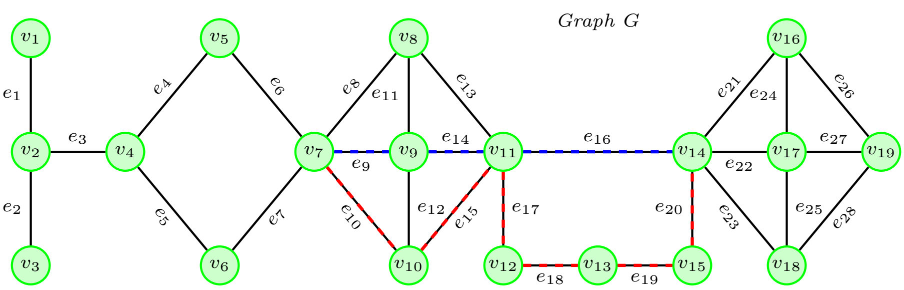
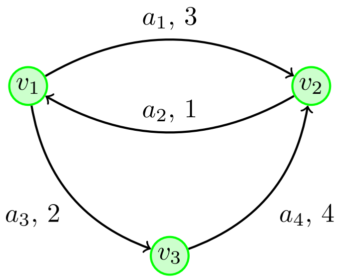


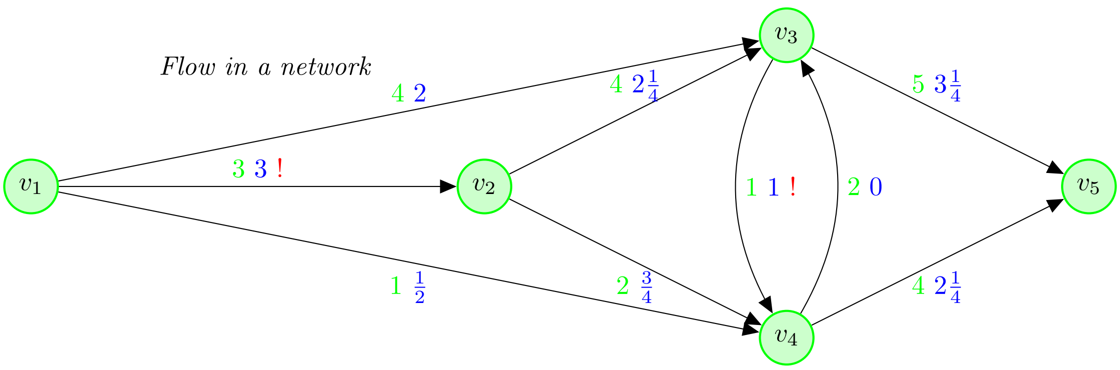
Graph	$G = (V, E)$
Vertices/nodes	$V = \{v_i : i = 1, \ldots, 19\}$
Order	$\|V\| = 19$
Edges/links	$E = \{e_j : j = 1, \ldots, 28\}$
	E.g., $e_{16} = \{v_{11}, v_{14}\}$
Size	$\|E\| = 28$
Adjacency	E.g., vertices v_{11} and v_{14} are adjacent
Incidence	E.g., vertex v_{11} is incident with edge e_{16}
Vertex/nodal degree	E.g., $deg(v_9) = 4$
Handshaking theorem	E.g., $deg(v_1) = deg(v_3)$
Average degree	$\mathbb{E}[deg] = \frac{1 \times 2 + 2 \times 5 + 3 \times 7 + 4 \times 2 + 5 \times 3}{19} = 2\frac{\|E\|}{\|V\|} \approx 2.95$
Path	E.g., between v_7 and v_{14}: blue one $< v_7, v_{14} >_{\text{blue}} = < v_7, v_9, v_{11}, v_{14} > = < e_9, e_{14}, e_{16} >$
	and red one $< v_7, v_{14} >_{\text{red}} = < v_7, v_{10}, v_{11}, v_{12}, v_{13}, v_{15}, v_{14} > = < e_{10}, e_{15}, e_{17}, e_{18}, e_{19}, e_{20} >$
Path length	E.g., $\| < v_7, v_{14} >_{\text{red}} \| = 6$
Distance	E.g., between vertices v_7 and v_{14}: $dist(v_7, v_{14}) = \min_k \{\| < v_7, v_{14} >_k \|\} = 3$
Diameter of a graph	$d(G) = \max_{i,j} dist(v_i, v_j) = \max_{i,j} \min_k \{\| < v_i, v_j >_k \|\} = dist(v_1, v_{19}) = 9$
Edge partition set	E.g., $\{e_4, e_5, e_{15}, e_{16}, e_{19}\}$
Cut	E.g., $\{e_4, e_5\}$
Bridge	E.g., e_3
Edge connectivity	$\lambda(G) = 1$
Vertex partition set	E.g., $\{v_1, v_5, v_6\}$
Vertex cut	E.g., $\{v_5, v_6\}$
Articulation point	E.g., v_7
Vertex connectivity	$\kappa(G) = 1$
Subgraphs	Full mesh, e.g., $K_3 = (\{v_{16}, v_{17}, v_{19}\}, \{e_{24}, e_{26}, e_{27}\})$
