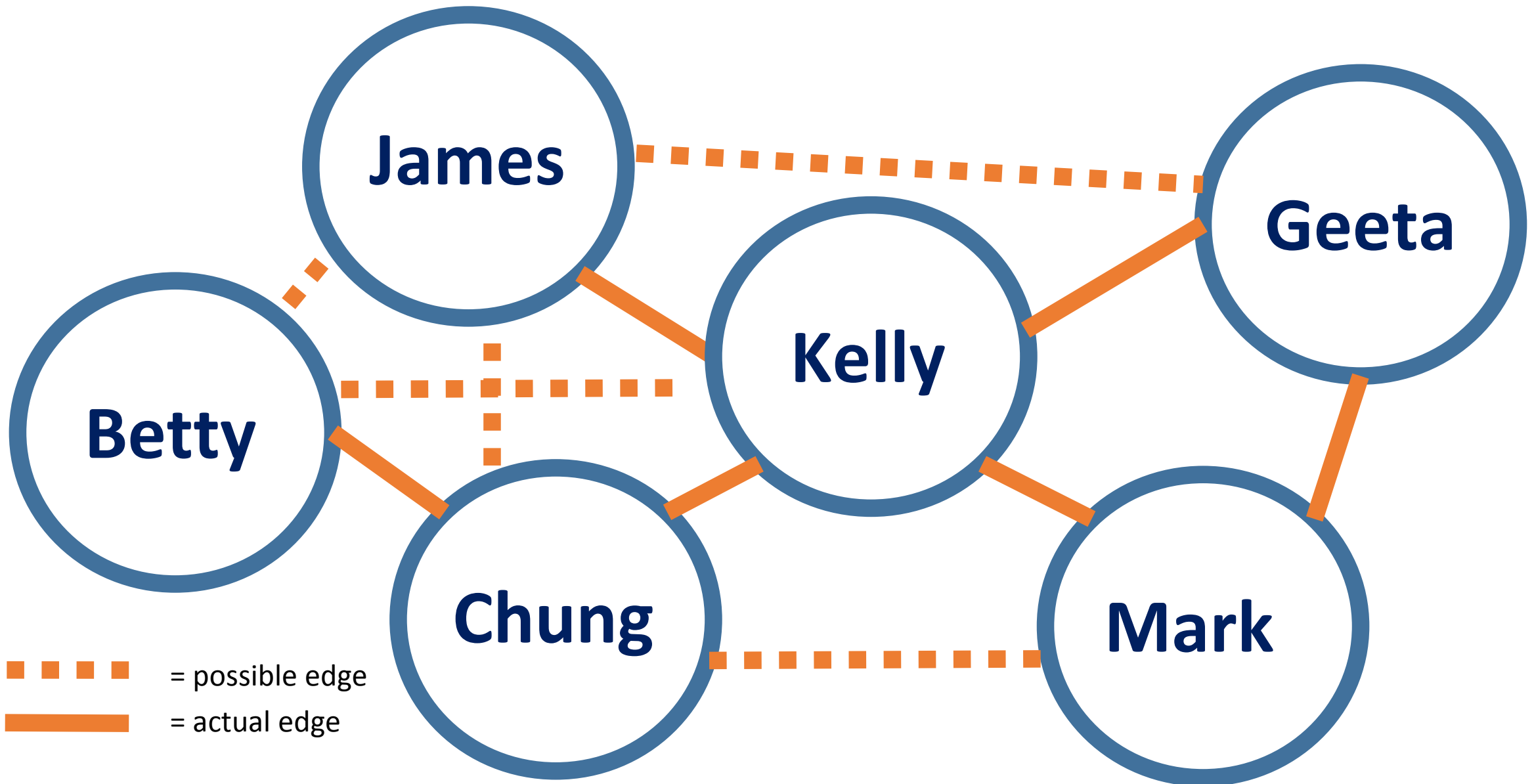




Introduction to Network Visualization and Analysis: Part 2

Kelly Schultz, Data Visualization Librarian &
Nich Worby, Government Information & Statistics Librarian

