RBAC-LBAC-DAC

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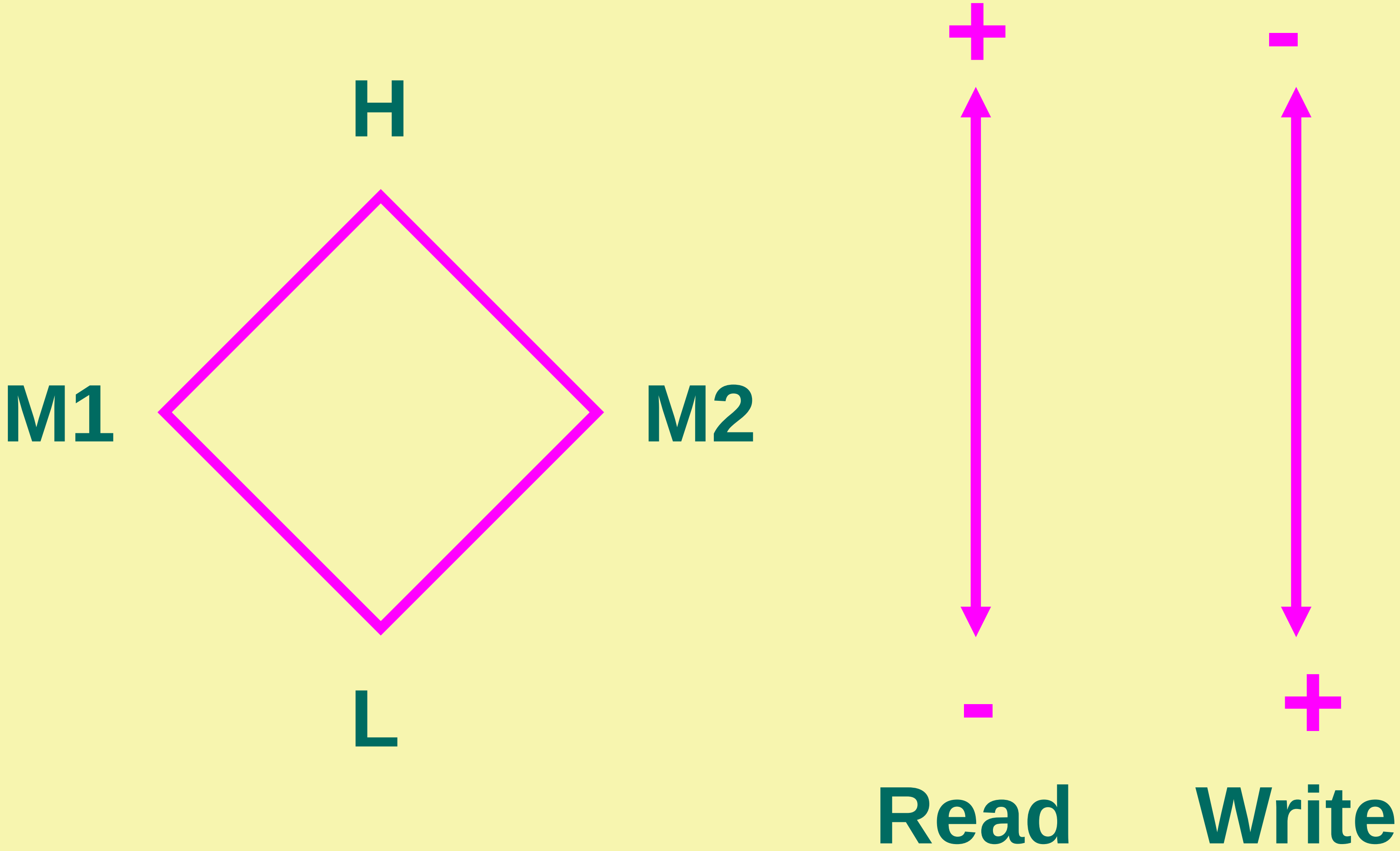
