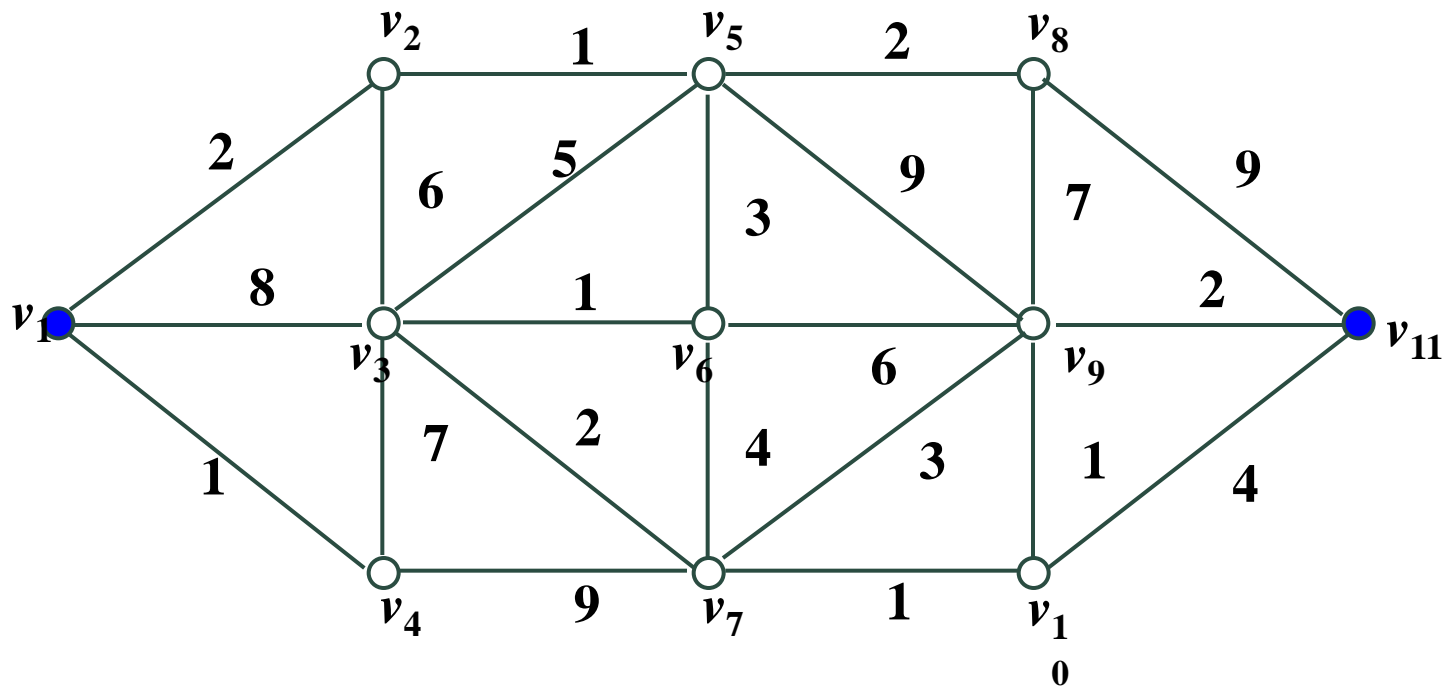


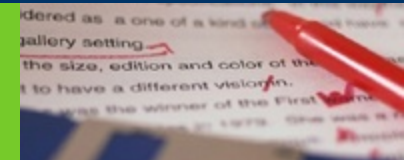


# 图论模型-Dijkstra算法

主讲人：泰山教育 小石老师



# Dijkstra算法简介

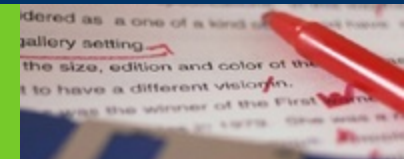


Dijkstra算法能求一个顶点到另一顶点最短路径。它是由Dijkstra于1959年提出的。实际它能出始点到其它所有顶点的最短路径。

Dijkstra算法是一种标号法：给赋权图的每一个顶点记一个数，称为顶点的标号（临时标号，称T标号，或者固定标号，称为P标号）。T标号表示从始顶点到该标点的最短路长的上界；P标号则是从始顶点到该顶点的最短路长。