Network Theory: Density



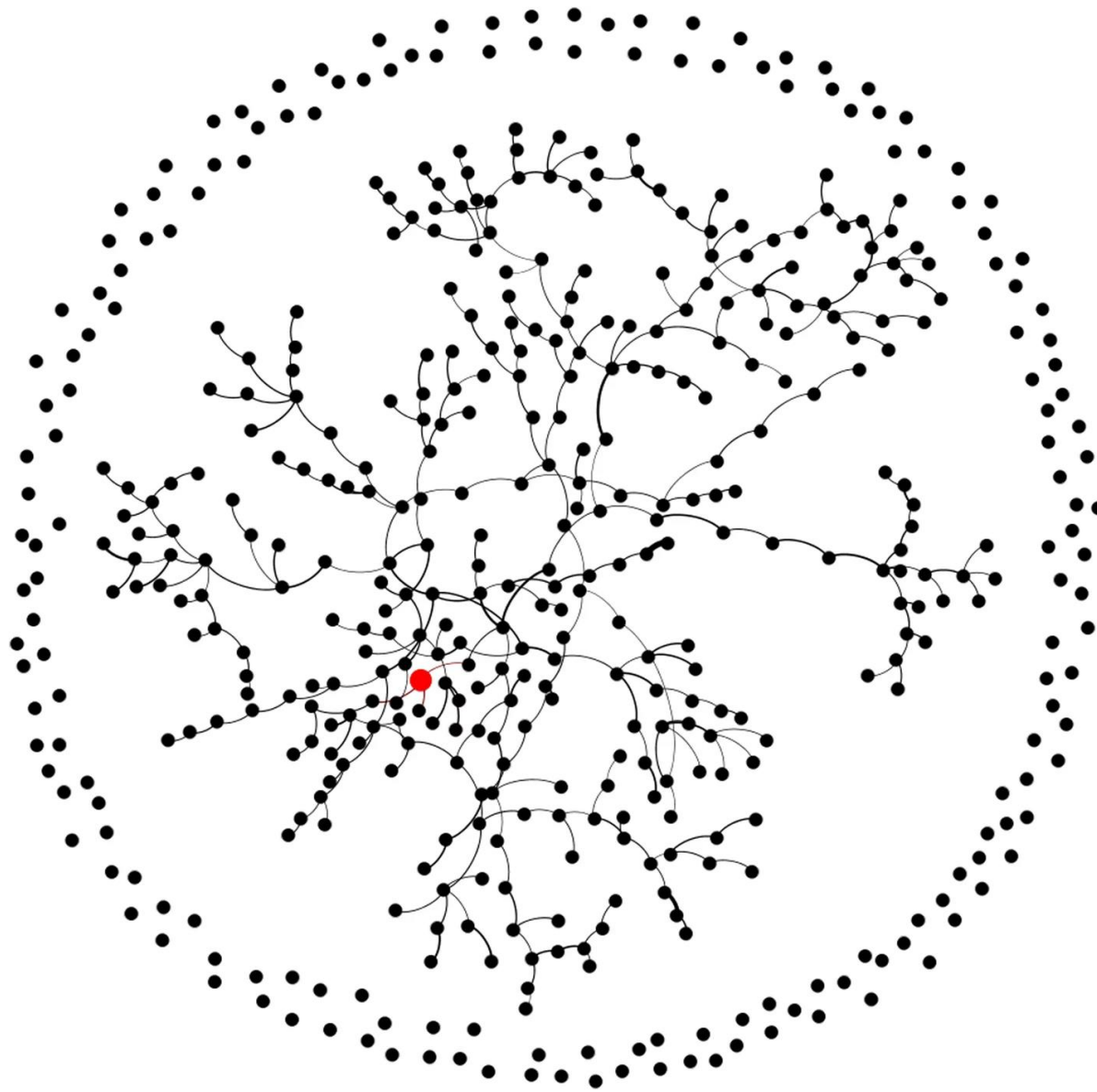