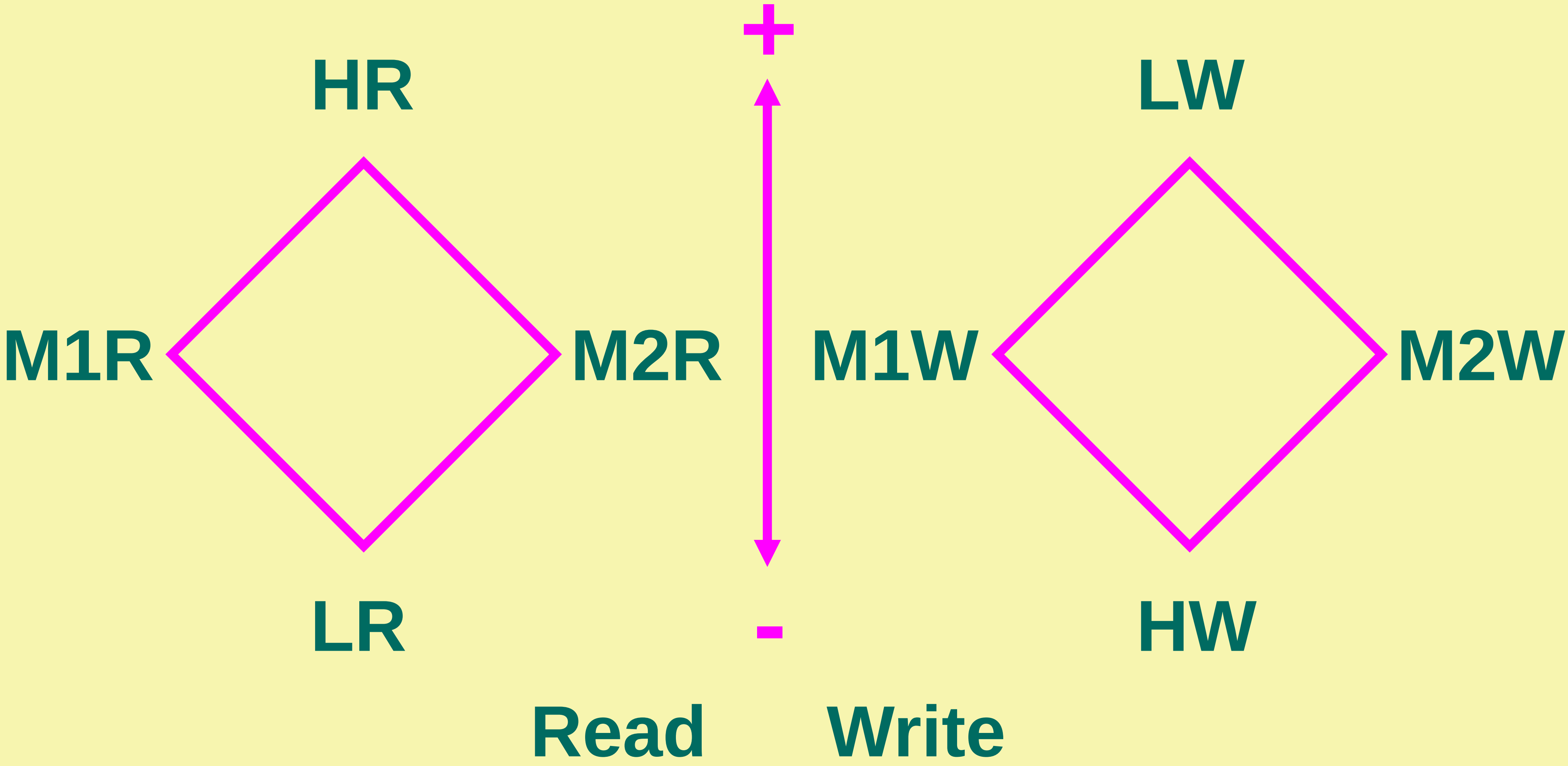
LBAC: LIBERAL *-PROPERTY



