SER 321 A Session

SI Session

Wednesday September 20th 2023

6:00 - 7:00 pm MST

Agenda

- Parallel vs. Distributed Systems
- Distributed Structure Review
  - Main and Worker
  - Peer to Peer
- Consensus Review

SI Session Expectations

Thanks for coming to the **SER 321** SI session. We have a packed agenda and we are going to try to get through as many of our planned example problems as possible. This session will be recorded and shared with others.

- If after this you want to see additional examples, please visit the drop-in tutoring center.
- We will post the link in the chat now and at the end of the session.
  - tutoring.asu.edu
- Please keep in mind we are recording this session and it will be made available for you to review 24-48 hours after this session concludes.
- Finally, please be respectful to each other during the session.

Interact with us:

Zoom Features

Zoom Chat

- Use the chat feature to interact with the presenter and respond to presenter's questions.
- Annotations are encouraged

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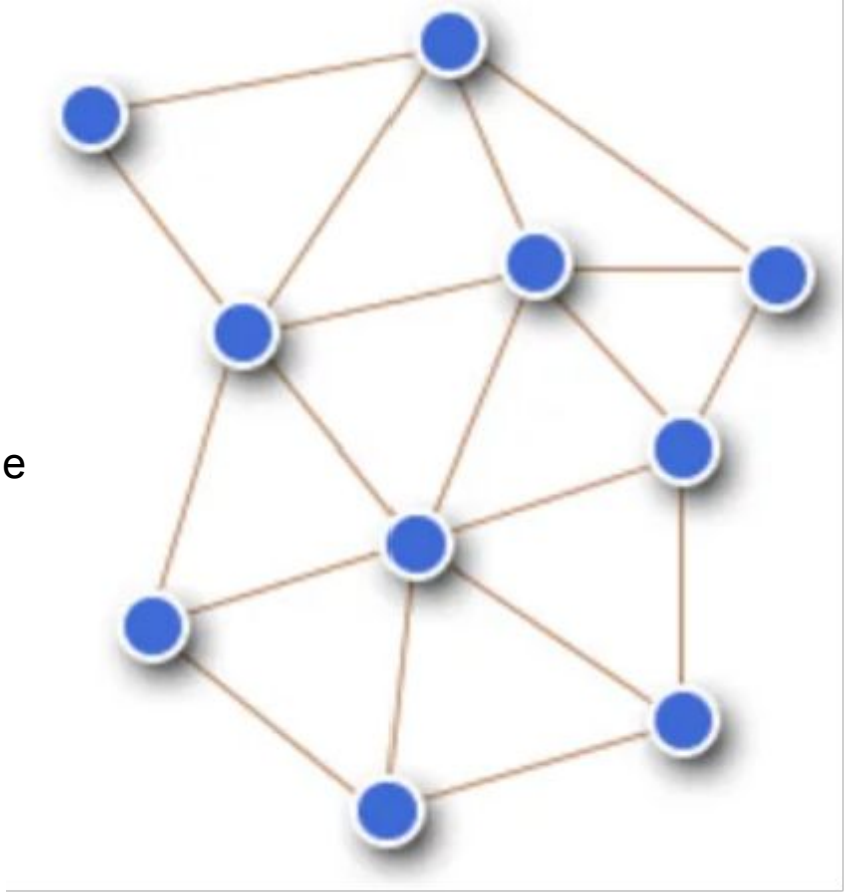
Distributed Systems

What do we mean by distributed system again?



- Appears to be a single system from the outside
- Made up of many nodes
- Nodes communicate
- Nodes are independent
- No Global Clock
- Nodes can fail

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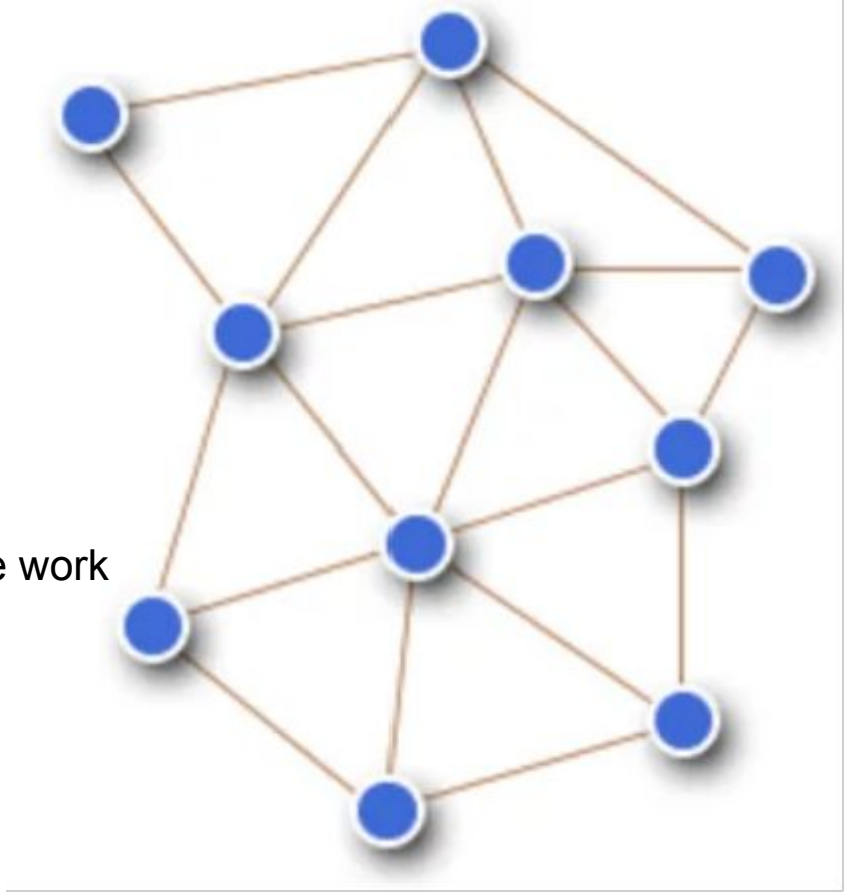
Distributed Systems

