

Setup: directed graph (digraph) G .

- Each arc e has a **capacity** $c(e) \geq 0$.
- Choose a **source** vertex s and a **sink** vertex t .

A **flow** or **st -flow** is a nonnegative function f satisfying:

- Capacity constraints: $f(e) \leq c(e)$ for every arc e .
- Kirchoff's Law: "flow in = flow out" at every vtx except s and t .
More precisely, for every vertex $v \neq s, t$,

$$\sum_{w \in N^+(v)} f(v, w) = \sum_{w \in N^-(v)} f(w, v).$$

The **value** of a flow f is the "net flow" leaving the source:

$$v(f) := \sum_{w \in N^+(s)} f(s, w) - \sum_{w \in N^-(s)} f(w, s).$$