Announcement

2019-07-02
Talk by Celonis

Programming Assignment: Buffer Manager

- Requirement: Don't hold latches longer than needed

Programming Assignment: Buffer Manager

- Requirement: Don't hold latches longer than needed
- Do not hold the global directory lock
  - ▶ while waiting
  - ▶ during I/O

Happy Path

1. Lock directory
2. Get frame from directory
3. Lock frame
4. Unlock directory

Happy Path

1. Lock directory
2. Get frame from directory ⚡ **I/O**
3. Lock frame
4. Unlock directory

Happy Path

1. Lock directory
2. Get frame from directory ⚡ **I/O**
3. Lock frame ⚡ **Deadlock**
4. Unlock directory

Locked Frames

- Need to unlock directory latch before blocking
- But: Directory latch protects from concurrent eviction

Locked Frames

- Need to unlock directory latch before blocking
- But: Directory latch protects from concurrent eviction
- Reference counting for eviction

External Frames

Frame might have been evicted or first accessed

1. Create new frame data structure
2. Lock the new frame
3. Insert into directory
4. Unlock directory
5. Load data from disk

External Frames

Frame might have been evicted or first accessed

1. Create new frame data structure ⚡ **evict**
2. Lock the new frame
3. Insert into directory
4. Unlock directory
5. Load data from disk

Evict Frames

1. Find page to evict
2. Try to lock the page (or restart)
3. If page is clean → evict

Evict Frames

1. Find page to evict
2. Try to lock the page (or restart)
3. If page is clean → evict
4. Unlock directory
5. Write data to disk
6. Mark as clean
7. Lock directory
8. If no concurrent access want's to keep this page → evict (else restart)
9. Remove from directory
10. Unlock