

ECS 235B Module 53

Information Flow and Integrity

Integrity Mechanisms

- The above also works with Biba, as it is mathematical dual of Bell-LaPadula
- All constraints are simply duals of confidentiality-based ones presented above

Example 1

For information flow of assignment statement:

$$y := f(x_1, \dots, x_n)$$

the relation $\text{glb}\{x_1, \dots, x_n\} \geq y$ must hold

- Why? Because information flows from x_1, \dots, x_n to y , and under Biba, information must flow from a higher (or equal) class to a lower one

Example 2

For information flow of conditional statement:

if $f(x_1, \dots, x_n)$ **then** S_1 ; **else** S_2 ; **end**;

then the following must hold:

- S_1, S_2 must satisfy integrity constraints
- $\text{glb}\{\underline{x}_1, \dots, \underline{x}_n\} \geq \text{lub}\{\underline{y} \mid y \text{ target of assignment in } S_1, S_2\}$

Quiz

For the iterative statement:

`while $f(x_1, \dots, x_n)$ do S ;`

which of the following is *not* a condition for certification?

1. The loop must terminate
2. The block S must be secure
3. $\text{lub}\{ \underline{x}_1, \dots, \underline{x}_n \} \geq \text{glb}\{ \underline{y} \mid y \text{ target of assignment in } S \}$