RBAC96: LIBERAL *-PROPERTY



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RBAC96: LIBERAL *-PROPERTY

- user ∈ xR, user has clearance x
  user ∈ LW, independent of clearance
- Need constraints
  - session ∈ xR iff session ∈ xW
  - read can be assigned only to xR roles
  - write can be assigned only to xW roles
  - (O,read) assigned to xR iff
    (O,write) assigned to xW

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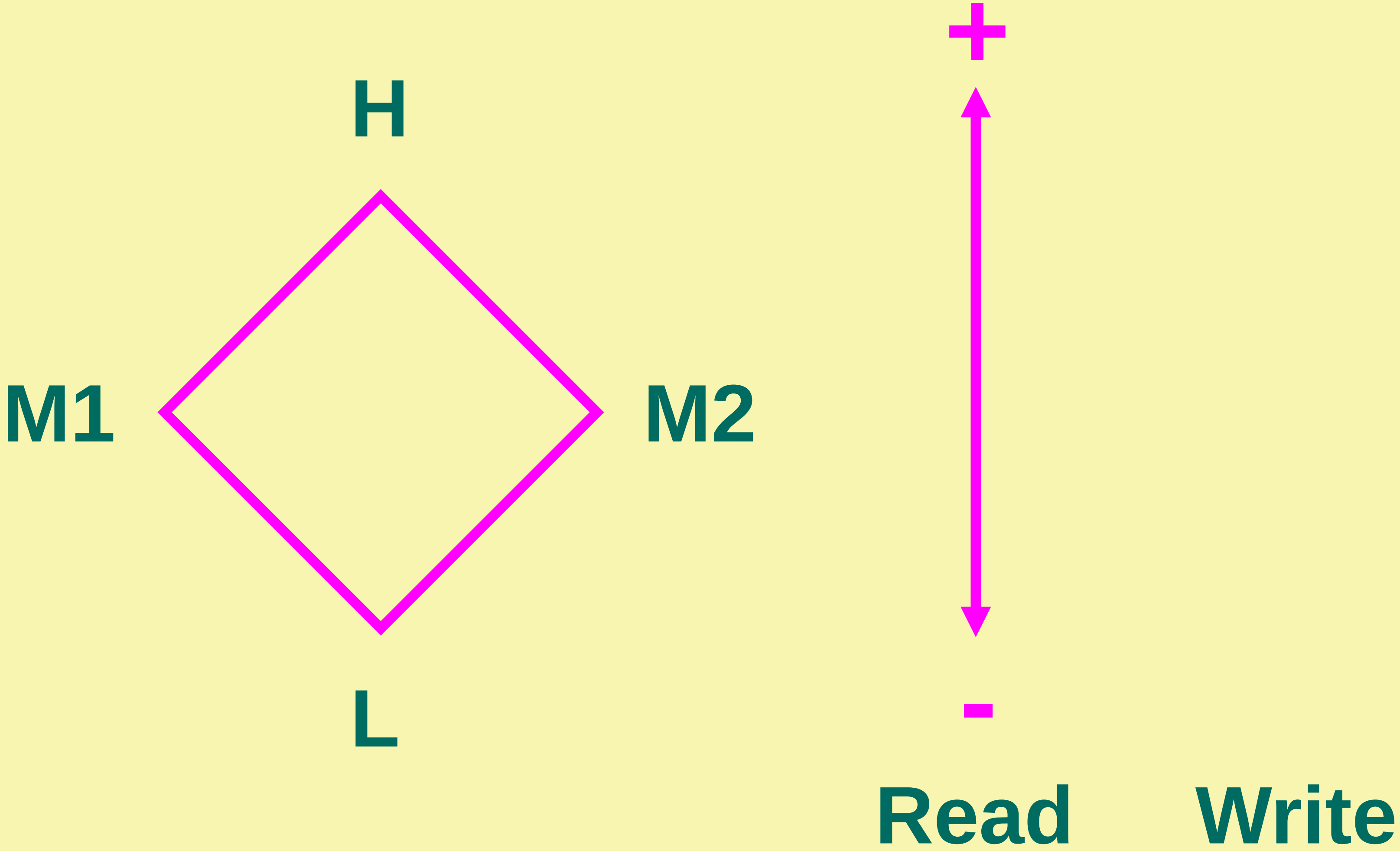
LBAC: STRICT *-PROPERTY



