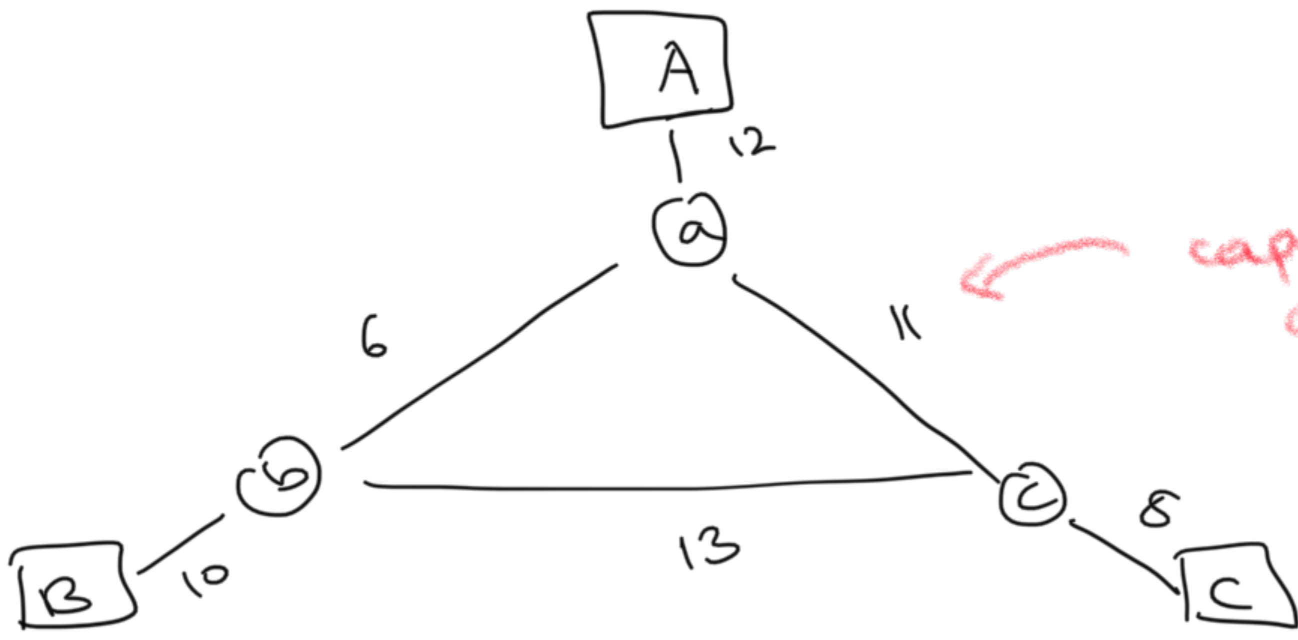
Linear Programming

Users: A, B, C

Switches: ⓐ, ⓑ, ⓒ



capacity constraint of each link

want each connection A – B, B – C, A – C should be ≥ 2 Mbps band width

A — B

(eg) Direct connection: A – a – b – B
(eg) Indirect connection: A – a – c – b – B

} allowed

<u>Revenue</u> :

A – B	Rs 300 / Mbps
B – C	Rs 200 / Mbps
A – C	Rs 400 / Mbps

<u>Problem</u> : Allocate bandwidth to maximize revenue

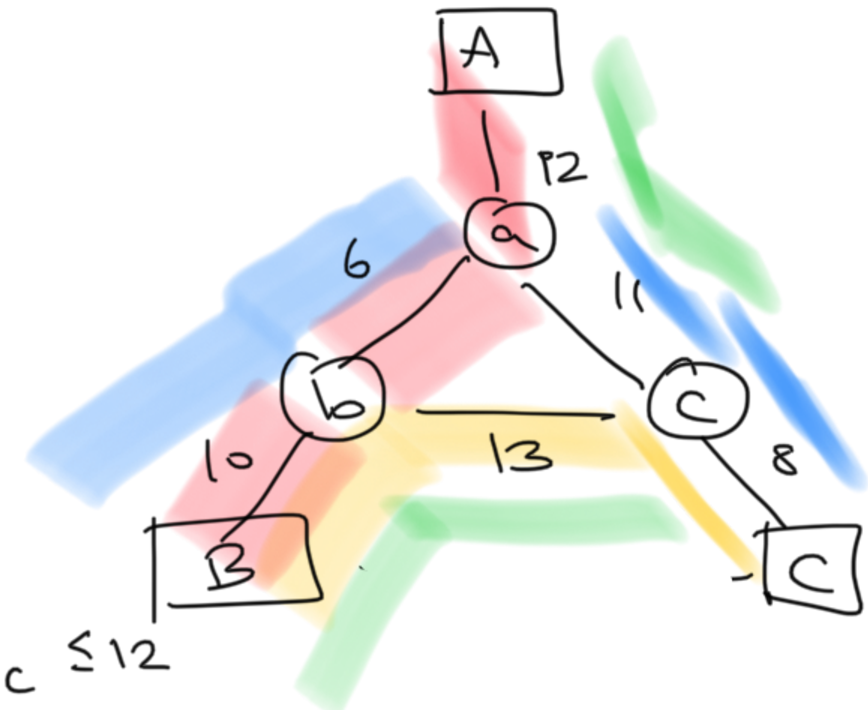
<u>Variables</u>

x_{AB} – bandwith via direct connection A – a – b – B

y_{AB} – bandwith via indirect connection A – a – c – b – B

similarly x_{BC}, y_{BC}, x_{AC}, y_{AC}

Constraints



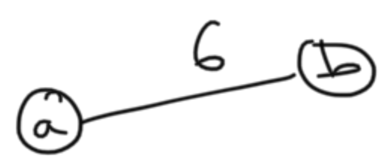
lies on 4 routes

$$x_{AB} + y_{AB} + x_{BC} + y_{BC} \leq 10$$

Similarly $x_{AB} + y_{AB} + x_{AC} + y_{AC} \leq 12$

$$x_{AC} + y_{AC} + x_{BC} + y_{BC} \leq 8$$

Again



lies on

x_{AB}, y_{BC}, y_{AC}

$$x_{AB} + y_{BC} + y_{AC} \leq 6$$

Similarly

$$y_{AB} + x_{BC} + y_{AC} \leq 13$$

$$y_{AB} + y_{BC} + x_{AC} \leq 11$$

min. constraints :

$$x_{AB} + y_{AB} \geq 2$$

$$x_{BC} + y_{BC} \geq 2$$

$$x_{AC} + y_{AC} \geq 2$$

All $x_{\bullet}, y_{\bullet} \geq 0$

Revenue

maximize $R = 300(x_{AB} + y_{AB}) + 200(x_{BC} + y_{BC}) + 400(x_{AC} + y_{AC})$

Drawback : Each path $\rightarrow$ a variable
so this strategy won't scale to bigger graphs. as paths $\sim$ exponential