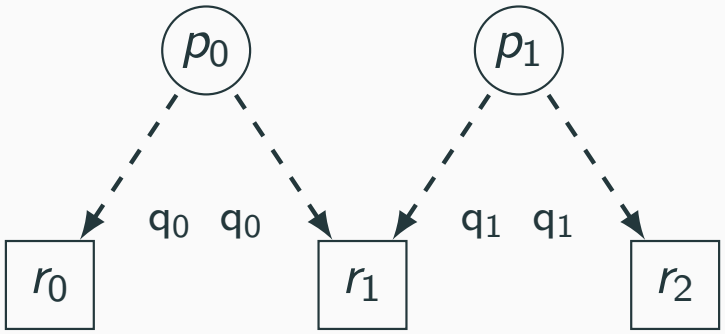
# Scenario 1

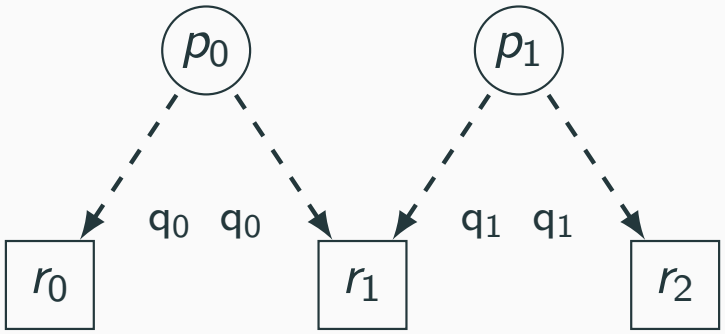
# Dining Philosophers




| | $r_0$ | | $r_1$ | | $r_2$ |
|---|---|---|---|---|---|
| 0 | $q_0$* | | 1 | | 2 |
| 1 | | | 2 | | 3 |
| 2 | | | 3 | | 4 |
| ⋮ | ⋮ | | ⋮ | ⋮ | ⋮ |
| n | | | n | | n |

**Comment**: Suppose $r_0$ replies to $p_0$ first with 0 and increments $pp(r_0)$ to $pp(r_0) = 1$ (* means promised, not locked yet).

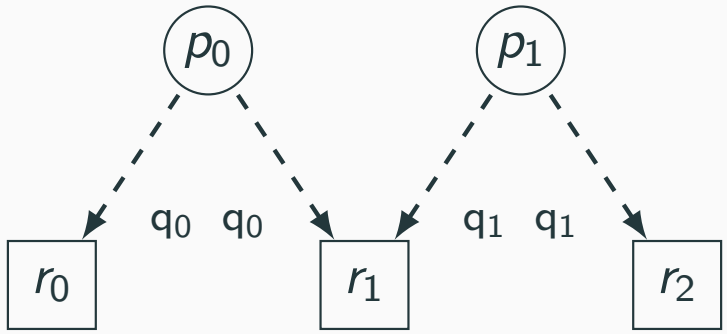
# Dining Philosophers




| | $r_0$ | | $r_1$ | | $r_2$ |
|---|---|---|---|---|---|
| 0 | $q_0$* | 1 | $q_1$* | 2 | |
| 1 | | 2 | | 3 | |
| 2 | | 3 | | 4 | |
| ⋮ | ⋮ | ⋮ | ⋮ | ⋮ | |
| n | | n | | n | |