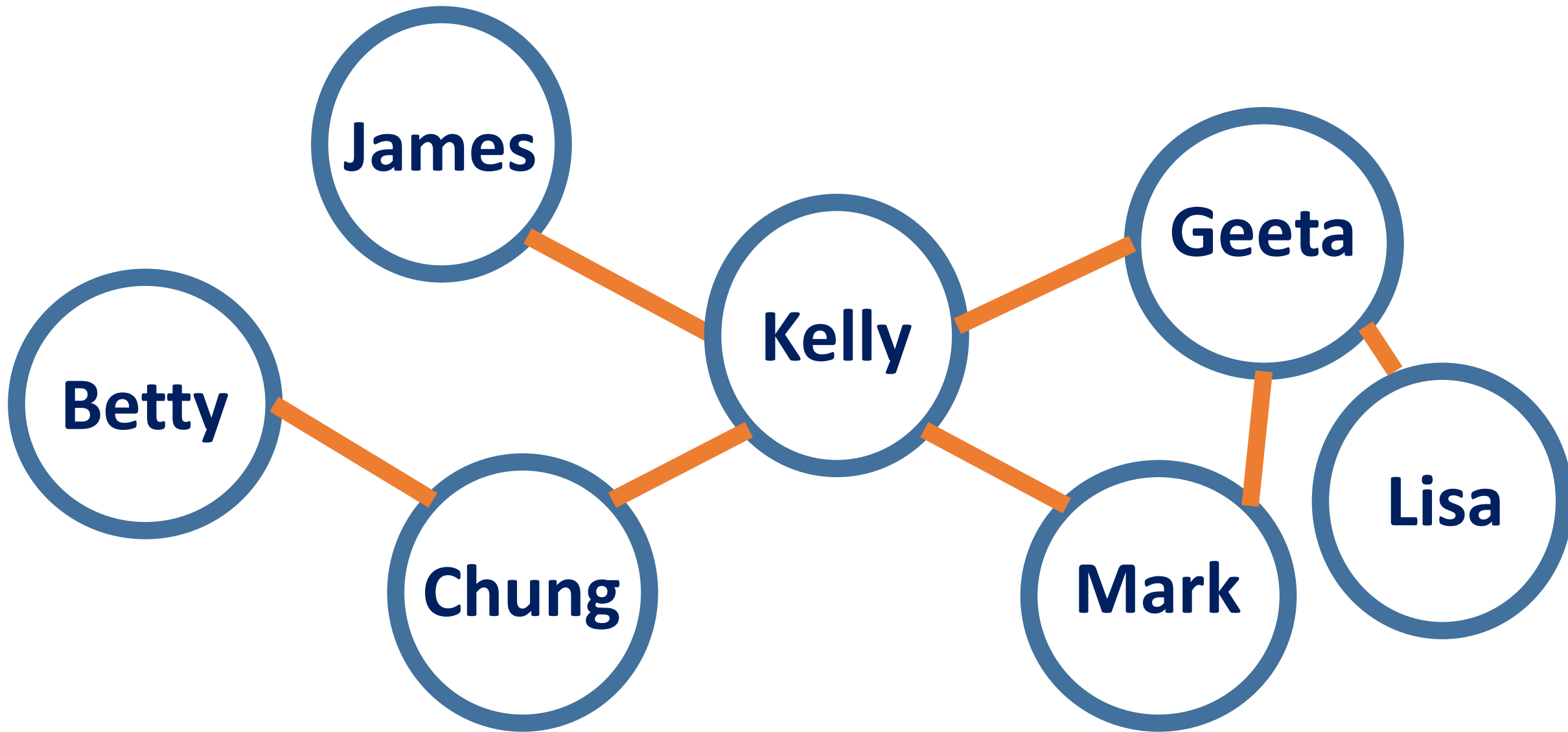
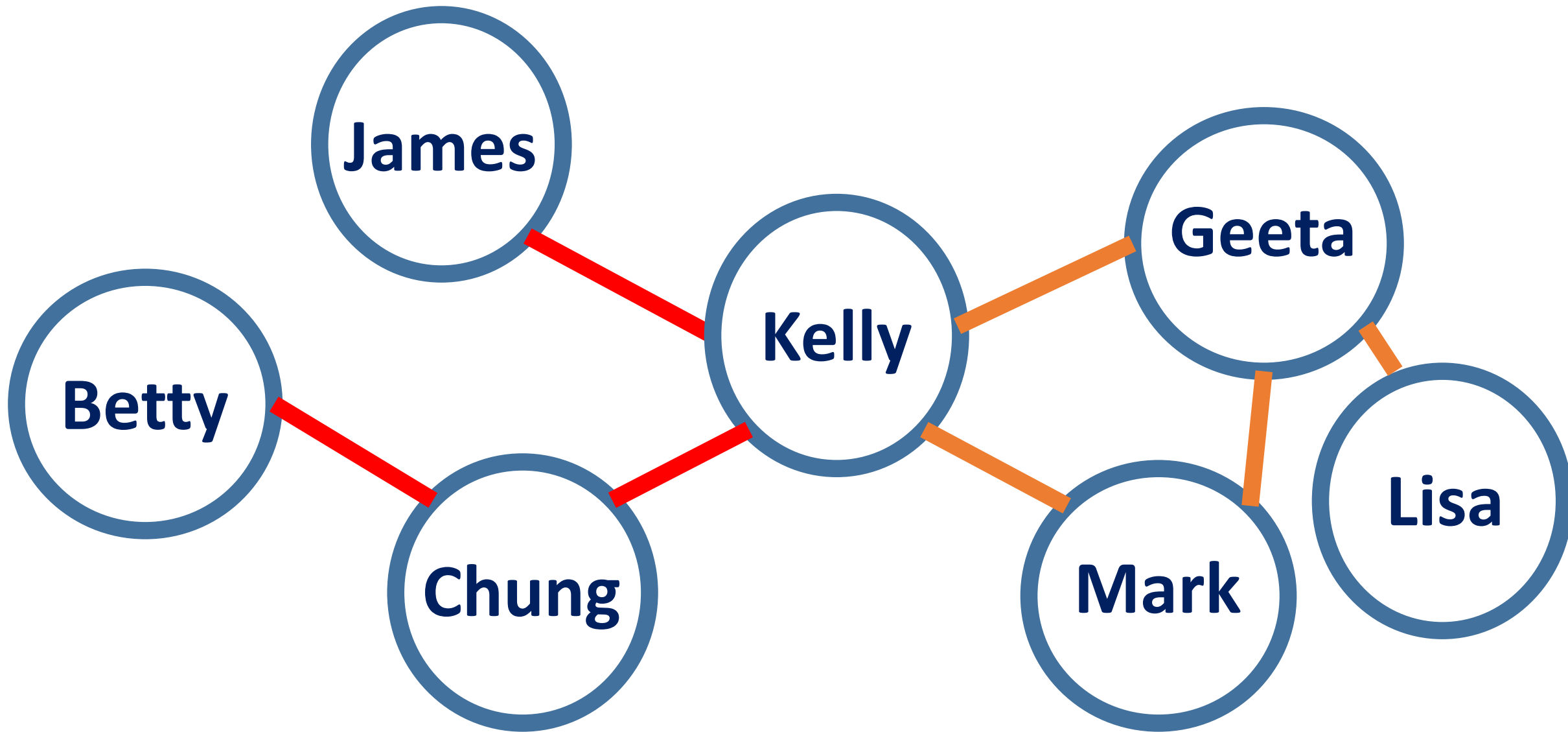