Then a distributed algorithm would be…



Algorithms using distributed systems!

- Each node is going to perform a “share” of the work
- May save memory
- Can be faster
- Can be slower!
    - Do we remember Big-Oh?

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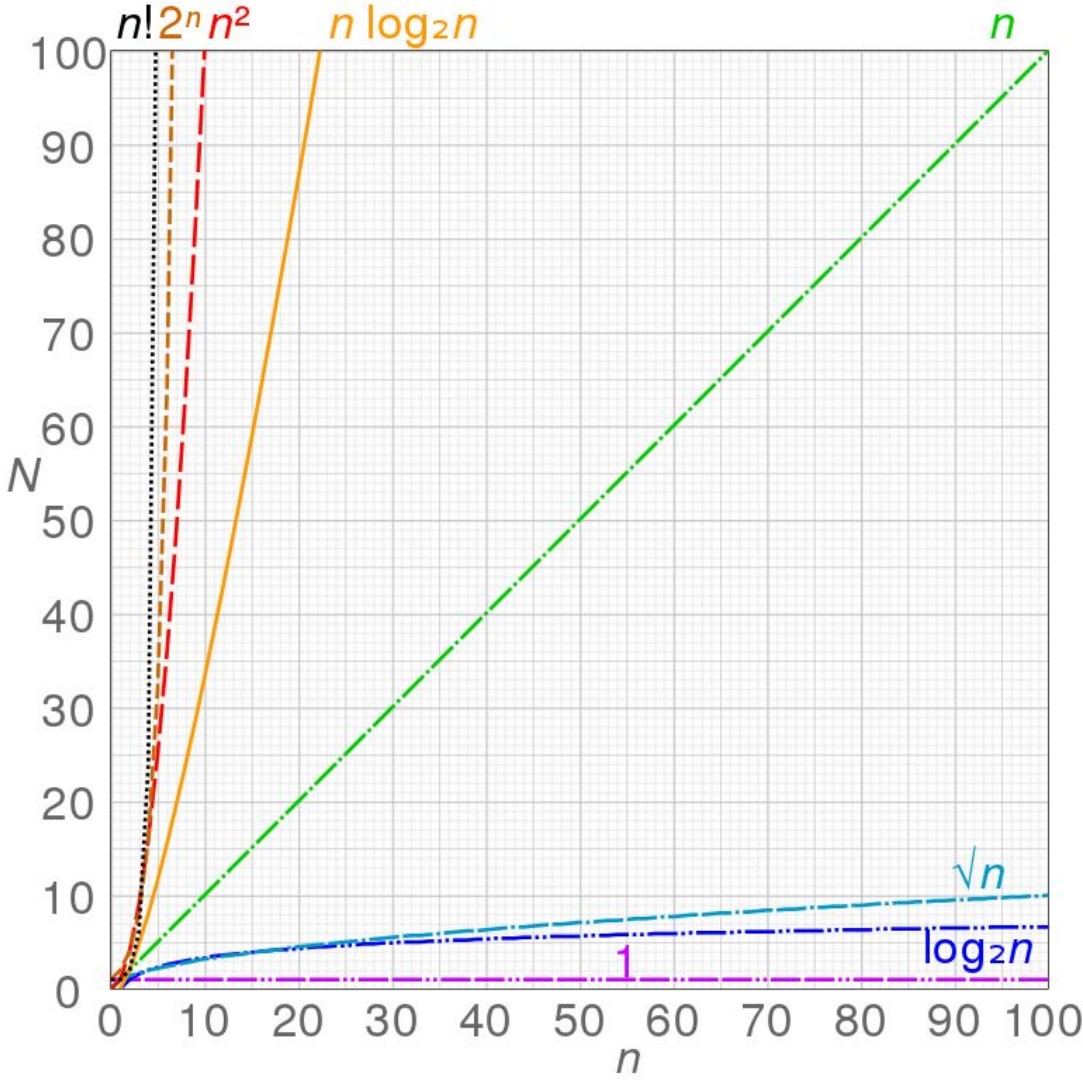
Distributed Systems

Really only going to be truly “worth it” for excessively large orders.



