

# IY5512: Coursework 6

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If feedback is required, coursework solutions must be submitted electronically via the course Moodle page. The deadline for receipt of submissions is 23:59 UK time on Friday 4/12/15. Coursework submissions should normally be in the form of a single pdf file. If you use Word, a free add-on to enable you to save a document in pdf format can be obtained from the Microsoft web site. Take care to ensure that you include your full name on the first page of your submission, the course number (IY5512), and the coursework number.

These questions are designed to test and extend your understanding of Part 6 of the course material.

1. Describe the operation and use of an access control matrix, and explain why operating systems rarely implement access control using this approach.
2. The following three access control mechanisms were discussed in the course notes:
  - access control matrices;
  - capabilities;
  - access control lists.

For each access control mechanism, describe the complexity of:

- determining authorised access during execution;
  - adding accesses for a new principal;
  - deleting all accesses for a particular principal;
  - determining all principals which have access to a particular object;
  - creating a new object to which all principals have access by default.
3. What is the difference between the notions of a *group* and a *role*? Is there a difference at all?
  4. Describe an information flow access control model for confidentiality, covering the notions of security labels, sensitivity and clearance (and how they are applied to subjects and objects). How is a partial ordering used to control the flow of information? What security breaches relating to read and write operations does this model address?
  5. Give a formal definition of a lattice. Give an example of a partial ordering that is not a lattice. In your answer clearly define:
    - a. the set of objects on which the partial ordering is defined,
    - b. the partial ordering itself, and

c. why the partial ordering is not a lattice.

How might you convert the partial ordering into a lattice by adding extra elements to the set of objects?

6. Give a simple example of a case where a problem can arise when constrained RBAC is used in conjunction with hierarchical RBAC.
7. Outline the operation of a tool designed to aid in the process of role mining for RBAC.