

Reading

Read Chapters 5 and 13 of *Access Control, Security, and Trust: A Logical Approach* (ACSTLA).

Logistics

This homework is officially due in class on **Thursday, November 17**. However, it comes with an automatic (and longer than usual!) extension: anything submitted by **1pm on Friday, November 18** will be accepted as being on time.

You may work singly or in pairs on this assignment: if you work with someone else, turn in a single assignment with both names on it.

Exercises

- (27 points) ACSTLA, Exercise 5.5.1 (parts a through e)
- (30 points) ACSTLA, Exercise 5.5.2
For part a(b), express only the integrity policy related to Room_B . Likewise, for part b(b), express only the integrity policy related to Airlock_B .
- (18 points) Categories can be combined with integrity levels, in much the same way that they are with security levels. For the purposes of this question, consider the set of integrity labels are given as follows:

$$\mathcal{L} = \{(t, X) \mid t \in \{\text{HI}, \text{MED}, \text{LO}\}, X \in \mathcal{P}(\{\text{ENG}, \text{BUD}, \text{PER}\})\}.$$

The ordering on these labels is given as follows:

$$(t_1, X_1) \leq (t_2, X_2) \quad \text{iff} \quad (t_1 \leq' t_2 \text{ and } X_1 \subseteq X_2),$$

where \leq' is the simple ordering ($\text{LO} \leq' \text{MED} \leq' \text{HI}$).

Finally, suppose the following security labels are assigned to the files A , B , and C :

File	Level Assigned
A	(HI, {PER, BUD})
B	(LO, {ENG, BUD})
C	(MED, {ENG})

For each of the following situations, give both the **highest** and the **lowest** integrity labels that would allow Joe to be given the indicated discretionary access, in accordance with the *Simple Integrity Condition* and the *Integrity *-Property*. If no such label exists, explain why.

- Discretionary **read** access to file A and discretionary **read** access to file B
- Discretionary **write** access to file A and discretionary **write** access to file C
- Discretionary **read** access to file B and discretionary **write** access to file C