

ECS 235B Module 44

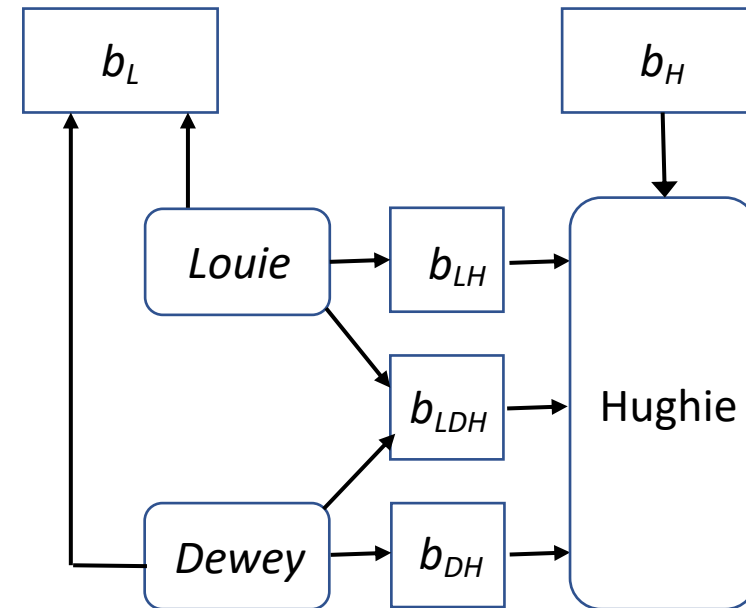
Policy Composition I

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- Assumed: Output function of input
 - Means deterministic (else not function)
 - Means uninterruptability (differences in timings can cause differences in states, hence in outputs)
- This result for deterministic, noninterference-secure systems

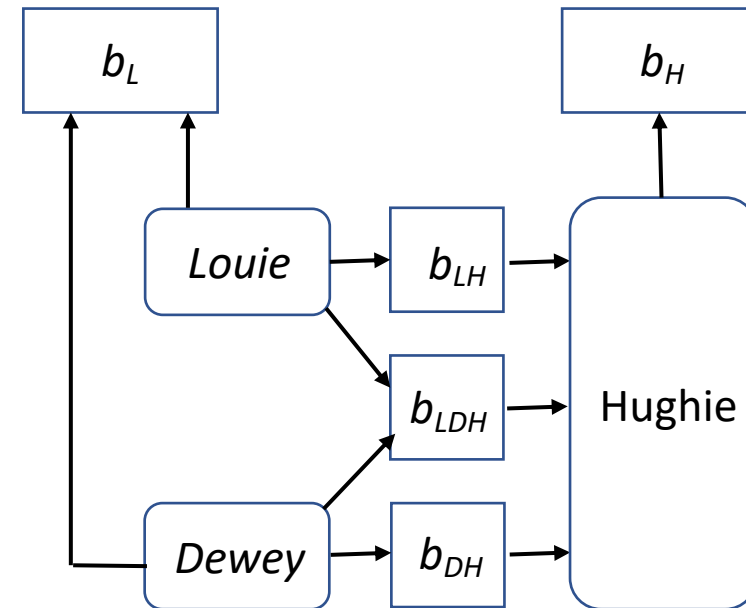
Compose Systems

- Louie, Dewey LOW
- Hughie HIGH
- b_L output buffer
 - Anyone can read it
- b_H input buffer
 - From HIGH source
- Hughie reads from:
 - b_{LH} (Louie writes)
 - b_{LDH} (Louie, Dewey write)
 - b_{DH} (Dewey writes)



Systems Secure

- All noninterference-secure
 - Hughie has no output
 - So inputs don't interfere with it
 - Louie, Dewey have no input
 - So (nonexistent) inputs don't interfere with outputs



Security of Composition

- Buffers finite, sends/receives blocking: composition *not* secure!
 - Example: assume b_{DH} , b_{LH} have capacity 1
- Algorithm:
 1. Louie (Dewey) sends message to b_{LH} (b_{DH})
 - Fills buffer
 2. Louie (Dewey) sends second message to b_{LH} (b_{DH})
 3. Louie (Dewey) sends a 0 (1) to b_L
 4. Louie (Dewey) sends message to b_{LDH}
 - Signals Hughie that Louie (Dewey) completed a cycle

Hughie

- Reads bit from b_H
 - If 0, receive message from b_{LH}
 - If 1, receive message from b_{DH}
- Receive on b_{LDH}
 - To wait for buffer to be filled

Example

- Hughie reads 0 from b_H
 - Reads message from b_{LH}
- Now Louie's second message goes into b_{LH}
 - Louie completes setp 2 and writes 0 into b_L
- Dewey blocked at step 1
 - Dewey cannot write to b_L
- Symmetric argument shows that Hughie reading 1 produces a 1 in b_L
- So, input from b_H copied to output b_L

Quiz

True or False: If a machine has no outputs, it is noninterference-secure