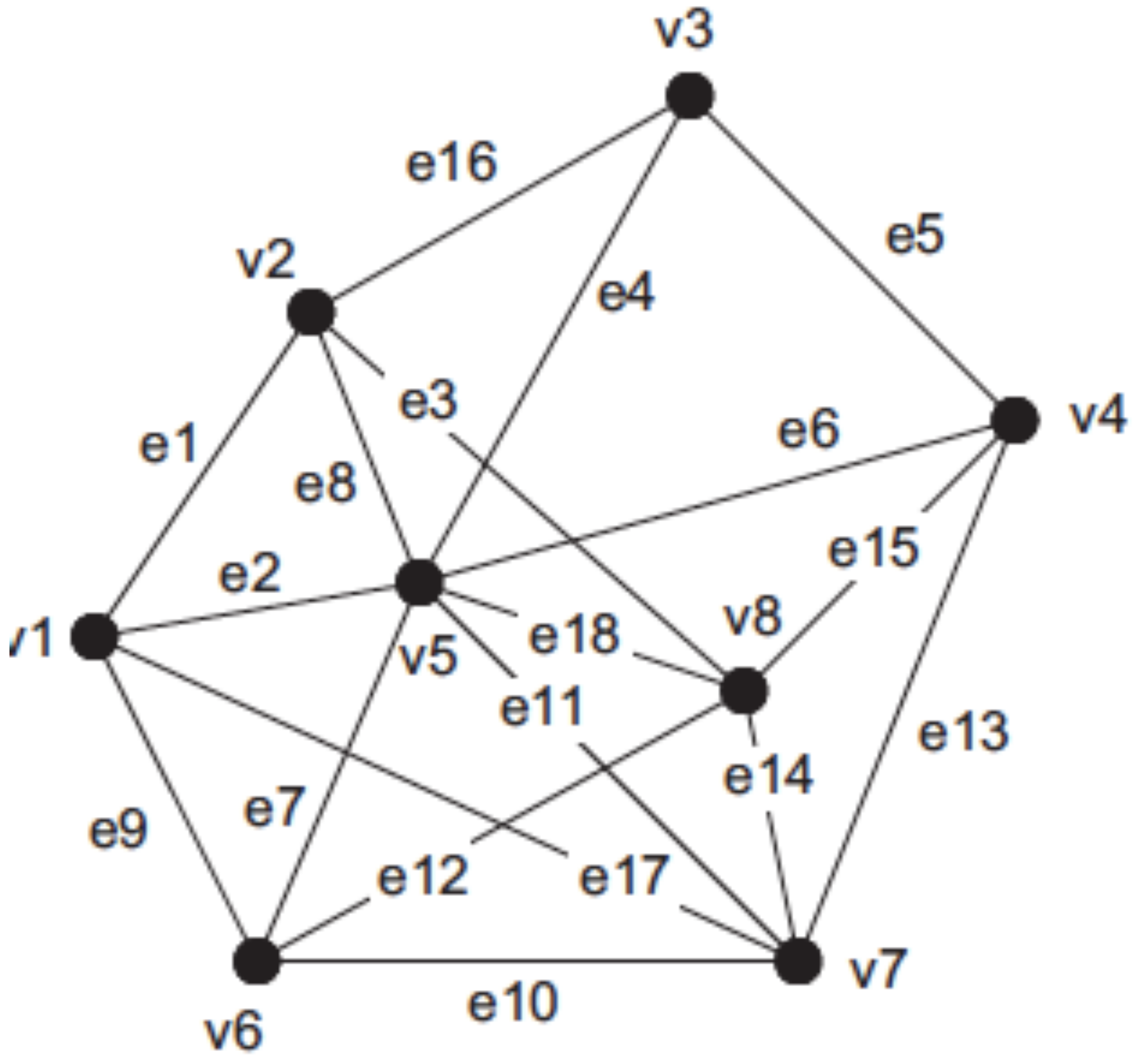
Graph theory

undirected graph

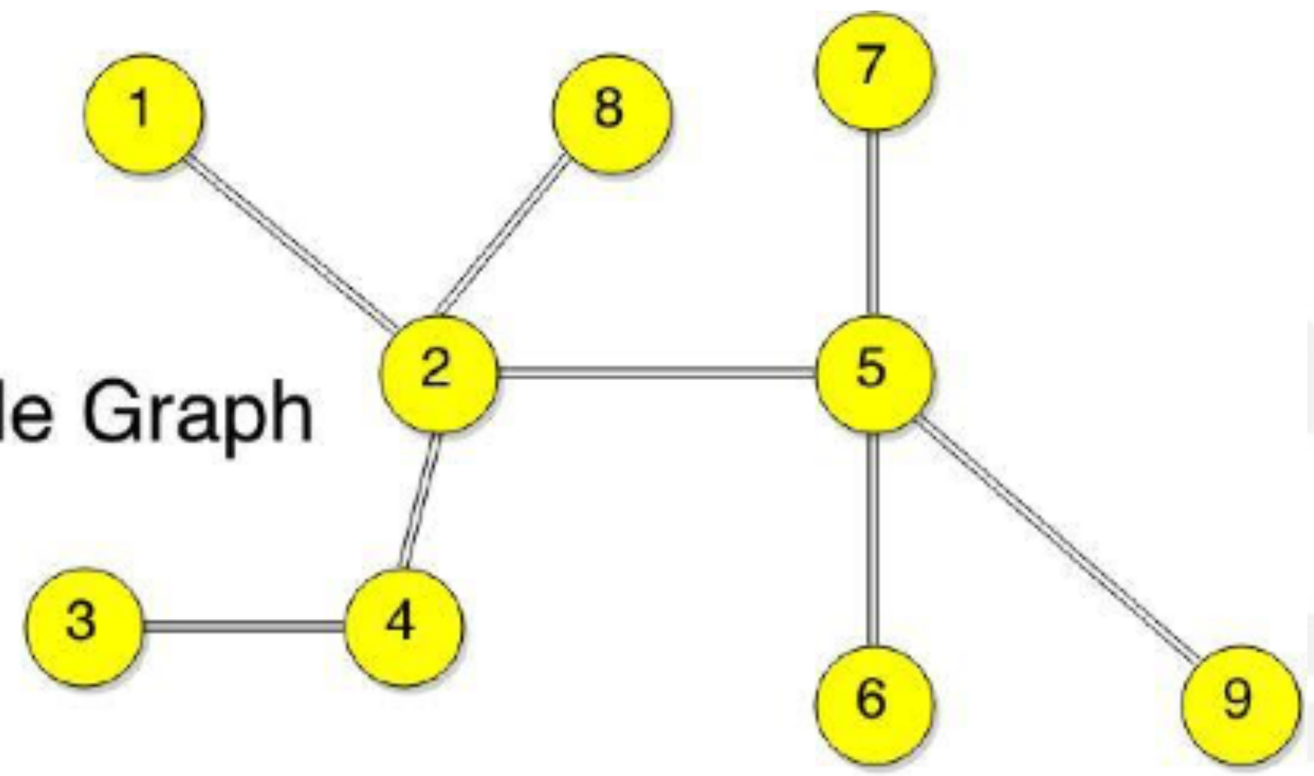


$$V(G) = \{v_1, \ldots, v_8\}$$
$$E(G) = \{e_1, \ldots, e_{18}\}$$

$e_1 = \langle v_1, v_2 \rangle$	$e_{10} = \langle v_6, v_7 \rangle$
$e_2 = \langle v_1, v_5 \rangle$	$e_{11} = \langle v_5, v_7 \rangle$
$e_3 = \langle v_2, v_8 \rangle$	$e_{12} = \langle v_6, v_8 \rangle$
$e_4 = \langle v_3, v_5 \rangle$	$e_{13} = \langle v_4, v_7 \rangle$
$e_5 = \langle v_3, v_4 \rangle$	$e_{14} = \langle v_7, v_8 \rangle$
$e_6 = \langle v_4, v_5 \rangle$	$e_{15} = \langle v_4, v_8 \rangle$
$e_7 = \langle v_5, v_6 \rangle$	$e_{16} = \langle v_2, v_3 \rangle$
$e_8 = \langle v_2, v_5 \rangle$	$e_{17} = \langle v_1, v_7 \rangle$
$e_9 = \langle v_1, v_6 \rangle$	$e_{18} = \langle v_5, v_8 \rangle$

Figure 2.1: An example of a graph with eight vertices and 18 edges.