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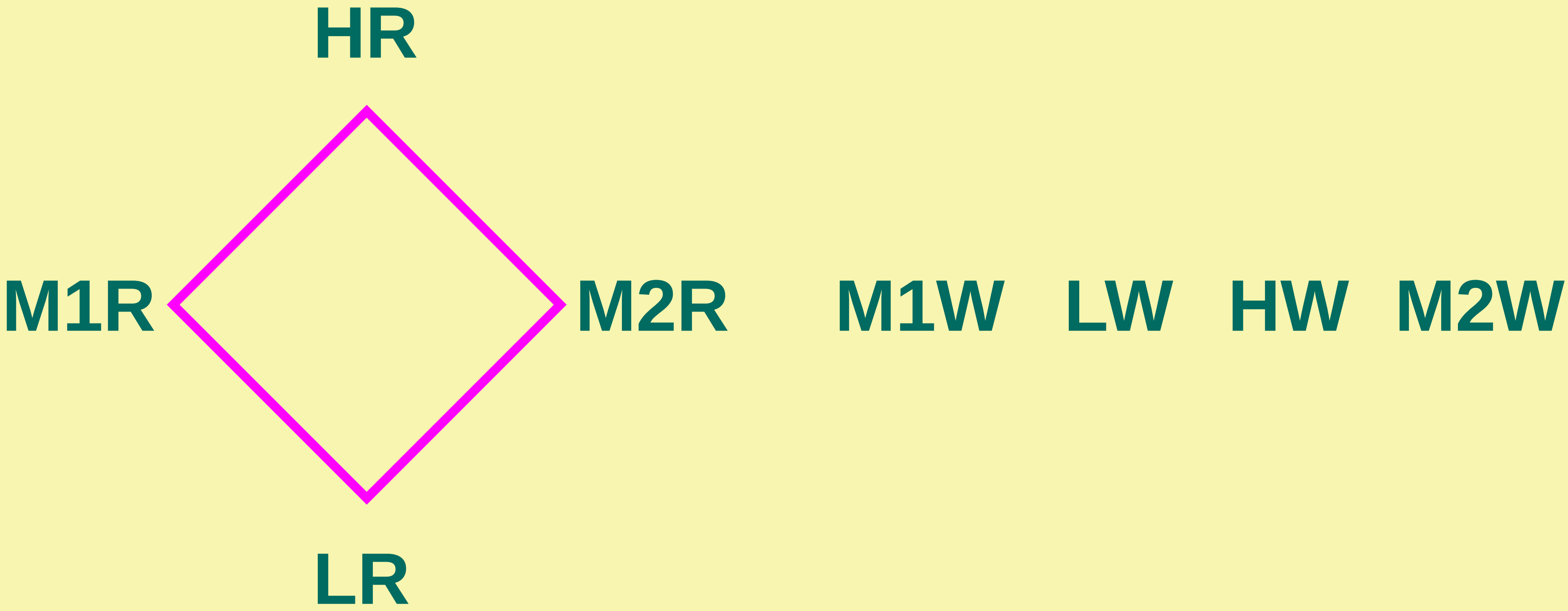
RBAC96: STRICT *-PROPERTY



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Variations of DAC

- Strict DAC
- Liberal DAC

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Strict DAC

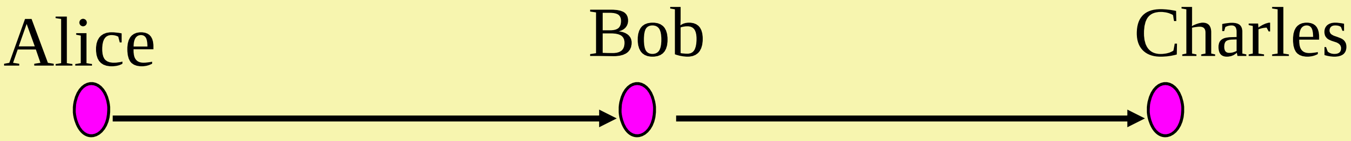
- Only owner has discretionary authority to grant access to an object.
- Example:
  - Alice has created an object (she is owner) and grants access to Bob. Now Bob cannot grant propagate the access to another user.