Dijkstra算法步骤如下：

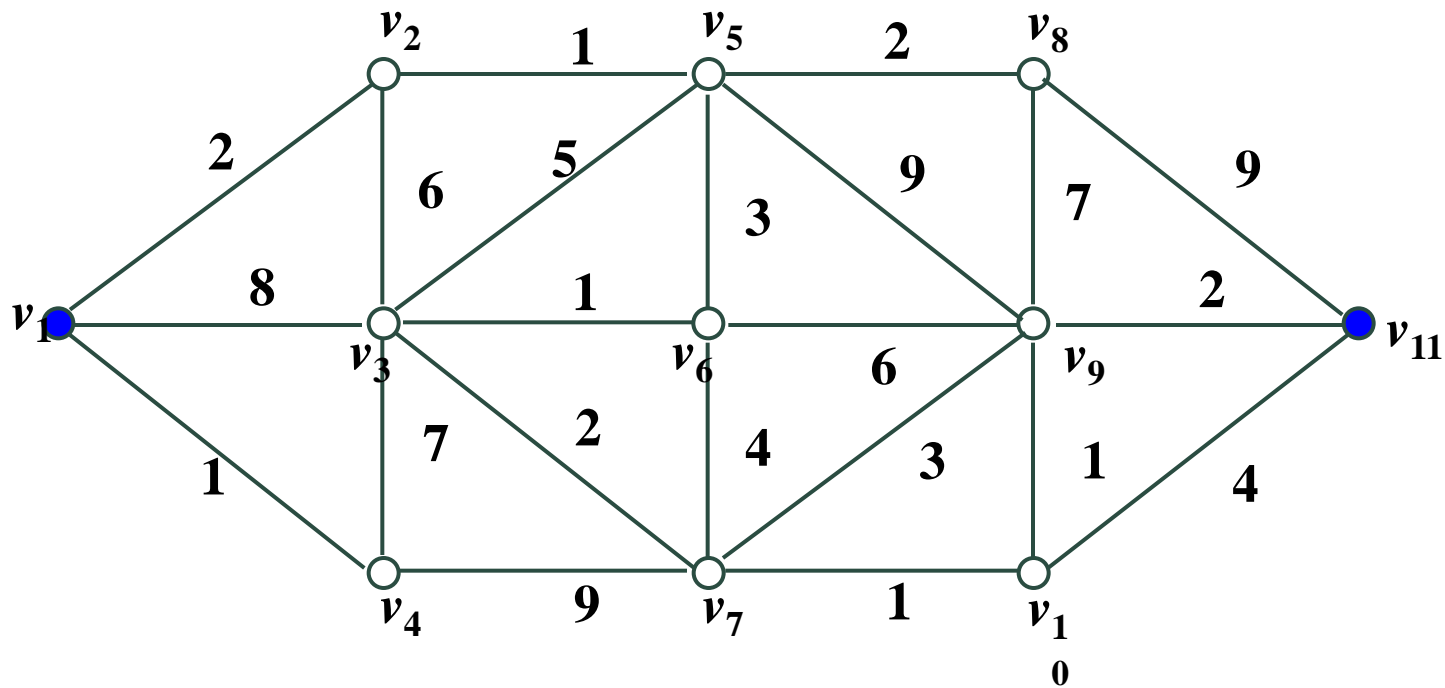
# Dijkstra算法简介

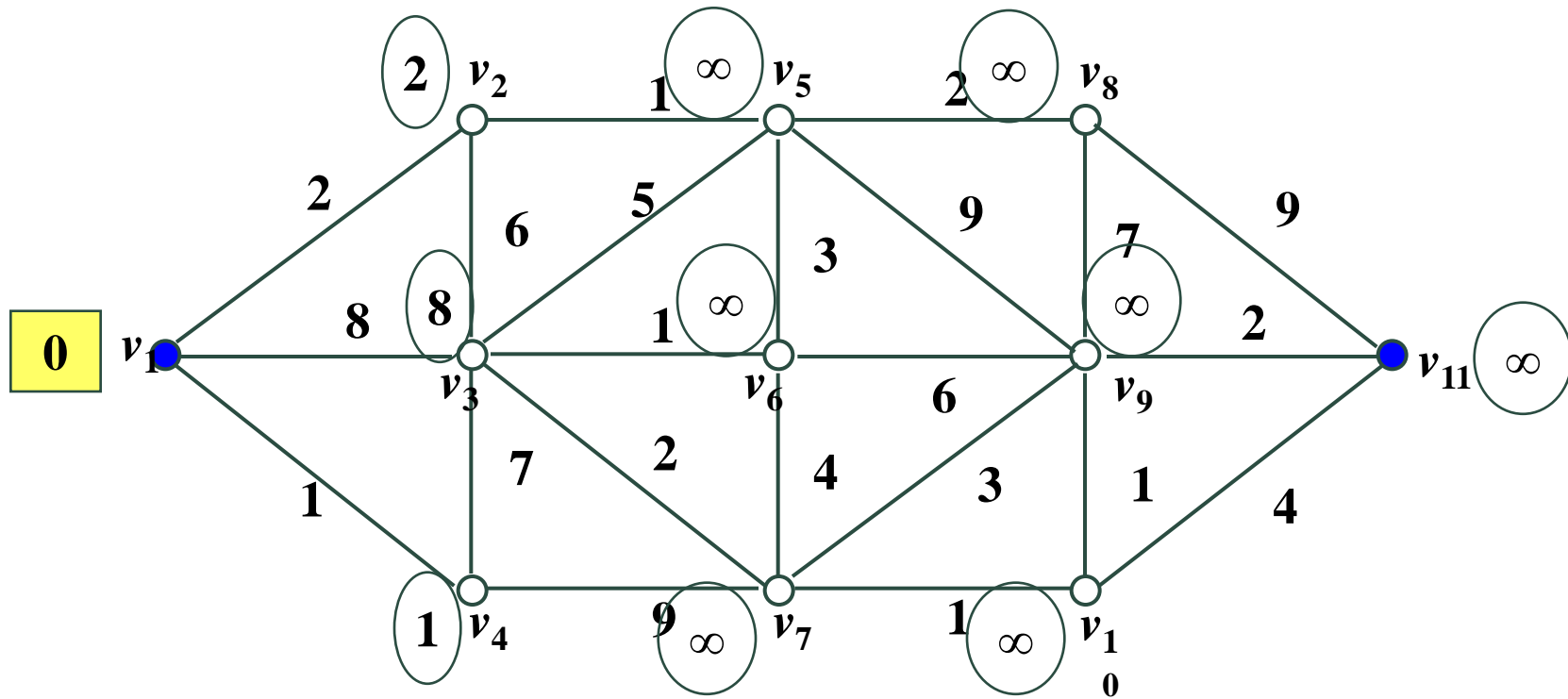


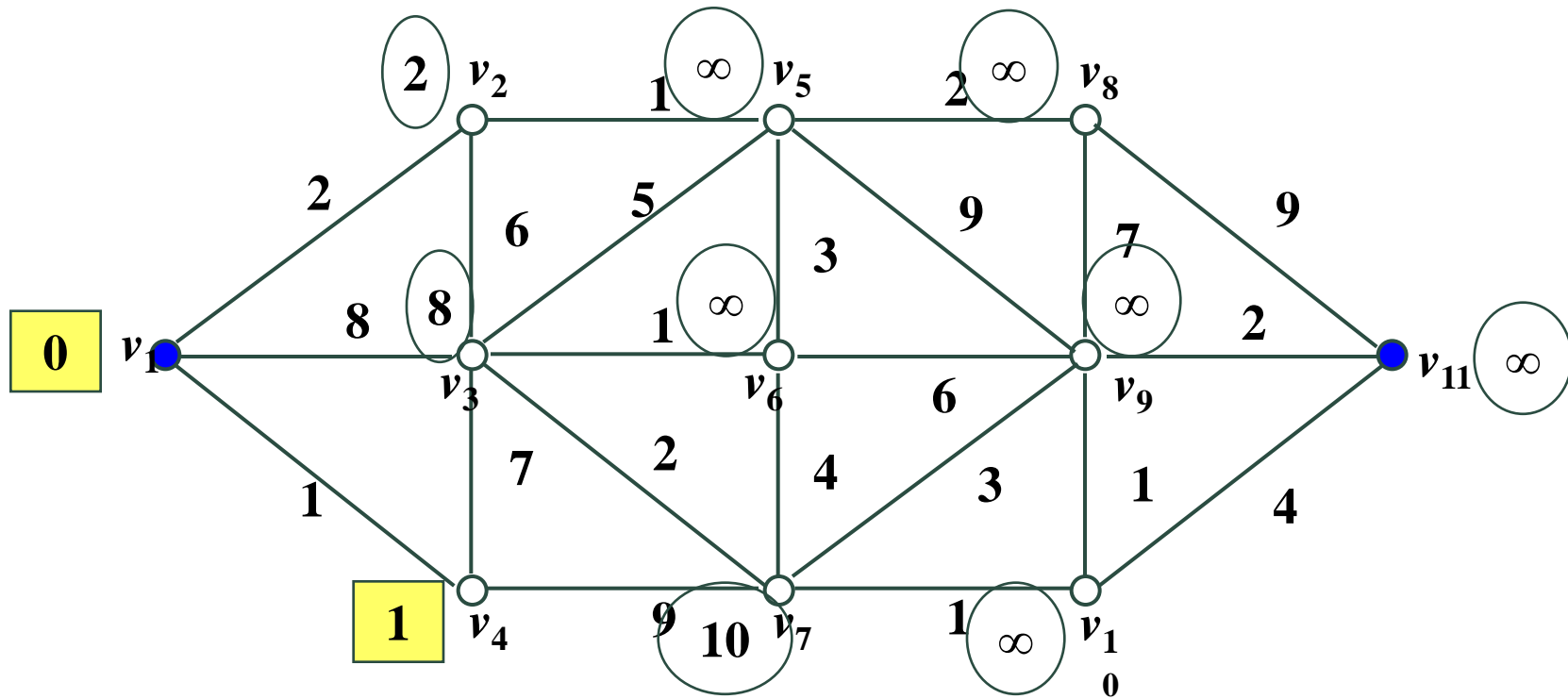
(1) 给顶点 $v_1$ 标P标号 $d(v_1) = 0$ , 给顶点 $v_j (j = 2, 3, \dots, n)$ 标T标号 $d(v_j) = l_{1j}$ ;