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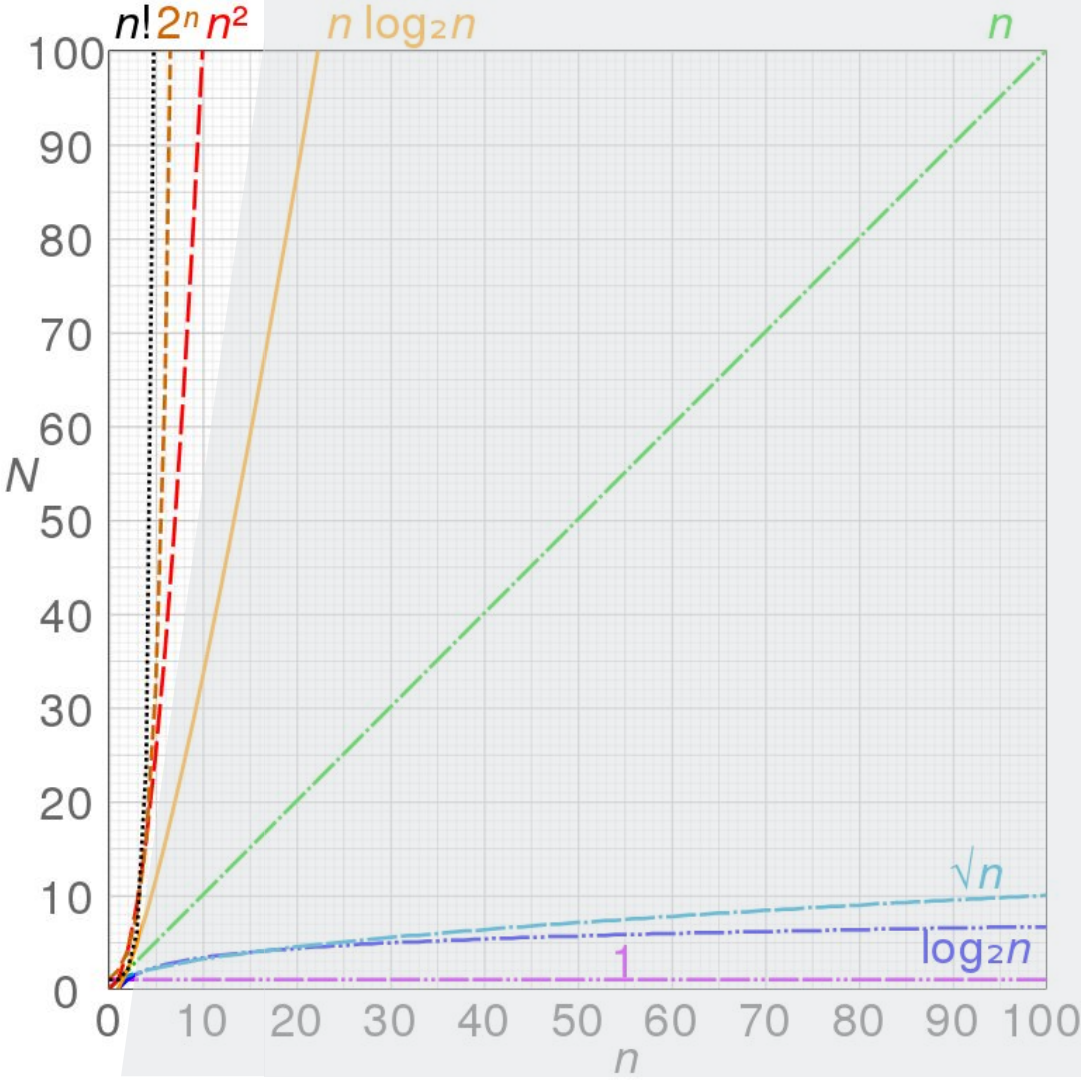
Distributed Systems

Really only going to be truly “worth it” for excessively large orders.

Think enormous amounts of data with very large orders

One system may not be able to handle it!