Liberal DAC

- Owner can delegate discretionary authority for granting access to other users.
  - One Level grant
  - Two Level Grant
  - Multilevel Grant

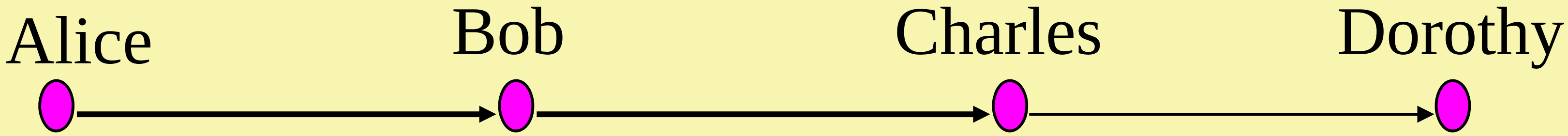
One Level Grant

- **Owner can delegate authority to another user but they cannot further delegate this power.**



Two Level Grant

- **In addition to a one level grant the owner can allow some users to delegate grant authority to other users.**



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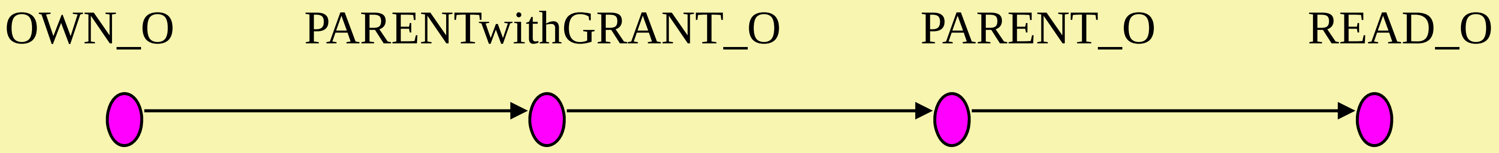
Revocation

- **Grant-Independent Revocation.**
- **Grant-Dependent Revocation.**

Common Aspects

- Creation of an object in the system requires the simultaneous creation of
  - three administrative roles
    - OWN_O, PARENT_O, PARENTwithGRANT_O
  - One regular role
    - READ_O



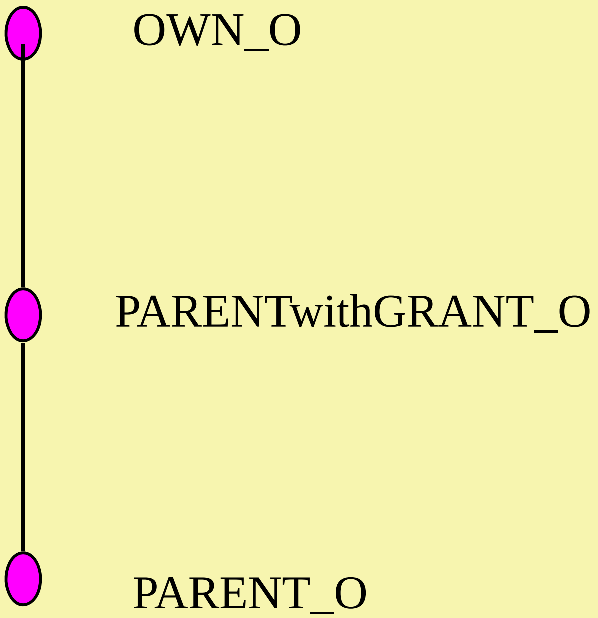
OWN_O

PARENTwithGRANT_O

PARENT_O

READ_O

Administration of roles associated with object O



OWN_O

PARENTwithGRANT_O

PARENT_O

Administrative role hierarchy

Common Aspects II

- **We require simultaneous creation of Eight Permissions**
  - **canRead_O**
  - **destroyObject_O**
  - **addReadUser_O, deleteReadUser_O**
  - **addParent_O, deleteParent_O**
  - **addParentWithGrant_O, deleteParentWithGrant_O**

Roles and associated Permissions

- **OWN_O**
  - **destroyObject_O, addParentWithGrant_O, deleteParentWithgrant_O**
- **PARENTwithGRANT_O**
  - **addParent_O, deleteParent_O**
- **PARENT_O**
  - **addReadUser_O, deleteReadUser_O**
- **READ_O**
  - **canRead_O**

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Common Aspects III

- Destroying an object O requires deletion of four roles and eight permissions in addition of destroying the object O.

