steps

640 **B1**: owner 6 = 4+2, group 4, others 0 **B1**.

Practice 2.3 ■ 1 mark

A file needs: owner read+write+execute, group read+execute, others none.

- (a) Write the chmod number.
- (b) State what the '7' means.

Solution 2.3

Method: Linux permissions

Worked steps

(a) 750 **B1**. (b) $7 = 4+2+1 = \text{read} + \text{write} + \text{execute}$ **B1**.

Exam-style 3.1 ■ 1 mark

“Every user with the role ‘nurse’ can open patient charts” describes

A RuBAC

B RBAC

C DAC

D MAC

Solution 3.1

A RuBAC

B RBAC 

C DAC

D MAC

Worked steps

B. access follows the role, so RBAC.

Exam-style 3.2 ■ 1 mark

The permission string `-rw-r---` corresponds to which `chmod` number?

A `chmod 444`

B `chmod 640`

C `chmod 740`

D `chmod 777`

Solution 3.2

Method: Linux permissions

A `chmod 444`

B `chmod 640`



C `chmod 740`

D `chmod 777`

Worked steps

B. owner `rw` = 6, group `r` = 4, others none = 0 $\rightarrow$ 640.

Exam-style 3.3 ■ 1 mark

An administrator applies the principle of least privilege.

- (a) State what least privilege means.
- (b) Explain one security benefit.

Solution 3.3

Worked steps

(a) each entity gets exactly the access it needs and no more **B1**. (b) if an account is compromised, the damage is limited to that minimal access **B1**.