Simple Graph



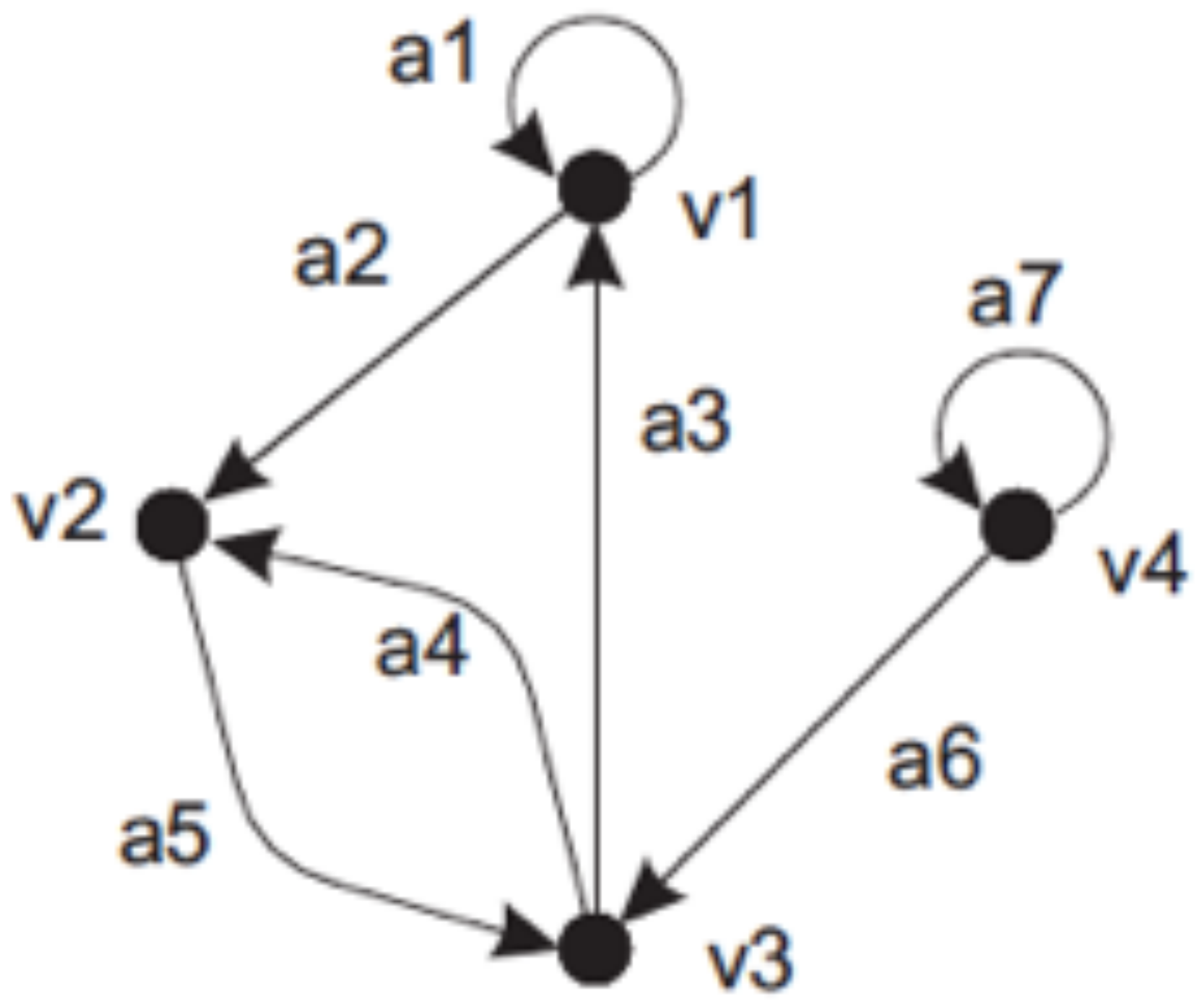
Adjacency Matrix

	Vertex 1	Vertex 2	Vertex 3	Vertex 4	Vertex 5	Vertex 6	Vertex 7	Vertex 8	Vertex 9
Vertex 1	0	1	0	0	0	0	0	0	0
Vertex 2	1	0	0	1	1	0	0	1	0
Vertex 3	0	0	0	1	0	0	0	0	0
Vertex 4	0	1	1	0	0	0	0	0	0
Vertex 5	0	1	0	0	0	1	1	0	1
Vertex 6	0	0	0	0	1	0	0	0	0
Vertex 7	0	0	0	0	1	0	0	0	0
Vertex 8	0	1	0	0	0	0	0	0	0
Vertex 9	0	0	0	0	1	0	0	0	0

http://theoryofprogramming.com/tag/adjacency-matrix/

van Steen, M. (2010). Graph Theory and Complex Networks. An Introduction. Retrieved from: http://www.distributed-systems.net/

directed graph (digraph)



With *loops* en *arcs*

	v_1	v_2	v_3	v_4	OUT $\sum$
v_1	1	1	0	0	2
v_2	0	0	1	0	1
v_3	1	1	0	0	2
v_4	0	0	1	1	2
IN $\sum$	2	2	2	1	7

van Steen, M. (2010). Graph Theory and Complex Networks. An Introduction. Retrieved from: http://www.distributed-systems.net/