Then it makes sense to partition and divvy up the work



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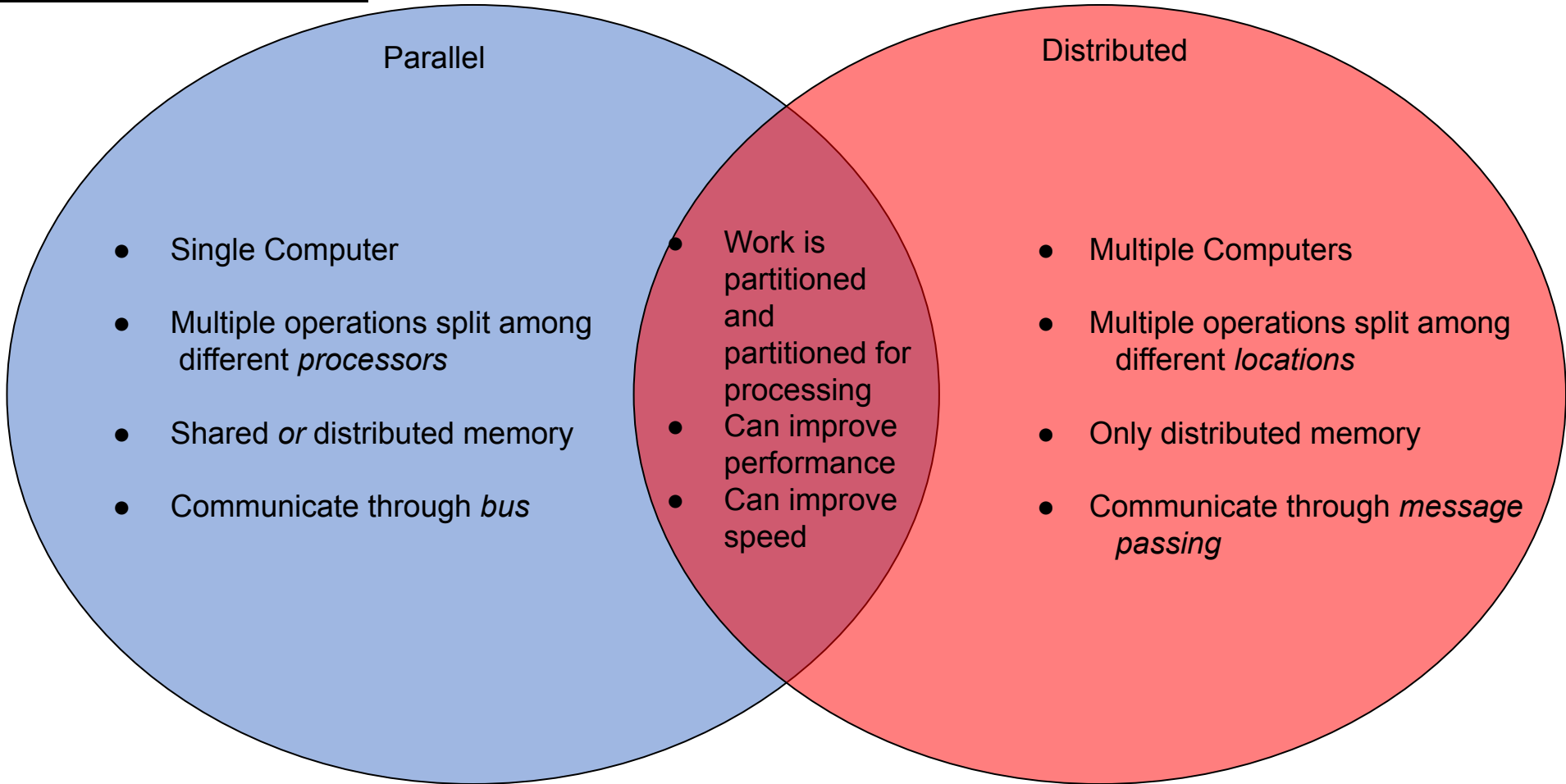
Parallel vs. Distributed



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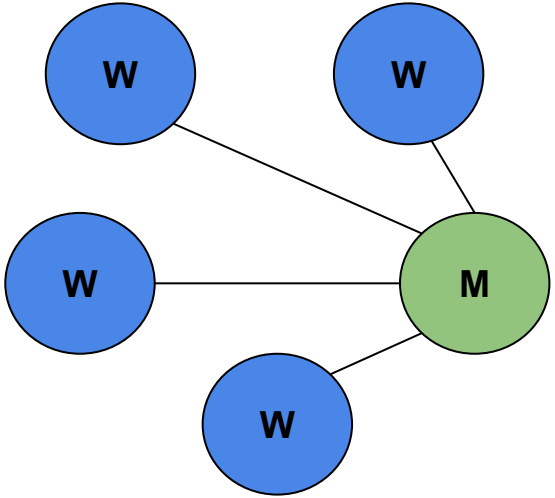
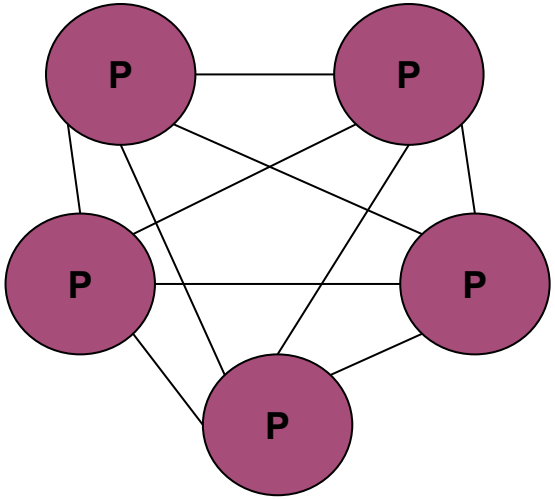
Distributed Structures