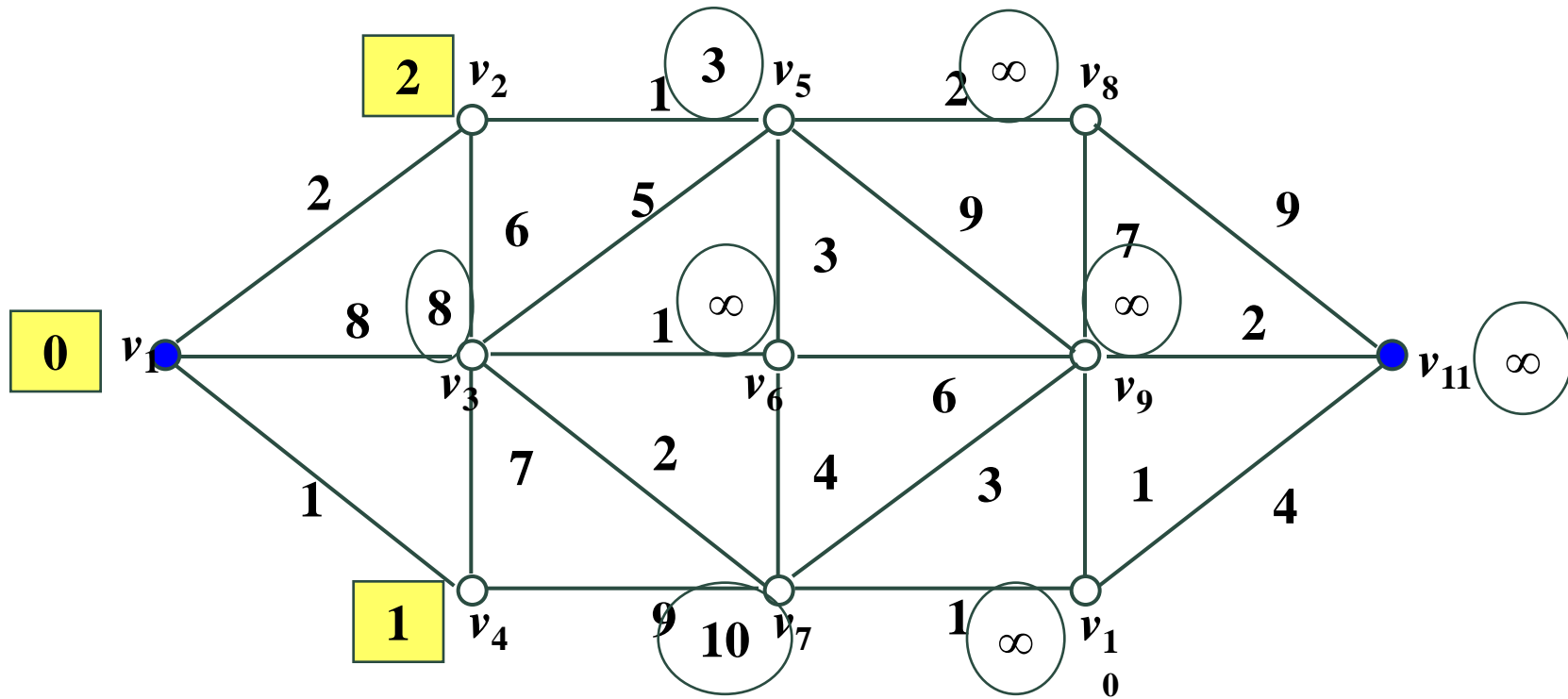
(2) 在所有T标号中取最小值, 譬如,  $d(v_{j_0}) = l_{1j_0}$ , 则把 $v_{j_0}$ 的T标号改为P标号, 并重新计算具有T标号的其它各顶点的T标号: 选顶点 $v_j$ 的T标号 $d(v_j)$ 与 $d(v_{j_0}) + l_{j_0j}$ 中较小者作为 $v_j$ 的新的T标号。