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Strict DAC in RBAC96

- Cardinality constraints as:
  - Role OWN_O = 1
  - Role PARENTwithGRANT_O = 0
  - Role PARENT_O = 0

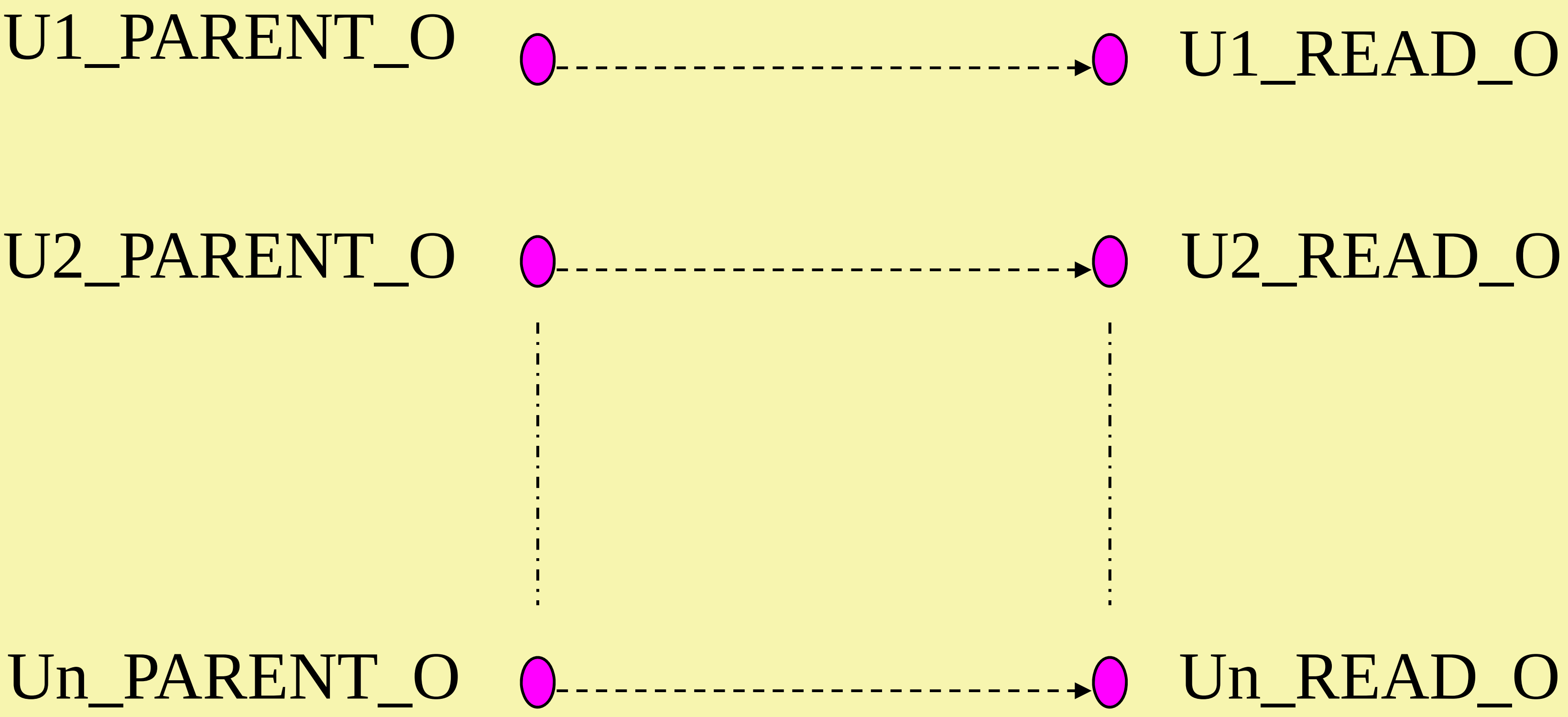
One level DAC in RBAC96

- Cardinality constraints as:
  - Role OWN_O = 1
  - Role PARENTwithGRANT_O = 0

Two Level DAC in RBAC96

- Cardinality constraints as:
  - Role OWN_O = 1

Grant-Dependent Revoke



U1_PARENT_O → U1_READ_O

U2_PARENT_O → U2_READ_O

Un_PARENT_O → Un_READ_O

READ_O role associated with members of PARENT_O

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