Two main forms:

Main and Worker



Peer to Peer



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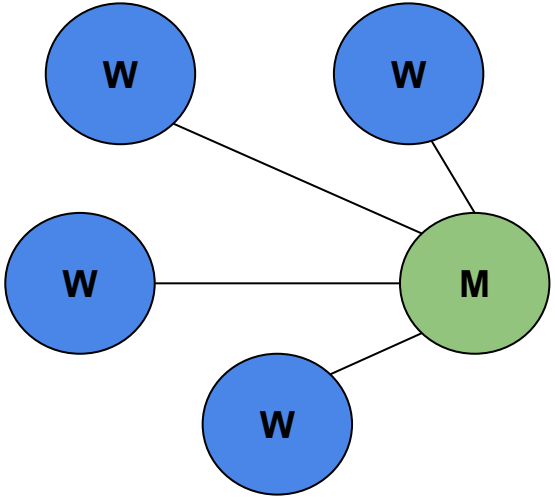
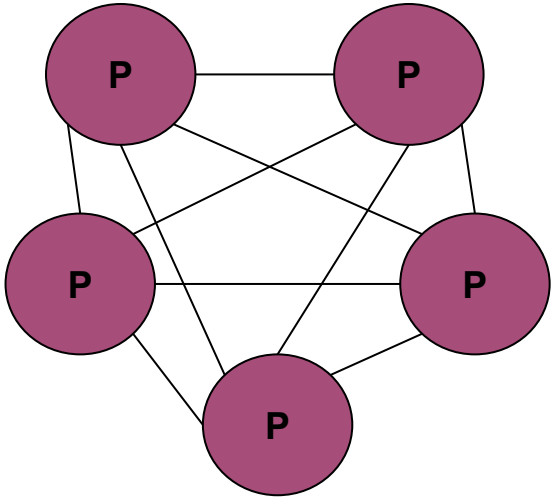
Distributed Structures

Peer to Peer **may or maynot** have a leader





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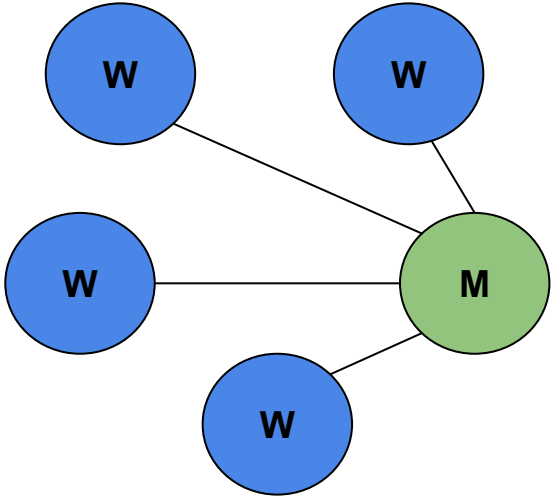
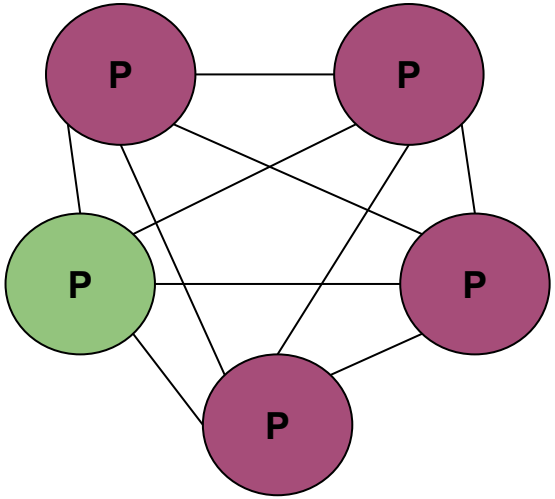
Distributed Structures

Peer to Peer **may or maynot** have a leader

What's a leader again?





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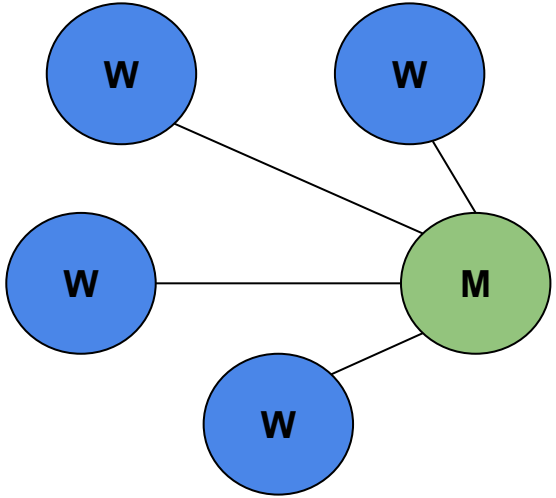
Distributed Structures