(3) 重复上述步骤, 直到目标顶点的标号改为P标号。

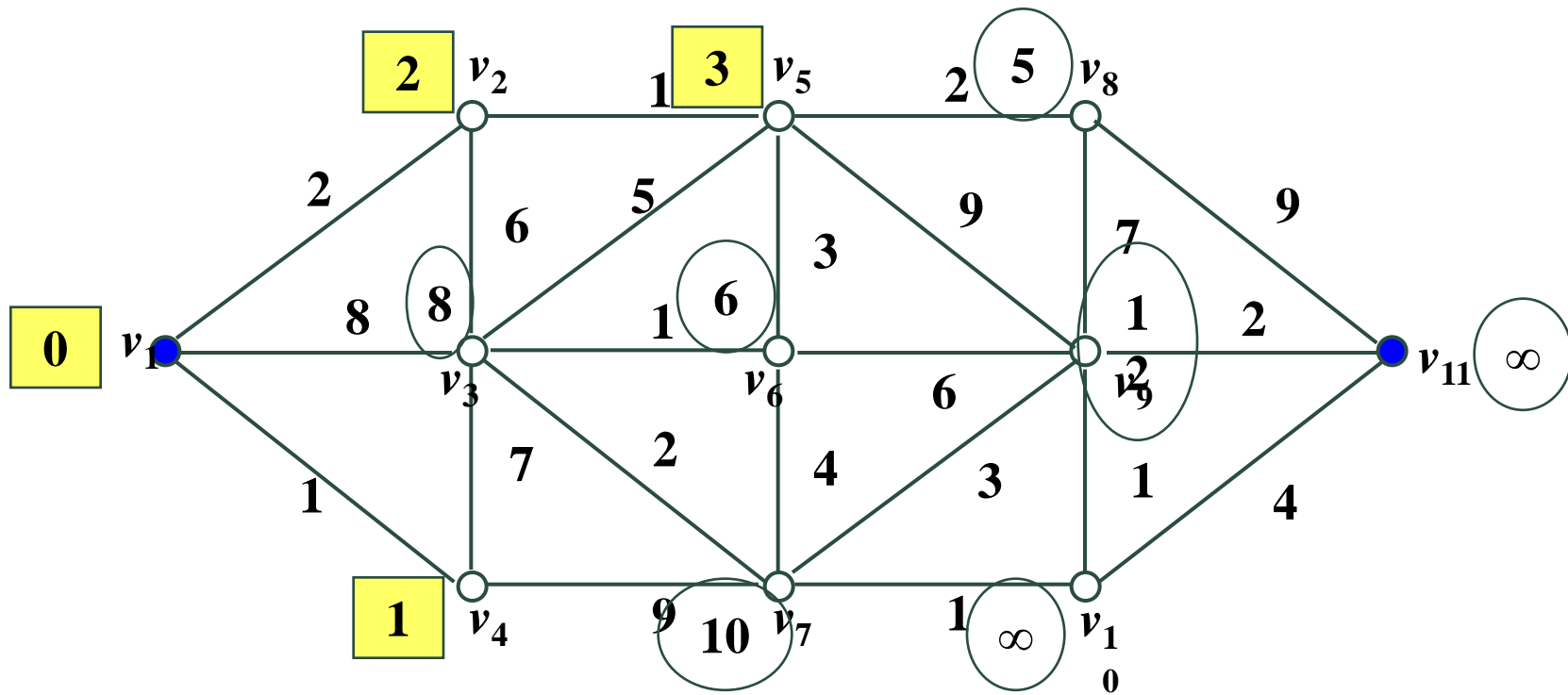


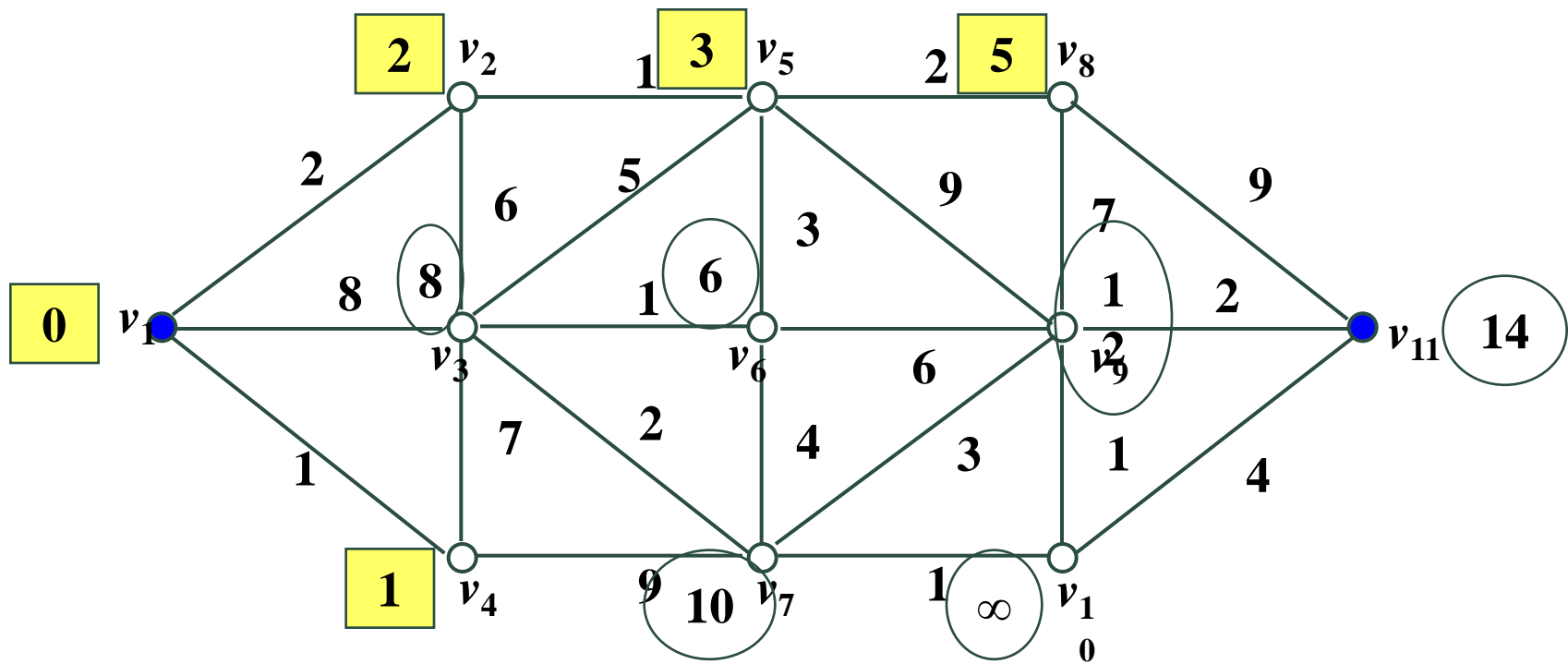


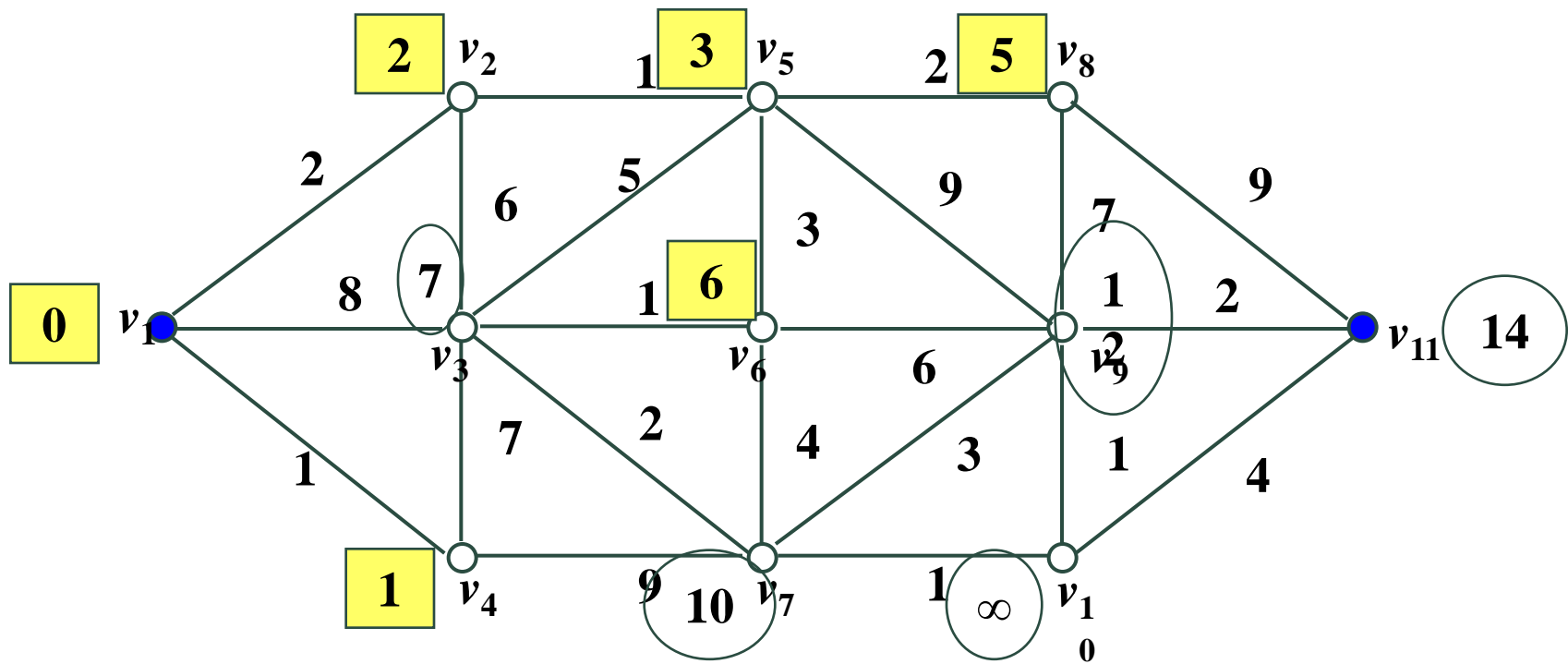


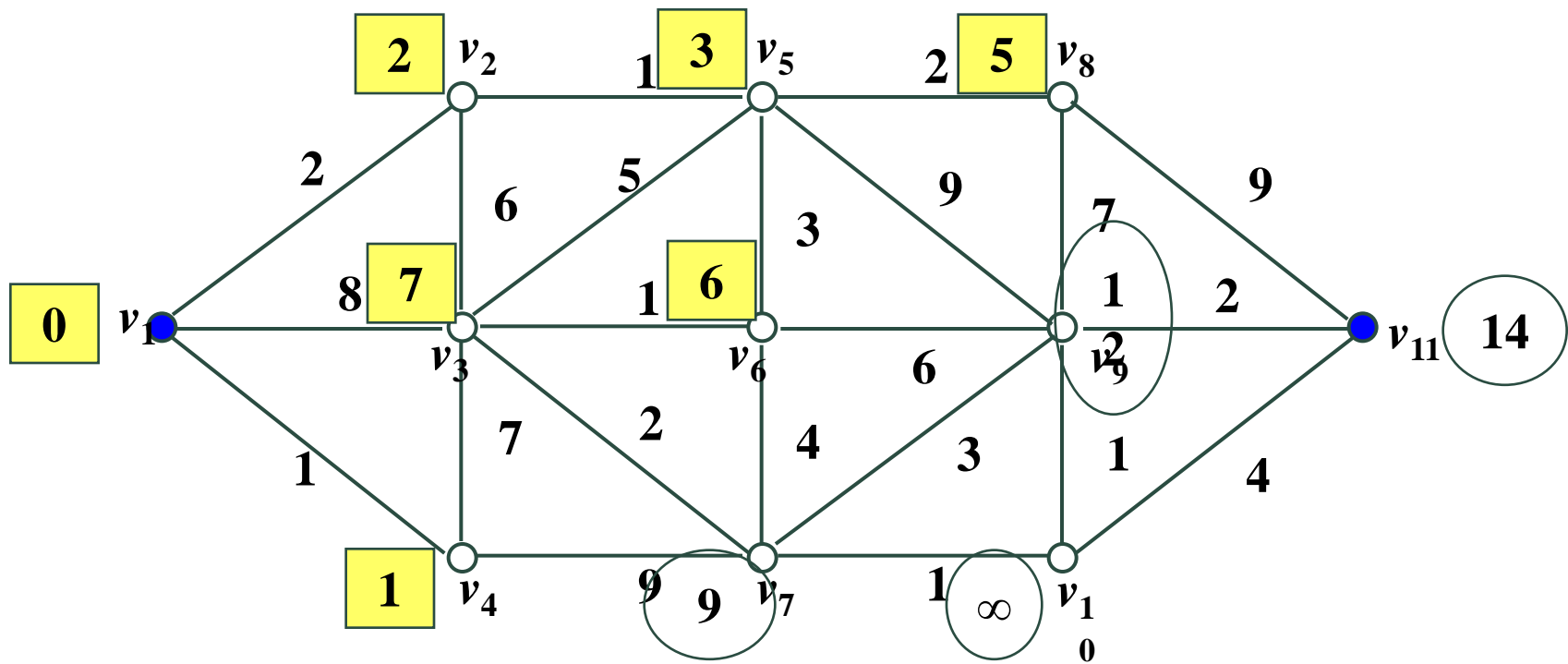


