

CS 103: Lecture 6 Traffic at Equilibrium

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Announcements

- ▶ HW 2 due Thursday
- ▶ Office Hours
 - ▶ Dan Tuesday 4-5pm
 - ▶ Areeba Tuesday 7-8pm
 - ▶ Tiffany Wednesday 8-9pm
- ▶ Blog posts!

Braess's Paradox

Dietrich Braess 1968



- ▶ Seoul, South Korea, mid-2000s: Cheonggyecheon restoration project
- ▶ Congestion improved after major highway removed

Braess's Paradox

Board work: present equilibrium model and analyze Braess's paradox

Braess's Paradox



NYC DOT
This "before" view of Times Square shows a streetscape that is not very friendly to pedestrians and bicyclists.



NYC DOT
This "after" shot of Times Square shows an area that is inviting to residents and visitors alike.

- ▶ NYC 2009: experimental road closures reduce congestion

Reflections on Braess's Paradox

How much worse can average commute time be for NE than the "social optimum"?

- ▶ social optimum = route choices that minimize average commute time
- ▶ the "price of anarchy"

Eva Tardos and Tim Roughgarden (early 2000s): if edge delay functions are linear ($x/100$, $10x$, $4.2x + 15$), then the price of anarchy is $4/3$.

- ▶ Average commute time of NE is at most $4/3$ times the social optimum