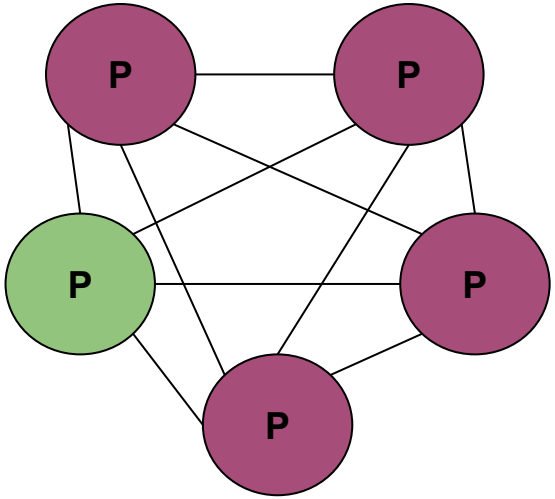
Peer to Peer **may or maynot** have a leader



What's a leader again?

A single node in the system that contains all system state and concurrency data

The node with the "true and final" list of data



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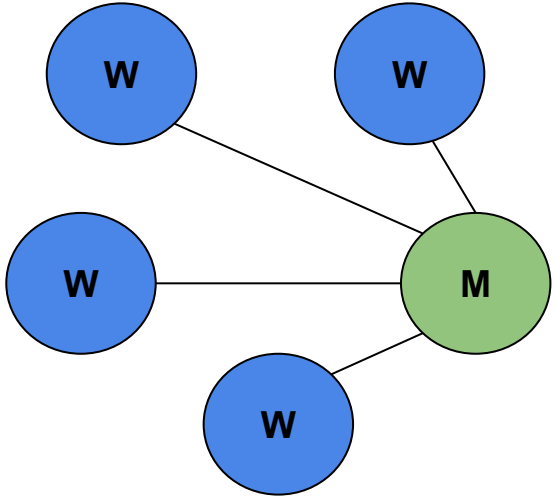
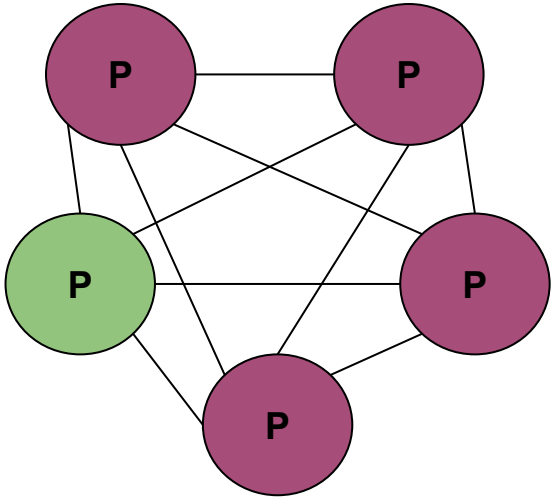
Distributed Structures

What's the difference between the main and worker structure and the peer to peer structure with a leader?



Worker nodes do not communicate with other worker nodes

Peer nodes always communicate with *all* peers in the system



A leader is chosen in a Leader Election, a form of consensus, where each node votes for the leader.

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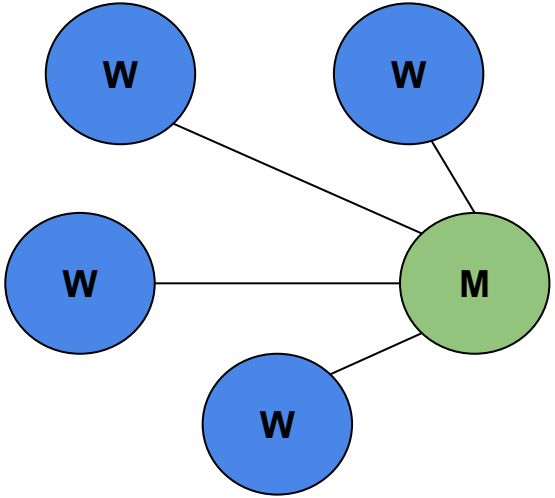
Consensus

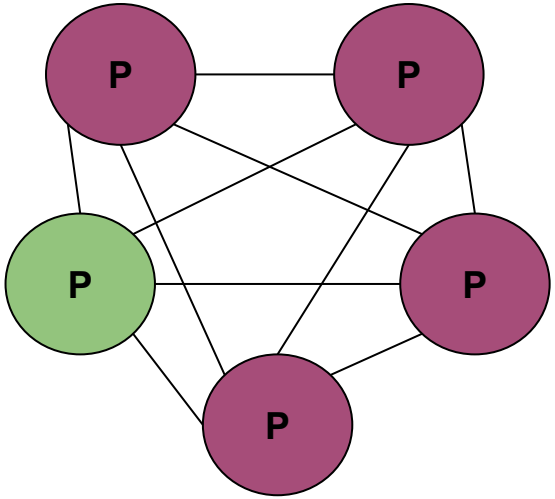
One node sends a statement to the other nodes