**Comment**: Suppose $r_1$ replies to $p_1$ with 1 and increments $pp(r_1)$ to $pp(r_1) = 2$.

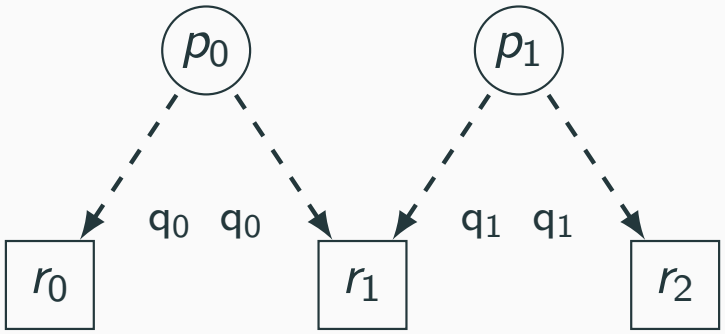
# Dining Philosophers




| | $r_0$ | | $r_1$ | | $r_2$ |
|---|---|---|---|---|---|
| 0 | $q_0$* | 1 | $q_1$* | 2 | $q_1$* |
| 1 | | 2 | | 3 | |
| 2 | | 3 | | 4 | |
| ⋮ | ⋮ | ⋮ | ⋮ | ⋮ | |
| n | | n | | n | |

**Comment**: Suppose $r_2$ replies to $p_1$ with 2 and increments $pp(r_2)$ to $pp(r_1) = 3$.

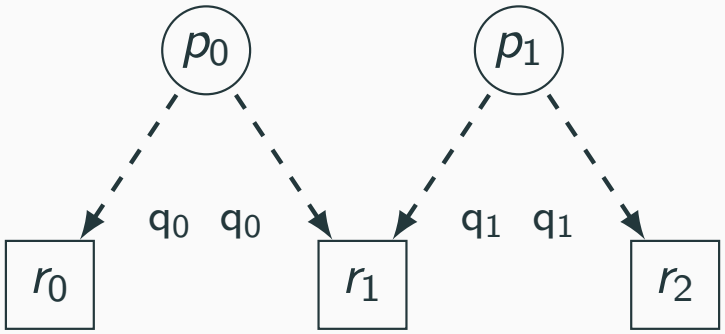
# Dining Philosophers




| | $r_0$ | | $r_1$ | | $r_2$ |
|---|---|---|---|---|---|
| 0 | $q_0$* | 1 | $q_1$* | 2 | $q_1$* |
| 1 | | 2 | $q_0$* | 3 | |
| 2 | | 3 | | 4 | |
| ⋮ | ⋮ | ⋮ | ⋮ | ⋮ | |
| n | | n | | n | |

**Comment**: Suppose $r_1$ replies to $p_0$ with 2 and increments $pp(r_2)$ to $pp(r_1) = 3$.

# Dining Philosophers

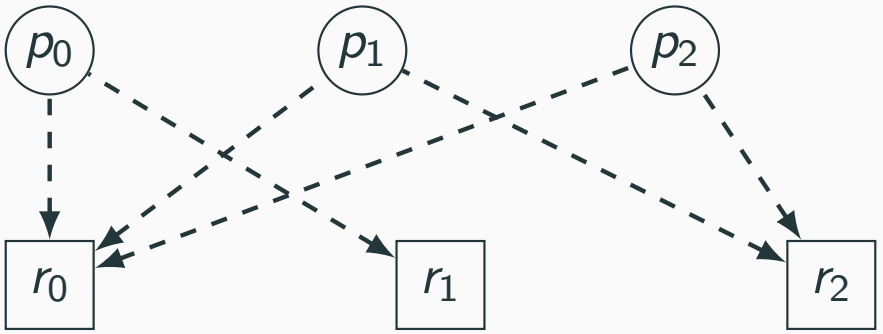



| | $r_0$ | | $r_1$ | | $r_2$ |
|---|---|---|---|---|---|
| 0 | $q_0$* | 1 | $q_1$* | 2 | $q_1$* |
| 1 | | 2 | $q_0$* | 3 | |
| 2 | | 3 | | 4 | |
| ⋮ | ⋮ | ⋮ | ⋮ | ⋮ | |
| n | | n | | n | |

**Comment**: Both $p_0$ and $p_1$ can confirm they received all replies they needed, but $\max(p_0) = \max(p_1) = 2$ and so they both would like to lock $r_1(2)$.

