

Lab 8

Network Flow

3. Figure 7.27 shows a flow network on which an s - t flow has been computed. The capacity of each edge appears as a label next to the edge, and the numbers in boxes give the amount of flow sent on each edge. (Edges without boxed numbers have no flow being sent on them.)
- (a) What is the value of this flow? Is this a **maximum** (s,t) flow in this graph?
- (b) Find a **minimum s - t** cut in the flow network pictured in Figure 7.27, and also say what its capacity is.

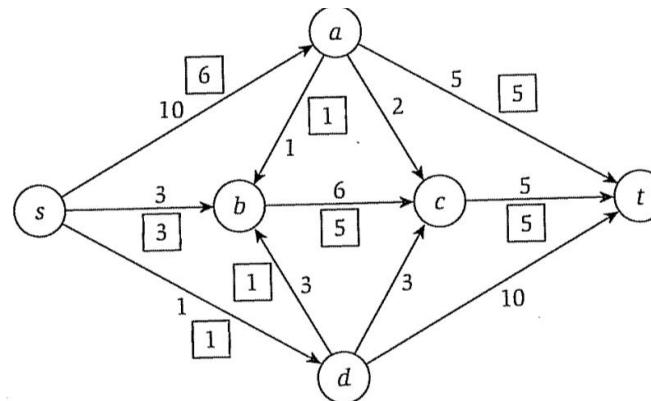


Figure 7.27 What is the value of the depicted flow? Is it a maximum flow? What is the minimum cut?

Ants on a tightrope

Suppose there are ants walking along a grid tightrope system. After an ant walks along one of the edges, it breaks. What is the maximum number of ants that can cross from any given points x and y in an $(m \times n)$ grid?

x and y must be at corners, but not necessarily the top-left and bottom-right. They can be internal.

Give a reduction to solve this as an instance of the max flow problem

Analyze runtime complexity. Would you use plain FF or scaling here?

Give a proof of correctness