ECS 235B Module 47
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:

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

the relation glb$\{\underline{x}_1, \ldots, x_n\} \geq \underline{y}$ must hold

- Why? Because information flows from $x_1, \ldots, x_n$ 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:

$$\texttt{if } f(x_1, \ldots, x_n) \texttt{ then } S_1; \texttt{ else } S_2; \texttt{ end;}$$

then the following must hold:

- S_1, S_2 must satisfy integrity constraints
- glb$\{ \underline{x_1}, \ldots, \underline{x_n} \} \geq$ lub$\{\underline{y} \mid y$ target of assignment in $S_1, S_2 \}$

Quiz

For the iterative statement:

`while` $f(x_1, \ldots, x_n)$ `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. lub{ $\underline{x}_1, \ldots, \underline{x}_n$ } $\geq$ glb{$\underline{y}$ | y target of assignment in S }