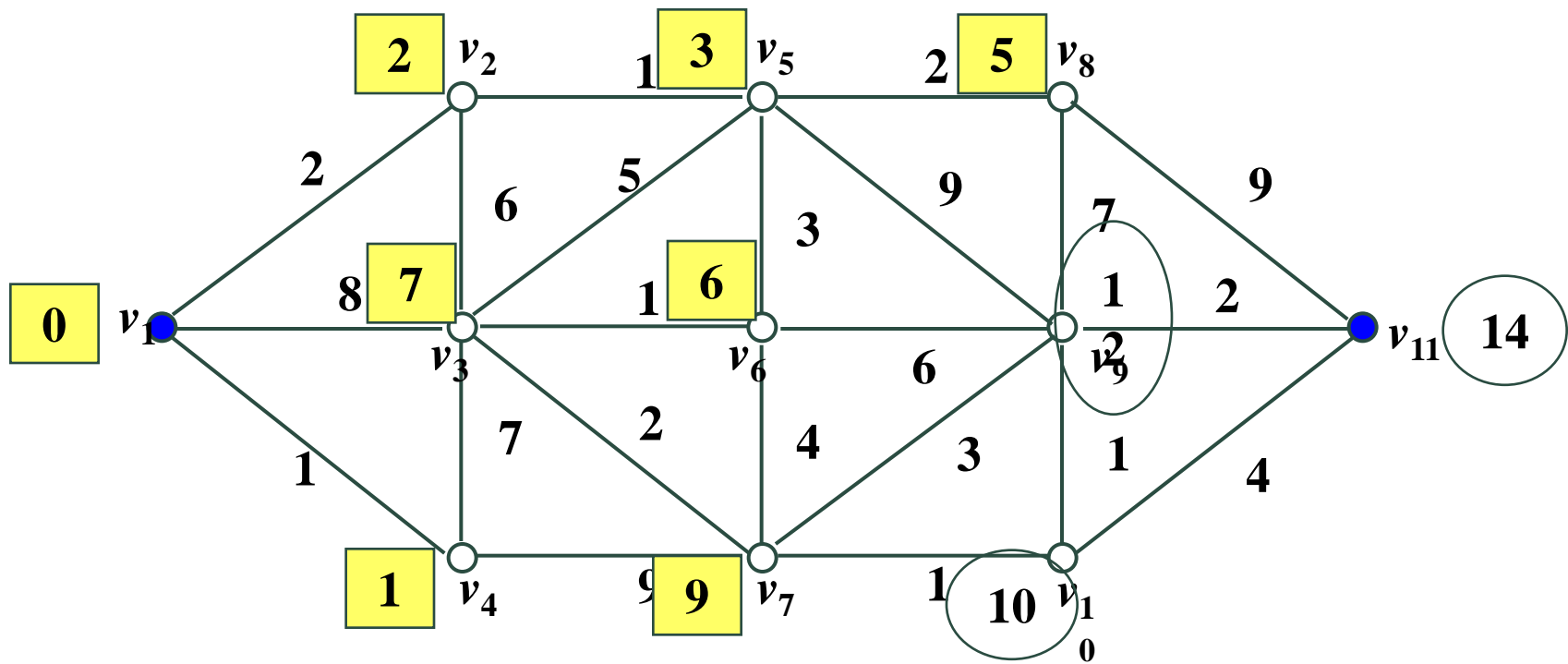


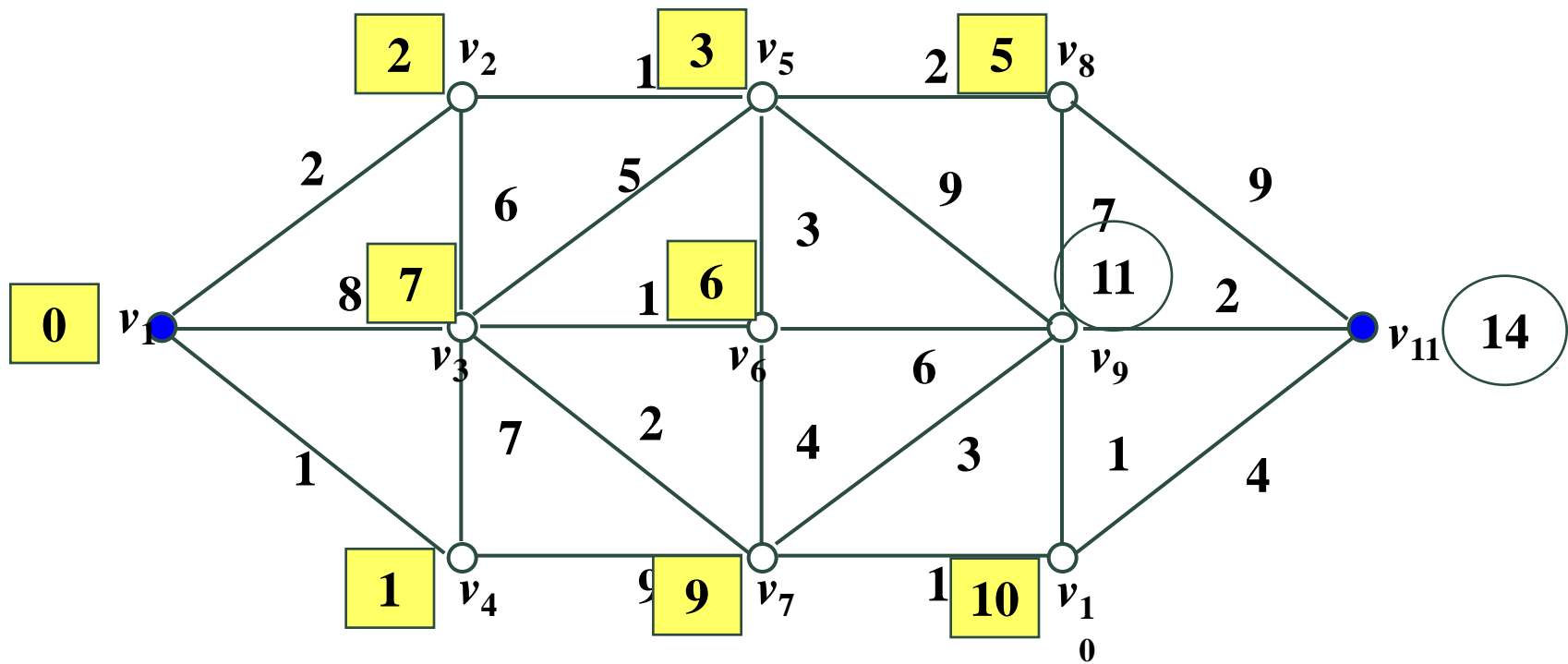


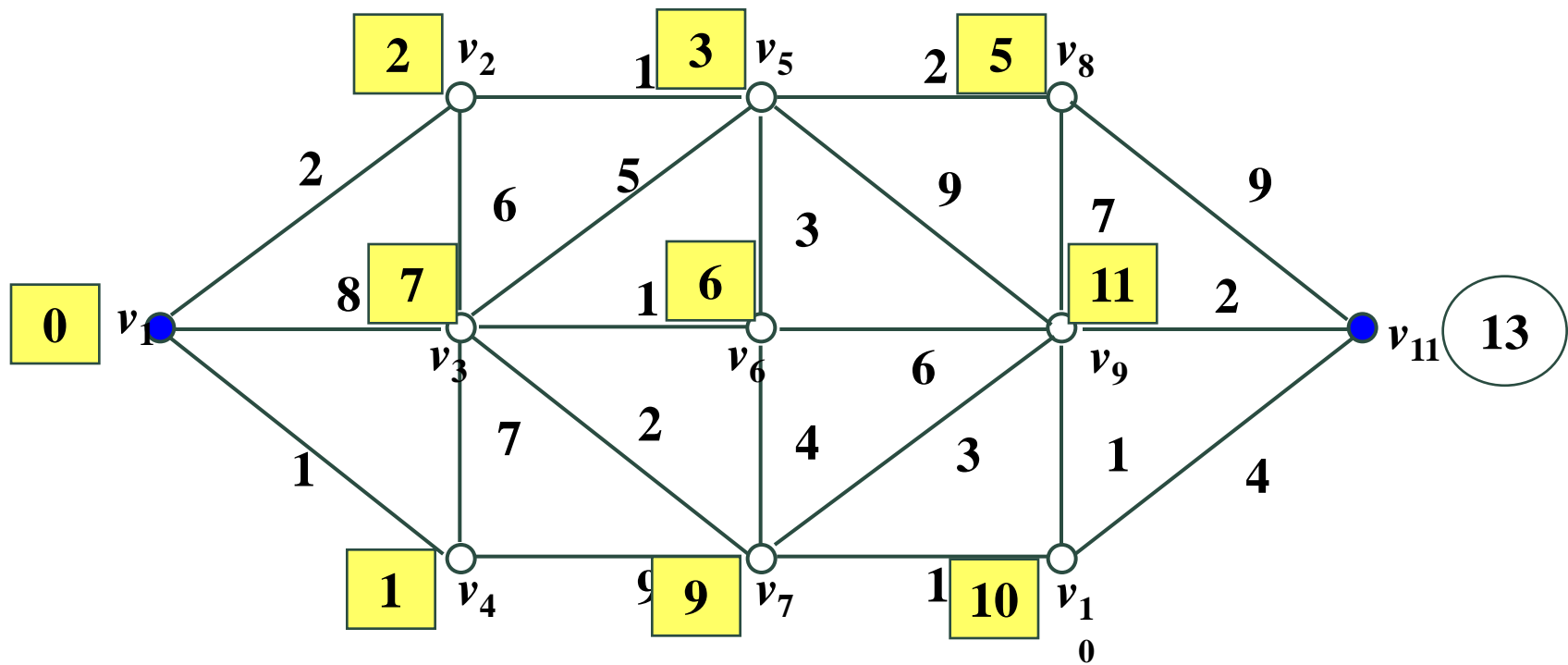


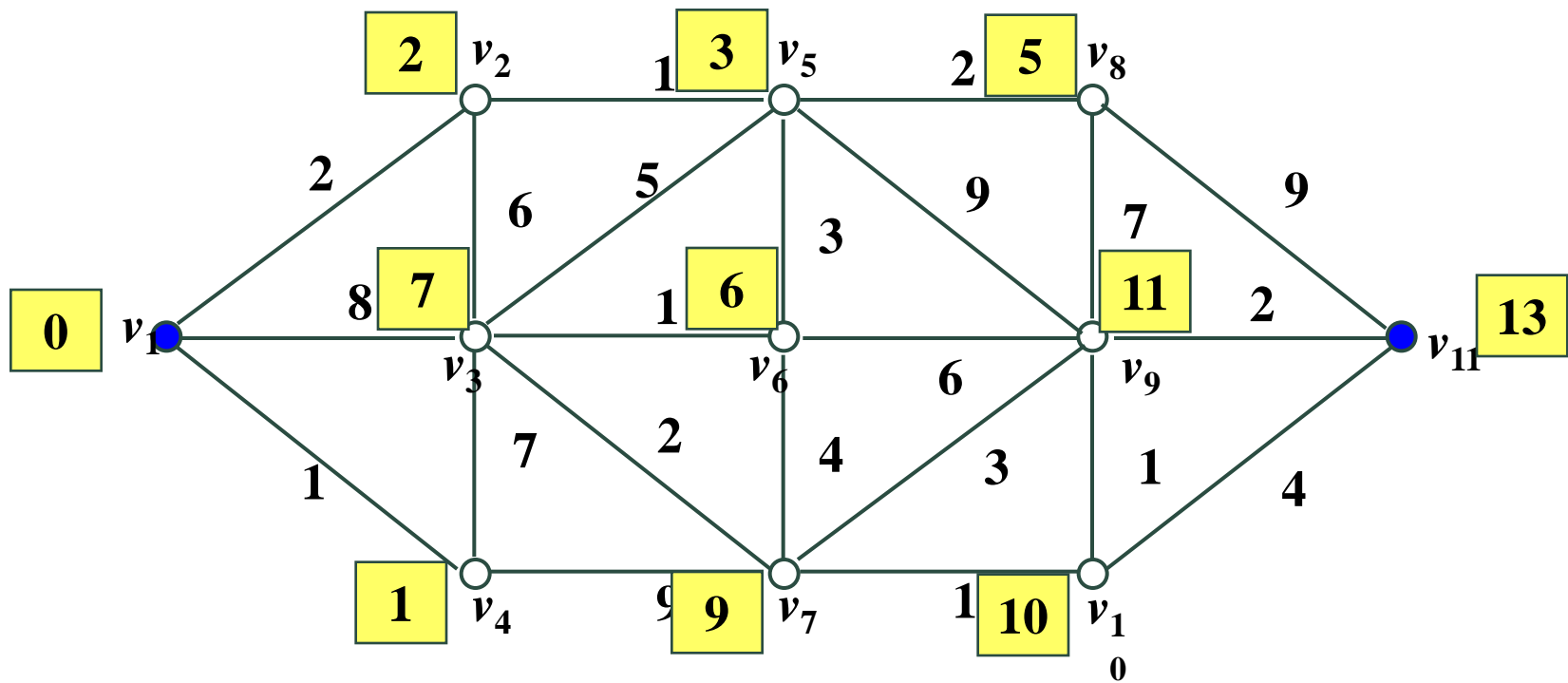






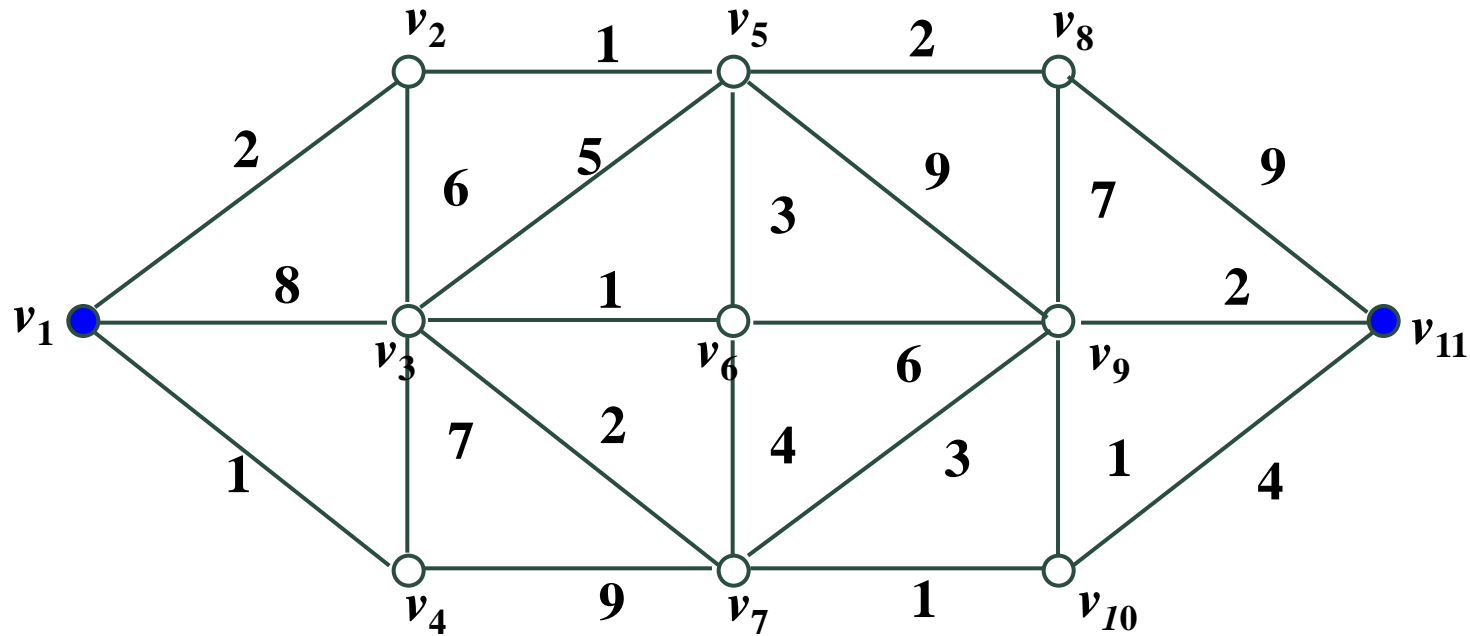








