Pegs and bands, wiring diagrams vs block models

I. Board with pegs and bands

You are given a handmade network with different planted structures (e.g., community or core-periphery structure, hub and spokes arrangement). The network is given in edge list format, with edges within each planted structure coded with the same color and edges between structures coded with white color.

■ 1 — 10	□ 1 — 20	■ 1 — 25	■ 2 — 9	■ 2 — 20
□ 2 — 33	■ 3 — 18	■ 3 — 29	■ 4 — 5	■ 4 — 8
■ 4 — 13	■ 4 — 15	□ 4 — 25	■ 6 — 7	■ 6 — 32
■ 6 — 34	■ 7 — 10	■ 7 — 32	■ 7 — 34	■ 8 — 16
■ 8 — 17	■ 8 — 27	■ 8 — 31	■ 9 — 24	■ 9 — 28
■ 10 — 25	■ 10 — 34	■ 11 — 12	■ 11 — 33	■ 12 — 14
■ 12 — 19	■ 12 — 30	■ 14 — 19	■ 14 — 21	■ 14 — 30
■ 16 — 23	■ 17 — 23	■ 18 — 28	■ 19 — 30	■ 19 — 33
■ 20 — 24	■ 22 — 30	□ 23 — 26	■ 23 — 27	■ 23 — 31
■ 24 — 29	■ 26 — 30	■ 28 — 29	■ 32 — 34	

Your task is to first reveal the structure of the network without using a computer or other electronic device.

1. **(work)** You can use a board with numbered wooden pegs and rubber bands of different color. These should serve as network nodes and edges, respectively. To simulate force-directed layout of a network, rubber bands will take care of the attractive forces between the linked nodes. You should, however, simulate the repulsive forces between the nodes on your own.

2. **(work)** Alternatively, you can use a whiteboard and markers of different color.

3. **(code)** Finally, browse your network library for implementations of network layout algorithms and methods for network visualization. Try to clearly visualize the network with a wiring diagram.
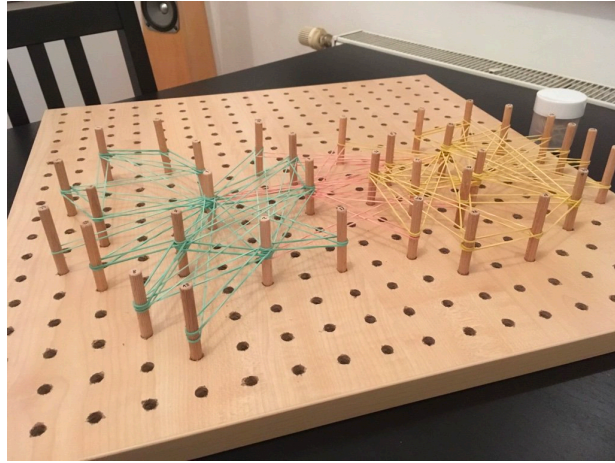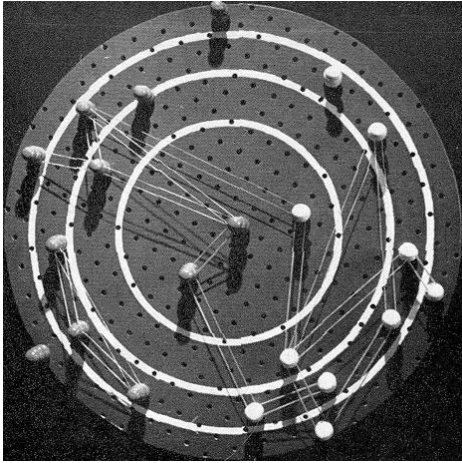
II. Wiring diagrams vs block models

You are given six real networks with less than 200 nodes.

- Zachary karate club network (karate_club.net)
- Davis southern women network (southern_women.net)
- Lusseau bottlenose dolphins network (dolphins.net)
- US college football network (american_football.net)
- Slovenian highways network from 2010 (highways.net)
- Little Rock Lake food web (foodweb_littlerock.net)

1. **(code)** Browse your network library for implementations of network layout algorithms and methods for network visualization. Try to clearly visualize the networks with a wiring diagram produced by different layout algorithms. You can use node sizes to show their centrality and node colors to show network community, core-periphery or other structure.

2. **(code)** Visualize the networks also with a block model, where you plot the network adjacency matrix with nodes order according to their clustering affiliation (e.g., community structure).