Every node will agree or disagree with that statement

If the previously defined rule is met, the statement is confirmed

Otherwise, the statement is rejected





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Consensus

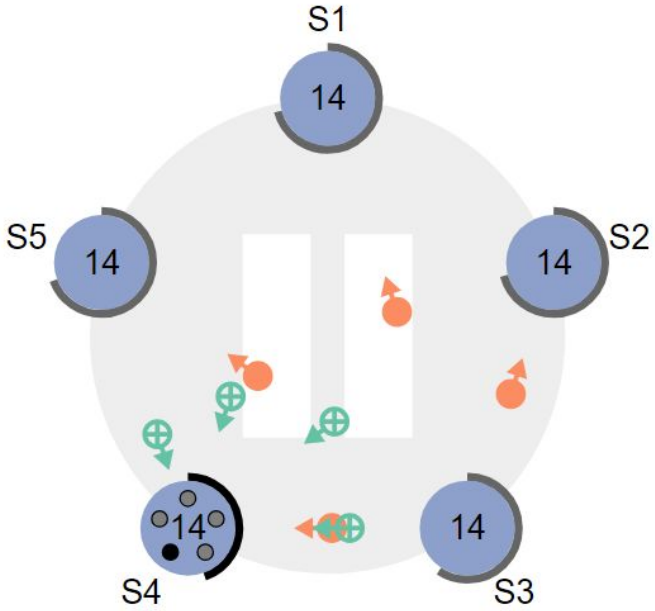
Different forms

All looking to ensure nodes agree
That nodes *trust* each other

Proof of Work

Leader Election

RAFT



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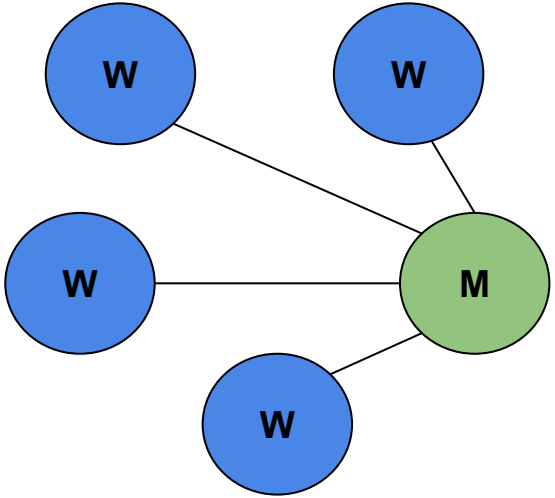
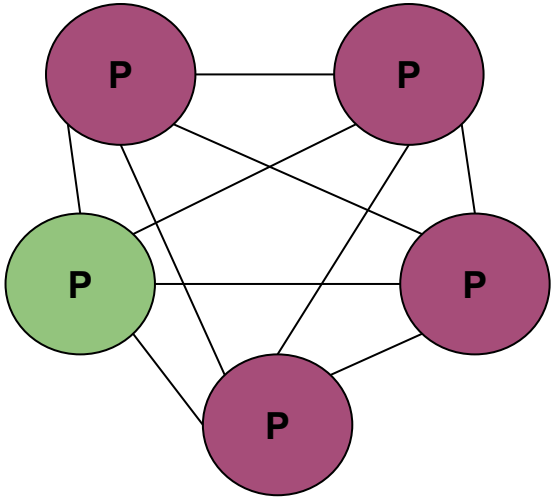
Consensus

True or false:

Consensus only exists in Peer to Peer structures.





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This Assignment

- Think about what protocol you want to use!
- Do you want to start from scratch?
  - Maybe build off a previous assignment?
  - Start with code from the CoureRepo?
    - SimplePeerToPeer
    - PeerToPeer
- Think about the encryption you are going to use
- ***Start slow! Build in small steps***
- ***Commit often***
- Ask questions in the #module5 channel

Questions?

Survey:

https://bit.ly/asn_survey

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Upcoming Events

SI Sessions:

- Sunday September 24th 2023 6:00 pm MST

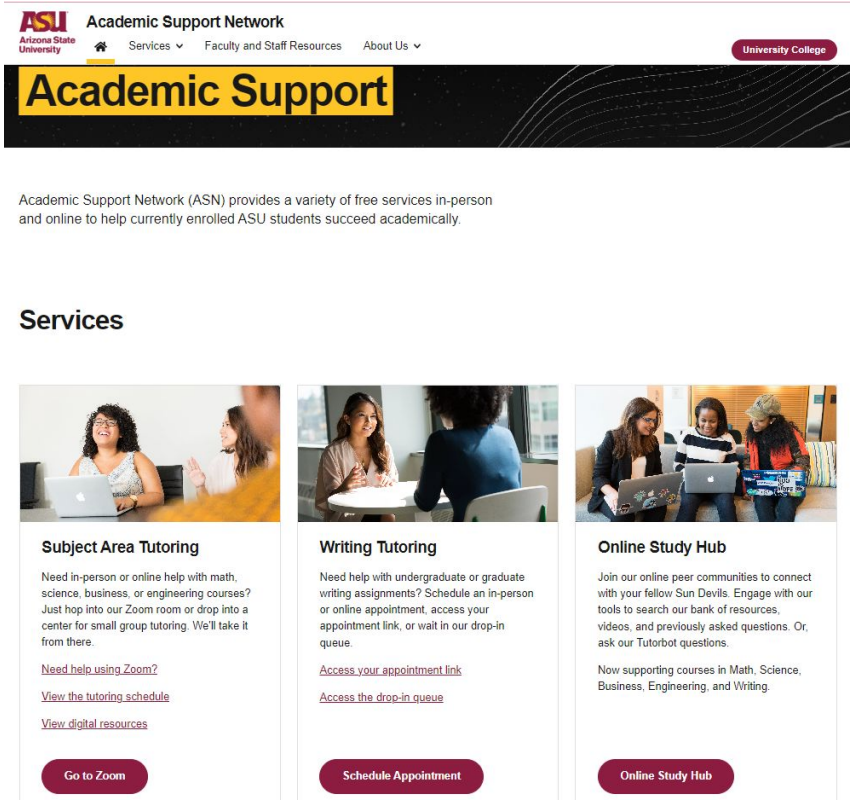
Review Sessions:

- TBD

More Questions?

Check out our other resources!

tutoring.asu.edu

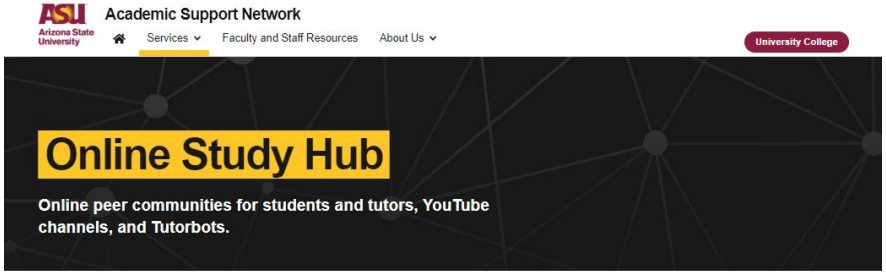


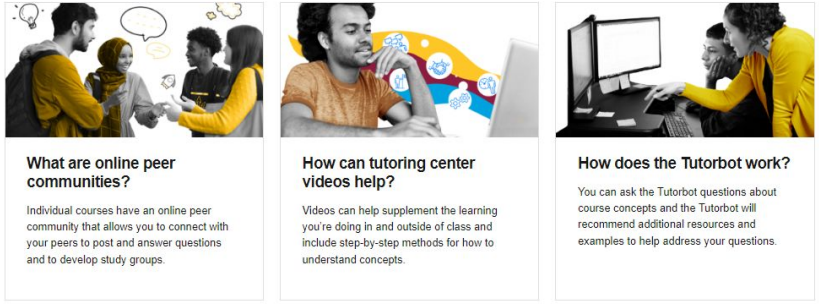
1. **Click on ‘Go to Zoom’ to log onto our Online Tutoring Center.**
2. **Click on ‘View the tutoring schedule’ to see when tutors are available for specific courses.**

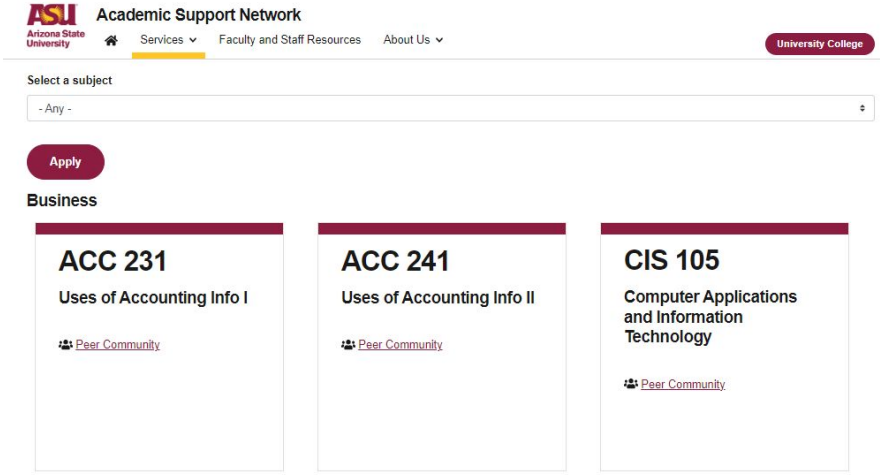
More Questions?

Check out our other resources!

tutoring.asu.edu/online-study-hub







Don't forget to check out the Online Study Hub for additional resources!

Additional Resources

CoureRepo

Dining Philosophers Interactive

Raft Interactive