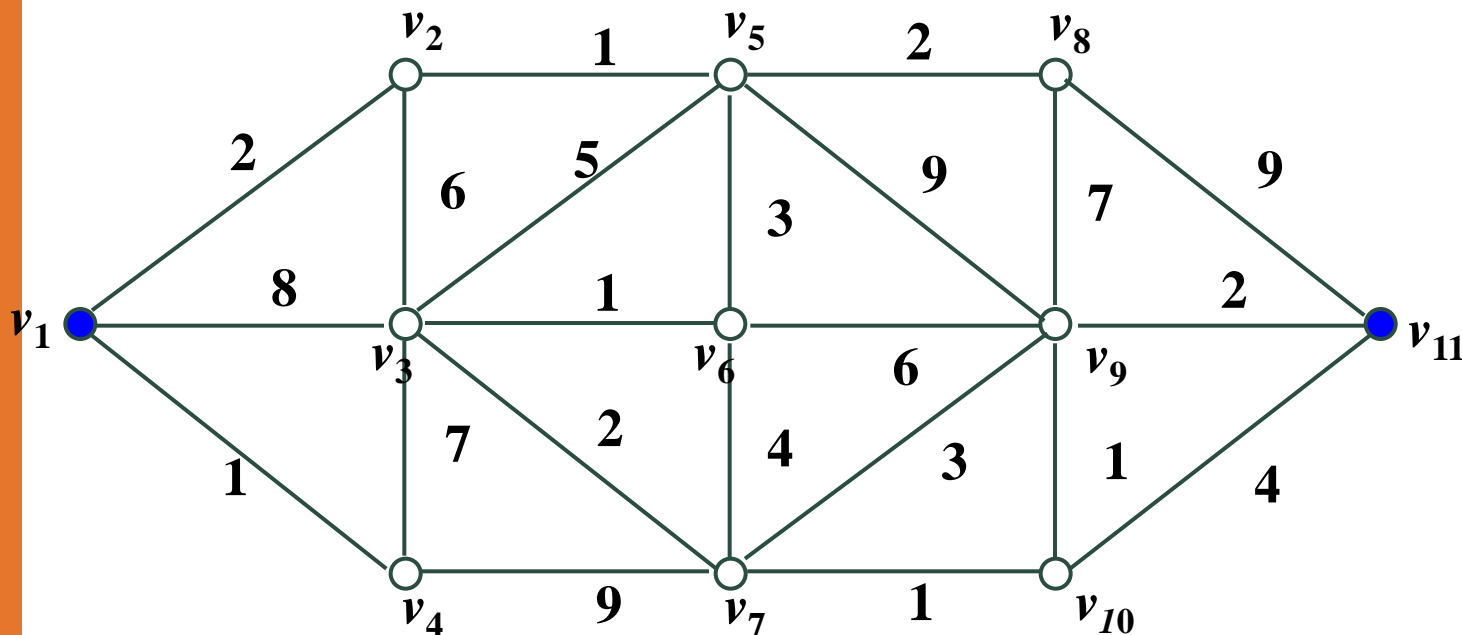
# 背景



顺序: 1, 2, 5, 6, 3, 7, 10, 9, 11

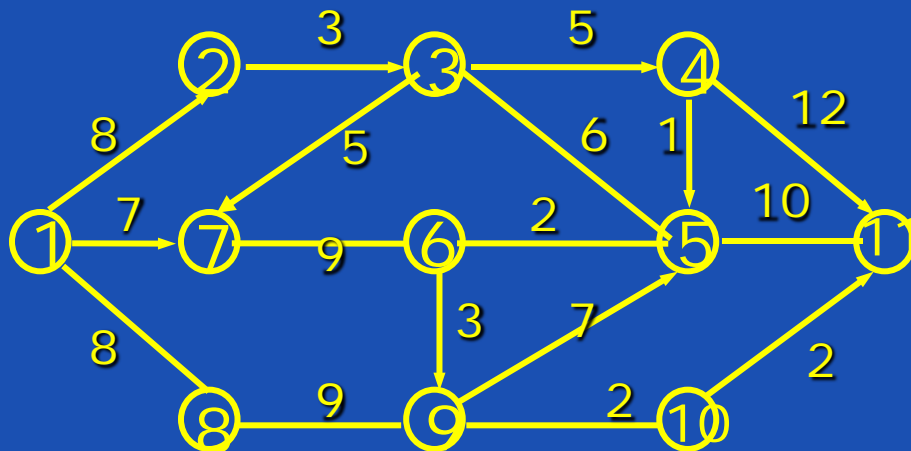
# 带权邻接矩阵

带权邻接矩阵：是表示顶点之间相邻关系的矩阵。



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

# 带权邻接矩阵



0	8	Inf	Inf	Inf	Inf	7	8	Inf	Inf	Inf
Inf	0	3	Inf	Inf	Inf	Inf	Inf	Inf	Inf	Inf
Inf	Inf	0	5	6	Inf	5	Inf	Inf	Inf	Inf
Inf	Inf	Inf	0	1	Inf	Inf	Inf	Inf	Inf	12
Inf	Inf	6	Inf	0	2	Inf	Inf	Inf	Inf	10
Inf	Inf	Inf	Inf	2	0	9	Inf	3	Inf	Inf
Inf	Inf	Inf	Inf	Inf	9	0	Inf	Inf	Inf	Inf
8	Inf	Inf	Inf	Inf	Inf	Inf	0	9	Inf	Inf
Inf	Inf	Inf	Inf	7	Inf	Inf	9	0	2	Inf
Inf	Inf	Inf	Inf	Inf	Inf	Inf	Inf	2	0	2
Inf	Inf	Inf	Inf	10	Inf	Inf	Inf	Inf	Inf	0



Thank You !