Image: Guo, Z., Xu, S., Tong, L., Dai, B., Liu, Y., & Xiao, D. (2020). An artificially simulated outbreak of a respiratory infectious disease. *BMC Public Health*, 20(1), 135.

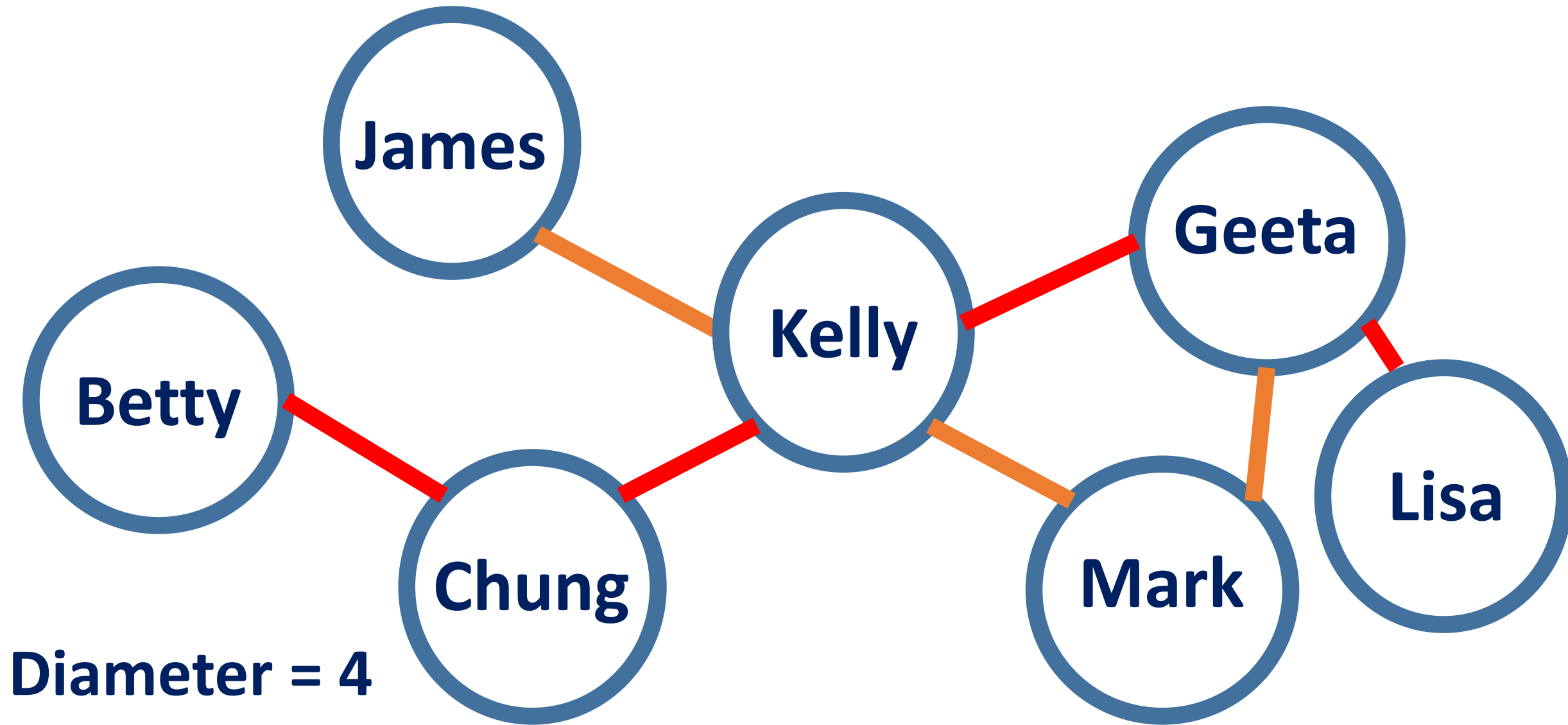
Network Theory: Distance



Network Theory: Shortest path



Network Theory: Diameter





Subway Map



Hours of operation

Weekday and Saturday service approximately 6 a.m. to 1:30 a.m.

Sunday service approximately 8 a.m. to 1:30 a.m.

