Mitchell Merritt Deadlock Detection Algorithm

Assignment 05

1

State Transitions

- Initiate: Set same random values for u, v
- Block: This will be in effect every time a process is blocked.
  - Add a new block edge in the WFG
  - Set both u, v of the blocked process with a new value k where
    - K = f(u1, u2) yields a unique label greater than both u1 and u2 – the two public labels for the blocking and blocked processes

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State Transitions

- Transmit: If public label of a blocking process is greater than that of the blocked process in the WFG, then this higher public label propagates in the opposite direction of the edges.
- Detect: If the public and private labels of a blocked process are same, and the value is again same as the public label of the blocking process, a deadlock is detected

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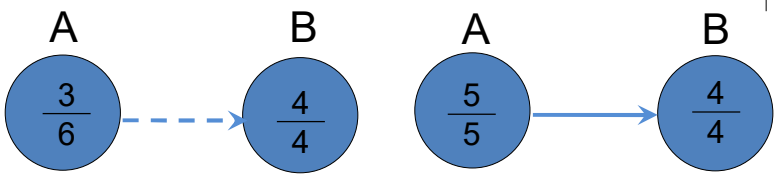

- Block rule
- Assume, f(u1, u2)=Maximum(u1, u2)+1

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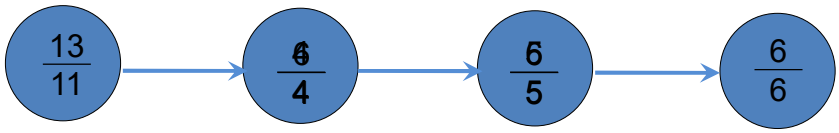

- Transmit rule

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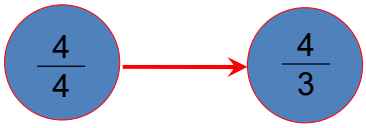

- Detection rule

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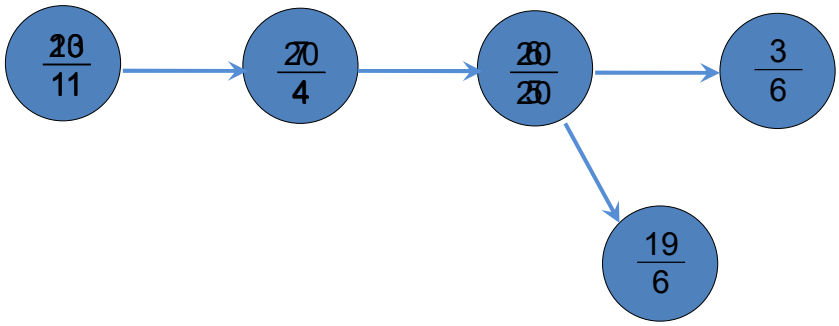

- Scenario 1

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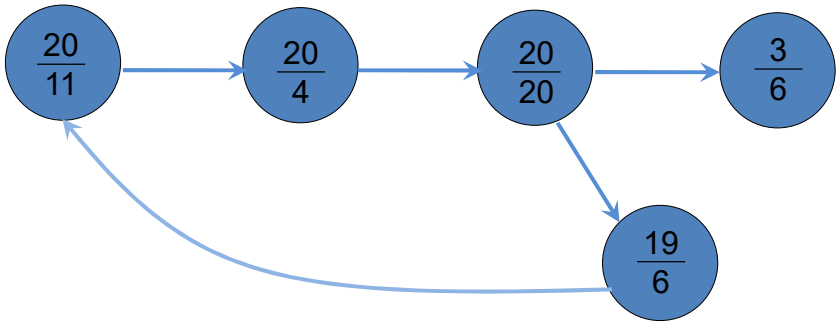

- Scenario 2

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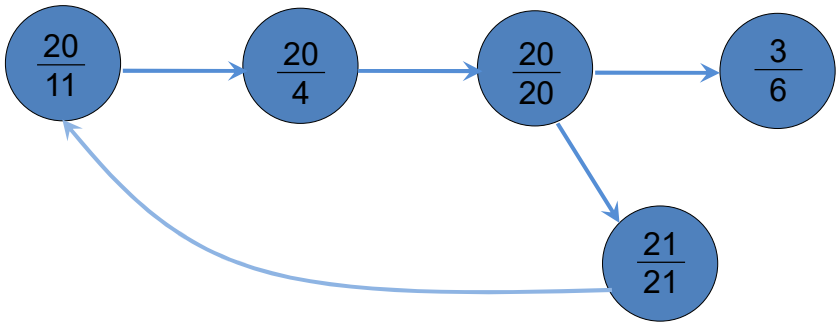

