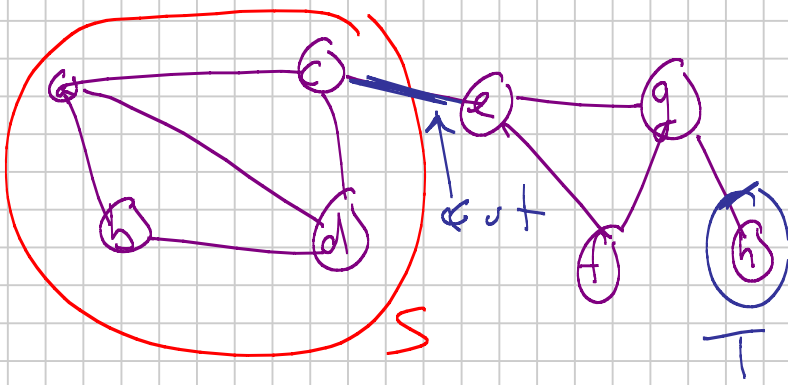
Spectral Clustering

Note Title 2/17/2016

Input: Graph $G = (V, E)$

top-down

- find a cut $S \subset V$ and $S' = V \setminus S$
- Recurse on (S, E_S) and $(S', E_{S'})$



$S = \{a, b, c, d\}$

$S' = \{e, f, g, h\}$

$G_S = (S, E_S)$ $\quad E_S = \{\{a,b\}, \{a,d\}, \{a,c\}, \{b,d\}, \{c,d\}\}$

Properties of good cuts

- $Cut(S, S')$ small: # edges
- $Vol(S)$ big: # edges with at least 1 vertex in S

Normalized Cut

$$NCut(S, S') = \frac{Cut(S, S')}{Vol(S)} + \frac{Cut(S, S')}{Vol(S')}$$

$$= \frac{1}{6} + \frac{1}{5} = 0.37$$

$$NCut(T, T') = \frac{1}{1} + \frac{1}{10} = 1.1$$