	Cyclic, e.g., $C_4 = (\{v_7, v_8, v_{10}, v_{11}\}, \{e_8, e_{10}, e_{13}, e_{15}\})$
	Linear, e.g., $P_3 = (\{v_2, v_4, v_5\}, \{e_3, e_4\})$
	Full bipartite, e.g., $K_{2,3} = (\{v_8, v_{10}\} \cup \{v_7, v_9, v_{11}\}, \{e_8, e_{10}, e_{11}, e_{12}, e_{13}, e_{15}\})$
Spanning tree	E.g., $T = (V, \{e_1, e_2, e_3, e_4, e_5, e_6, e_8, e_{11}, e_{12}, e_{14}, e_{17}, e_{18}, e_{19}, e_{20}, e_{22}, e_{24}, e_{25}, e_{27}\})$
Adjacency matrix	E.g., for subgraph $(\{v_1, v_2, v_3, v_4\}, \{e_1, e_2, e_3\})$:
	$\mathbf{A} = \begin{bmatrix} 0 & 1 & 0 & 0 \\ 1 & 0 & 1 & 1 \\ 0 & 1 & 0 & 0 \\ 0 & 1 & 0 & 0 \end{bmatrix}$
Incidence matrix	E.g., for subgraph $(\{v_1, v_2, v_3, v_4\}, \{e_1, e_2, e_3\})$:
	$\mathbf{B} = \begin{bmatrix} 1 & 0 & 0 \\ 1 & 1 & 1 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$

Digraph D



Weighted digraph	$D = (V, A, w)$
Arcs	$A = \{a_i : i = 1, \ldots, 4\}$
	E.g., $a_1 = (v_1, v_2)$
Incidence matrix of a digraph	$\mathbf{B} = \begin{bmatrix} 1 & -1 & 1 & 0 \\ -1 & 1 & 0 & -1 \\ 0 & 0 & -1 & 1 \end{bmatrix}$
Weight of an arc	E.g., $w(a_1) = 3$
Node strength	E.g., for v_1 equals 5

Flow in a network



Source	v_1
Sink/destination	v_5
Capacity	E.g., $c\,(v_1, v_3) = 4$
Flow	Flow between v_1 and v_5 is equal to $5\frac{1}{2}$, since $f\,(v_3, v_5) + f\,(v_4, v_5) = 5\frac{1}{2}$
'Nodal Kirchhoff's theorem'	E.g., for v_3: $f\,(v_1, v_3) + f\,(v_2, v_3) + f\,(v_4, v_3) = f\,(v_3, v_4) + f\,(v_3, v_5)$
(flow conservation law)	
Saturated arc/link	E.g., (v_1, v_2), since $f\,(v_1, v_2) = c\,(v_1, v_2)$