- Scenario 2

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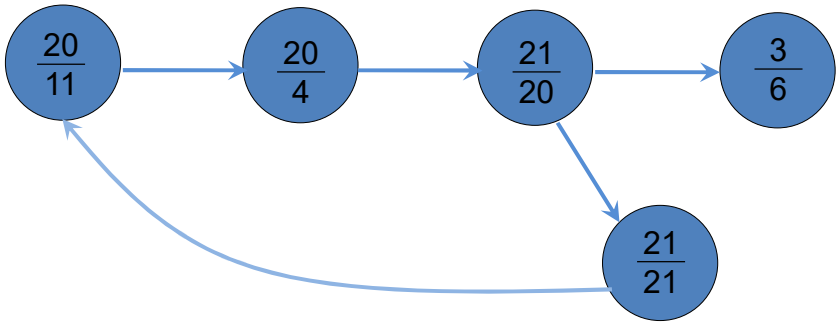

- Scenario 2

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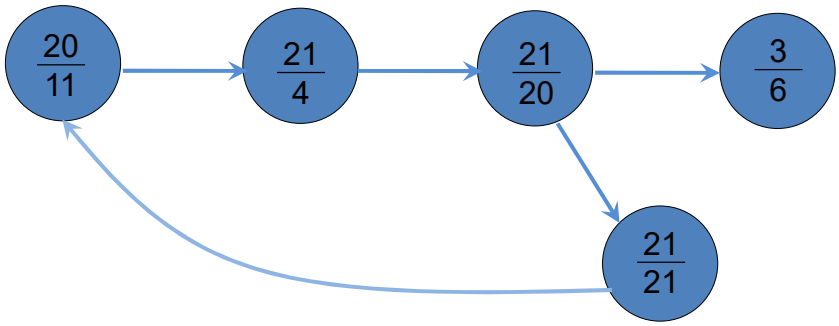

- Scenario 2

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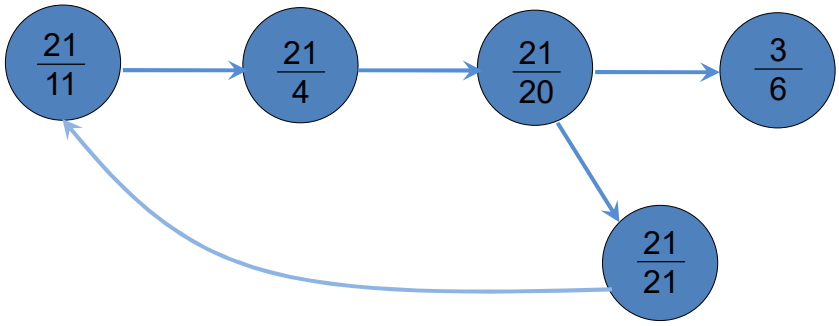

- Scenario 2

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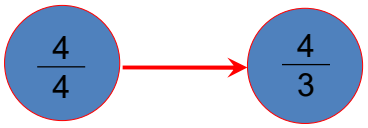

- Detection rule

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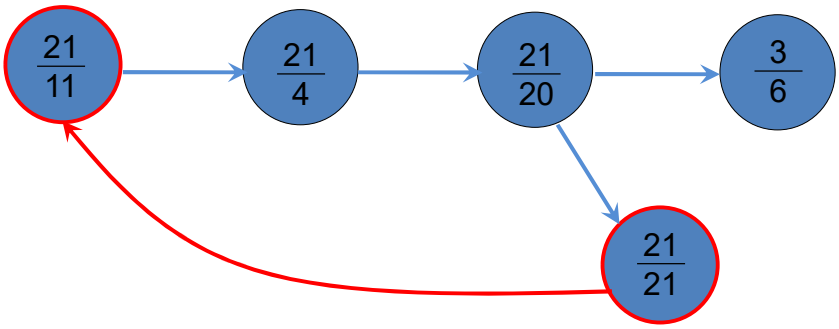

- Scenario 2

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Hints

- To start with, consider a network with N nodes.
- Each node is having the same unique public and private key initially.
- Choose (or randomize) a few pair of nodes and apply block rule between the two nodes in each pair

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Hints

- Detect the triggering condition for Transmit rule
- Apply Transmit rule whenever it is applicable
- Check for deadlock detection condition

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Thanks for your attention

All the best…

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