Holiday start times vary

ttc.ca | Information: 416-393-4636 | Customer Service: 416-393-3030

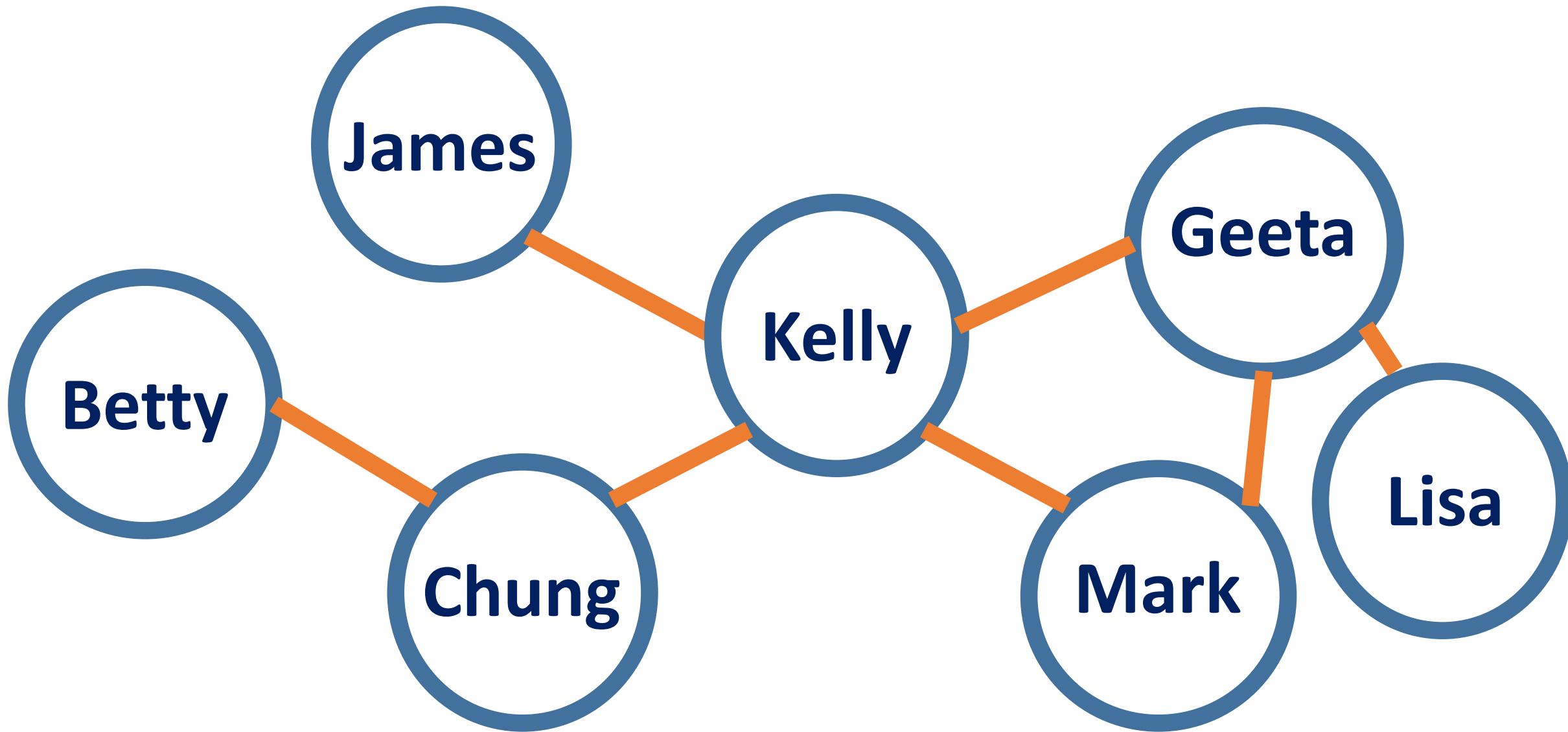
Toronto Transit Commission @TTCnotices @TTChelps

©2018 Toronto Transit Commission 12/18 - Map not to scale

- 1 Yonge-University Line
 - 2 Bloor-Danforth Line
 - 3 Scarborough Line
 - 4 Sheppard Line
- Interchange station
- Accessible station

Image: https://www.ttc.ca/PDF/Maps/Subway_Map.pdf

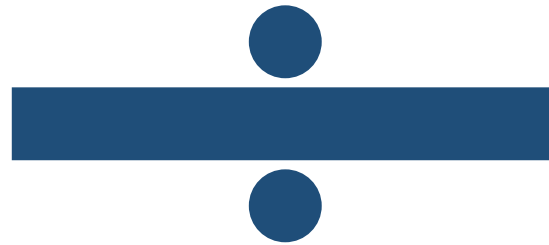
Network Theory: Average path length



Network Theory: Average path length

Betty → Chung = 1
Betty → Kelly = 2
Betty → James = 3
Betty → Geeta = 3
Betty → Mark = 3
Betty → Lisa = 4
James → Kelly = 1
etc.

