

Secure and Dependable Systems

Exercise 12

Baiasu Stefan Rares

Question 1

a)

Resource	Alice	Bob	Marvin	Peggy	Victor	Trent
FC1	r	r	-	c,r,u,d	-	c,r,u,d
FC2	-	-	r	-	c,r,u,d	c,r,u,d
GB1	r	r	-	c,r,u,d	-	c,r,u,d
GB2	-	-	r	-	c,r,u,d	c,r,u,d

- c: create (e.g., upload materials, create exams)
- r: read (e.g., view course content and grades)
- u: update (e.g., revise lecture notes, correct grades)
- d: delete (e.g., remove files, delete submissions)
- FC1 = Folder Course 1
- GB1 = Grade Course 1
- FC2 = Folder Course 2
- GB2 = Grade Course 2

b)

FC1 ACL:

- Alice: r
- Bob: r
- Peggy: c,r,u,d
- Trent: c,r,u,d

FC2 ACL:

- Marvin: r
- Victor: c, r, u, d
- Trent: c,r,u,d

GB1 ACL:

- Alice: r
- Bob: r
- Peggy: c,r,u,d
- Trent: c,r,u,d

GB2 ACL:

- Marvin: r
- Victor: c,r,u,d
- Trent: c,r,u,d

c)

Alice:

- FC1: r
- GB1: r

Bob:

- FC1: r
- GB1: r

Marvin:

- FC2: r
- GB2: r

Peggy:

- FC1: c, r, u, d
- GB1: c, r, u, d

Victor:

- FC2: c, r, u, d
- GB2: c, r, u, d

Trent:

- FC1: c, r, u, d
- FC2: c, r, u, d

- GB1: c, r, u, d
- GB2: c, r, u, d

d)

The ACL works well when there is a small number of users and resources. When the SEU adds a lot of new courses, instructor and student the matrix becomes very large with hundreds of rows and columns and also it becomes very hard to manage.

A solution to this problem would be to use a Role Based Access Control - RBA. It would simply work with creating roles like: student_at_course_x, studnet_at_course_y. Then it would assign the permission to the roles, not to users and finally it would assign roles to the users.

e)

Role-Based Access Control vs Discretionary Access Control

Feature	RBAC	DAC
Permission Assigning	The system admin	Resource owner → instructor
Control Structure	Centralized roles	Decentralizes , owner chooses
Security Policy	Organization defined roles	User defined sharing
Use Case	Universities, big companies	Personal file sharing

In this scenario, the RBAC is more appropriate to use because the:

- SEU has specific already existing roles: student, instructor, admin, etc.
- It simplifies permission management on a large scale, there are a lot of users.
- It enforces consistent access policies that the university has.