Unit I - Types and Representation of Graph

- Graph representation
  - Adjacency matrix
  - Adjacency list
- Definitions
  1. Walk - Sequence of incident edges
  2. Trail - No edge is visited more than once
  3. Tour - Closed trail
  4. Path - A walk where nodes and edges are distinct
  5. Null graph - Node set is empty (since there are no nodes, there no edges)
  6. Empty graph - Edge set is empty (nodes can be present)
- Selection and social influence
  - Selection
  - Social influence
  - Confounding - environment’s effect on making individuals similar
- Structural holes and brokerage opportunities
  - A, B, C in the same group - B is the coordinator broker
  - A, C, different B - Consultant broker
  - A, B, different C - Representative broker
  - A, B, C different - Liaison broker
- Ego centric network analysis

Ego network data can be collected in two ways -

1. From the ego about interactions with alters
2. Snowball method - ask ego about alters and alters about their alters

Homophily in an ego network - Portion of ties in the ego network that are homophilous.

Assortative mixing/Homophily - Bias in favour of connection between network nodes with similar characteristics

▼ Closure

1. Triadic closure - common friend
2. Foci closure - common goal
3. Membership closure - common activities

Density of an ego network

number of alters = size of the network

Density - $L/\left(n(n-1)\right.$

▼ Tie strength

Strong ties have 3 characteristics -

1. Long duration
2. Closeness of relationship
3. Frequency of contact

Clique - A subset of a network in which the actors are more closely tied to one another than to any other members in the network

- Knowledge reservoirs
- Preserve knowledge but cannot generate knowledge

▼ Centrality analysis

- Degree centrality
- Betweenness centrality
- Closeness centrality

Closeness centrality deals with the reciprocal of the mean distance

Harmonic centrality deals with the mean of the reciprocal distances

▼ Page rank

- Eigenvector centrality - generalizes degree centrality by incorporating the importance of neighbours
- Katz centrality - adds initial importance ß to the centrality values for all nodes in the neighbourhood.

Limitations of Early page rank -

1. Rank sinks or leak
2. Hoarding or circular reference
3. Dangling nodes