# Scenario 2 (Race condition?)

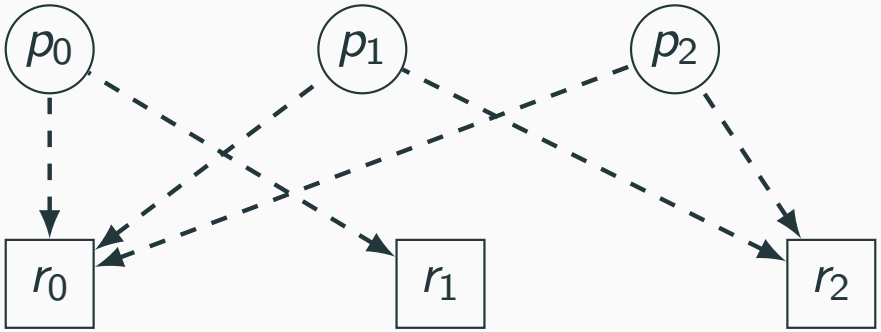
# Dining Philosophers




| | $r_0$ | | $r_1$ | | $r_2$ |
|---|---|---|---|---|---|
| 0 | $q_0$* | | 1 | | 2 |
| 1 | | | 2 | | 3 |
| 2 | | | 3 | | 4 |
| ⋮ | ⋮ | | ⋮ | ⋮ | ⋮ |
| n | | | n | | n |

**Comment**: Suppose $r_0$ replies to $p_0$ with 0 and increments $pp(r_0)$ to $pp(r_0) = 1$.

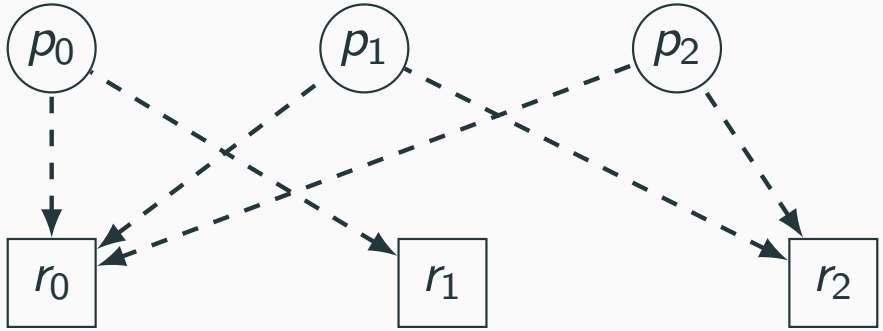
# Dining Philosophers




| | $r_0$ | | $r_1$ | | $r_2$ |
|---|---|---|---|---|---|
| 0 | $q_0$* | | 1 | | 2 |
| 1 | $q_1$* | | 2 | | 3 |
| 2 | $p_2$* | | 3 | | 4 |
| 3 | | | 4 | | 5 |
| ⋮ | ⋮ | | ⋮ | ⋮ | ⋮ |
| n | | | n | | n |

**Comment**: Suppose $r_0$ replies to $p_1$ and $p_2$ ($r_1$ hasn't replied to $p_0$ yet) respectively with 1 and 2, now $pp(r_0) = 3$

# Dining Philosophers




| | $r_0$ | | $r_1$ | $r_2$ |
|---|---|---|---|---|
| 0 | $q_0$* | 1 | $q_0$* | 2 |
| 1 | $q_1$* | 2 | | 3 |
| 2 | $q_2$* | 3 | | 4 |
| 3 | | 4 | | 5 |

**Comment**: Suppose $r_1$ now replies to $p_0$ with 1 and increments $pp(r_1)$ and now $p_0$ could lock $\max(0, 1) = 1$, but $r_0(1)$ is promised for someone else. Sure, it's possible that these will be released as other values might be higher, but it's likely they won't. (I'm considering locking lane with keys($q_n$), but that's not a particularly nice solution)