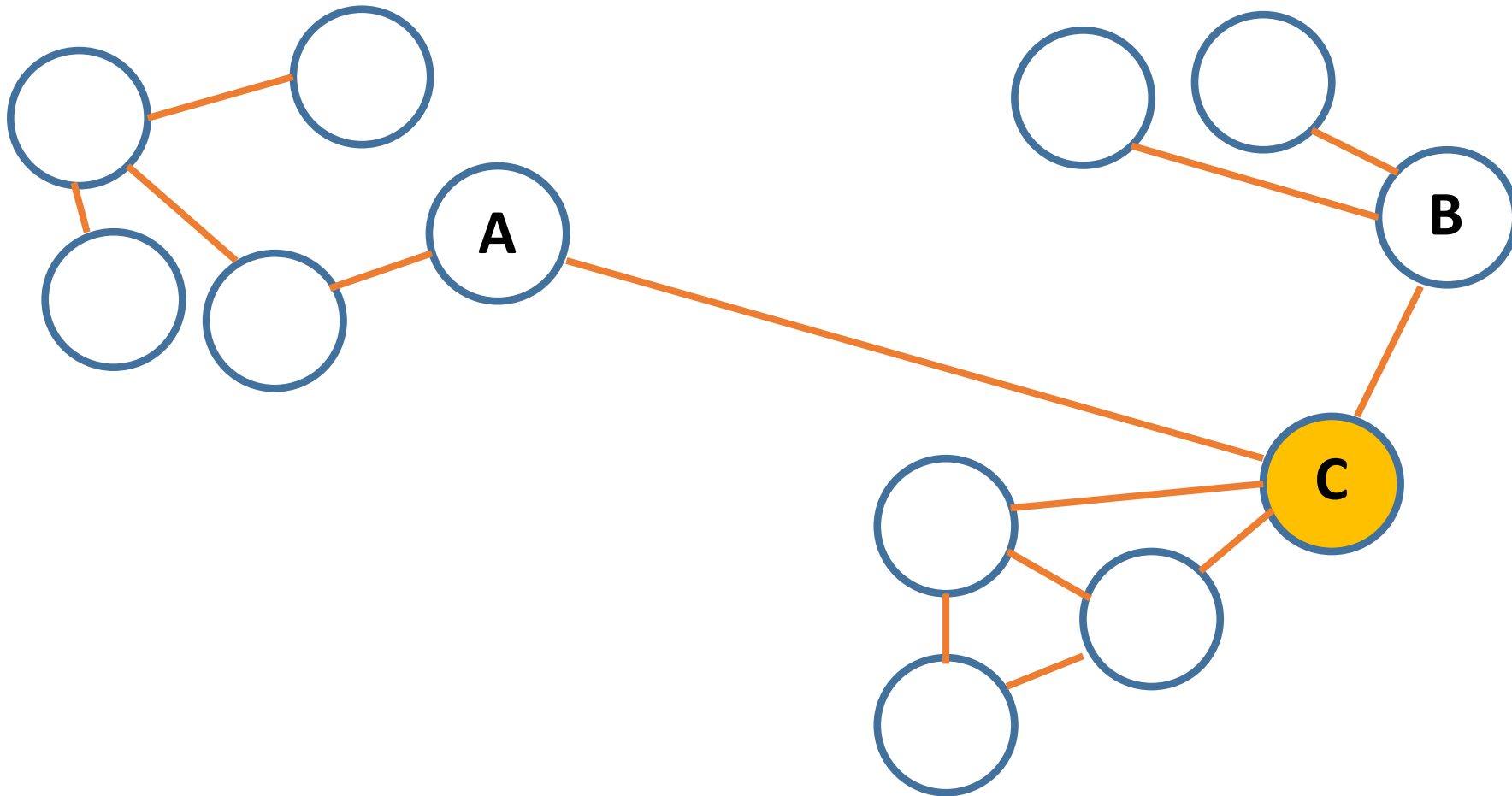
Sum shortest paths btw pairs



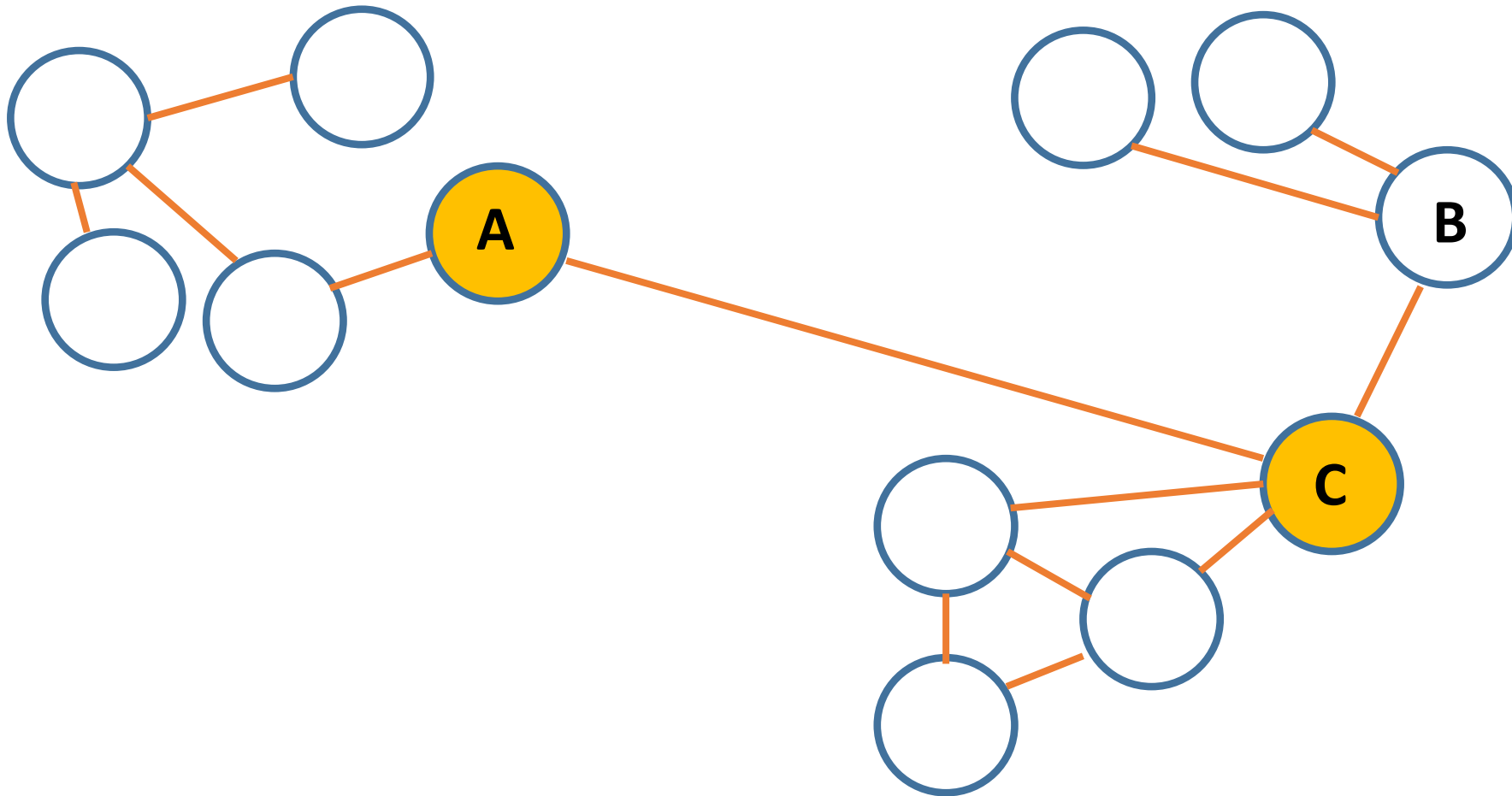
Total number
of pairs

= average distance between
nodes

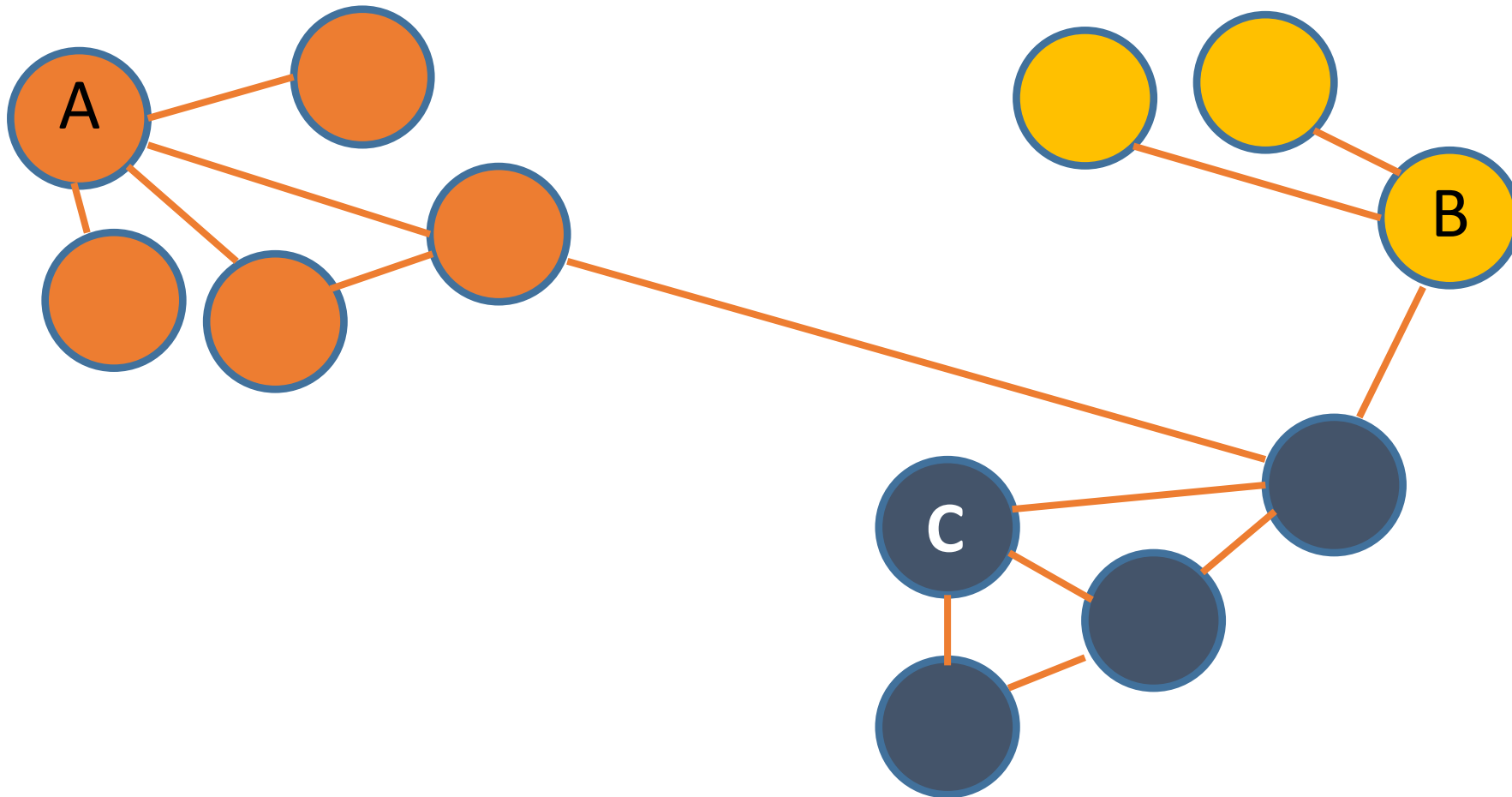
Network Theory: Betweenness centrality



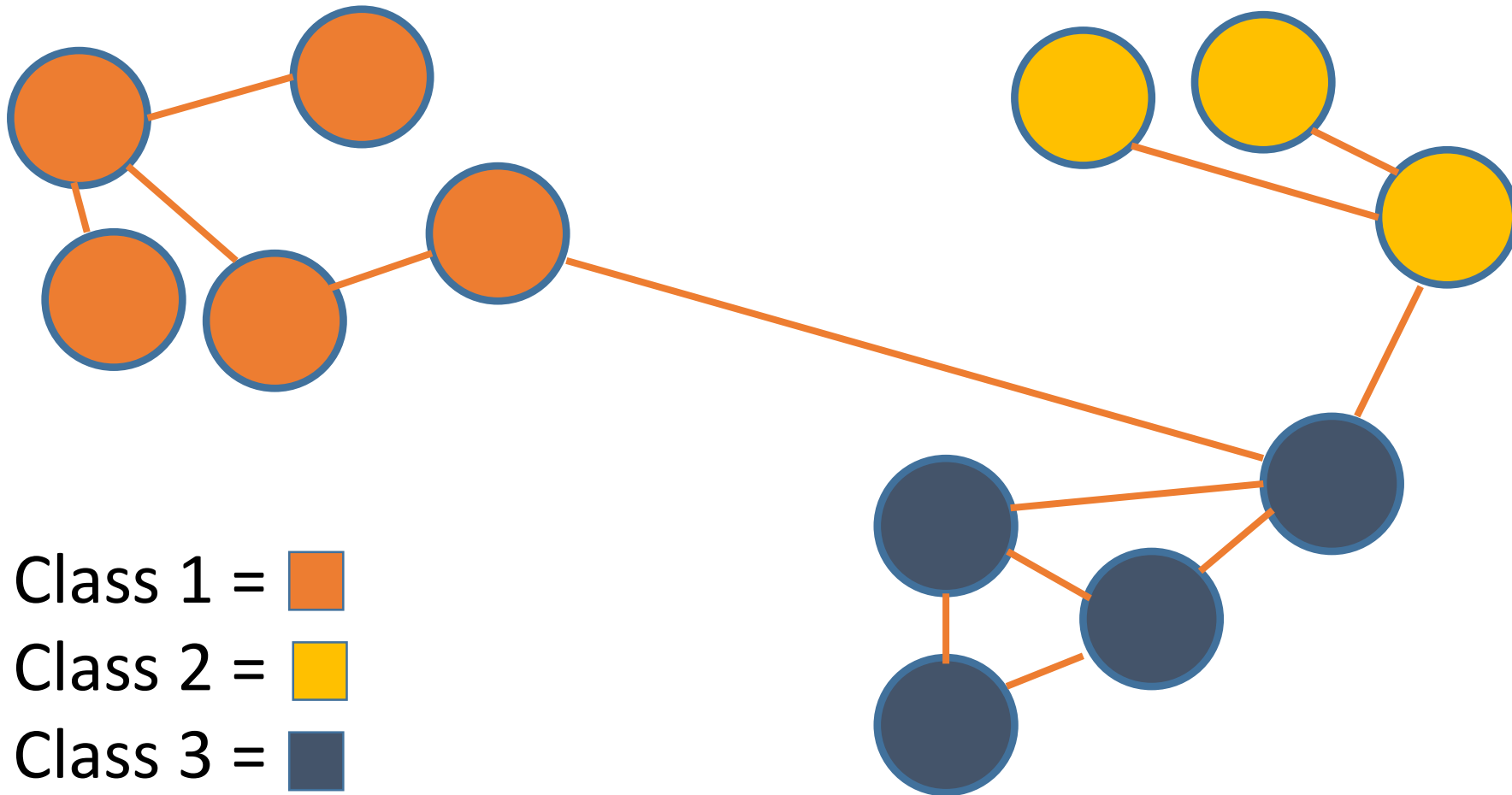
Network Theory: Closeness centrality



Network Theory: Clustering coefficient



Network Theory: Modularity



Troubleshooting

- Stay on top of Gephi updates
- Filter networks to improve performance
- Allocate more memory to Gephi if filtering is not an option:
<https://github.com/gephi/gephi/wiki/Troubleshooting>