Traffic at Equilibrium and Braess's Paradox

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B

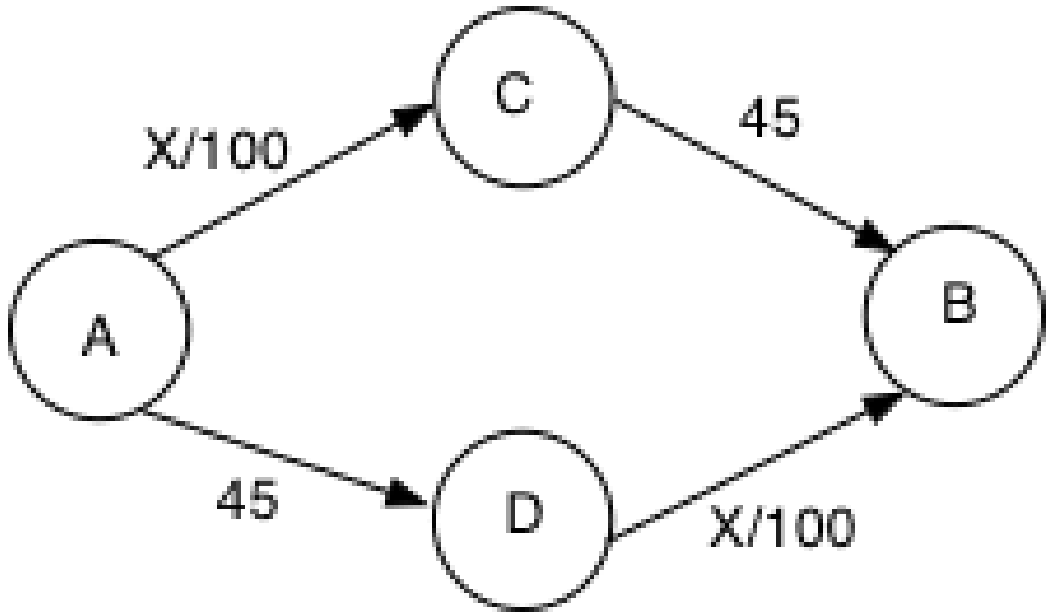
A

Transportation Network

- A total of 4000 motorists.
- Everyone wants to drive from A to B
- Bridges are highly sensitive to congestion
- Roads are insensitive to congestion

Which path a motorist would take?

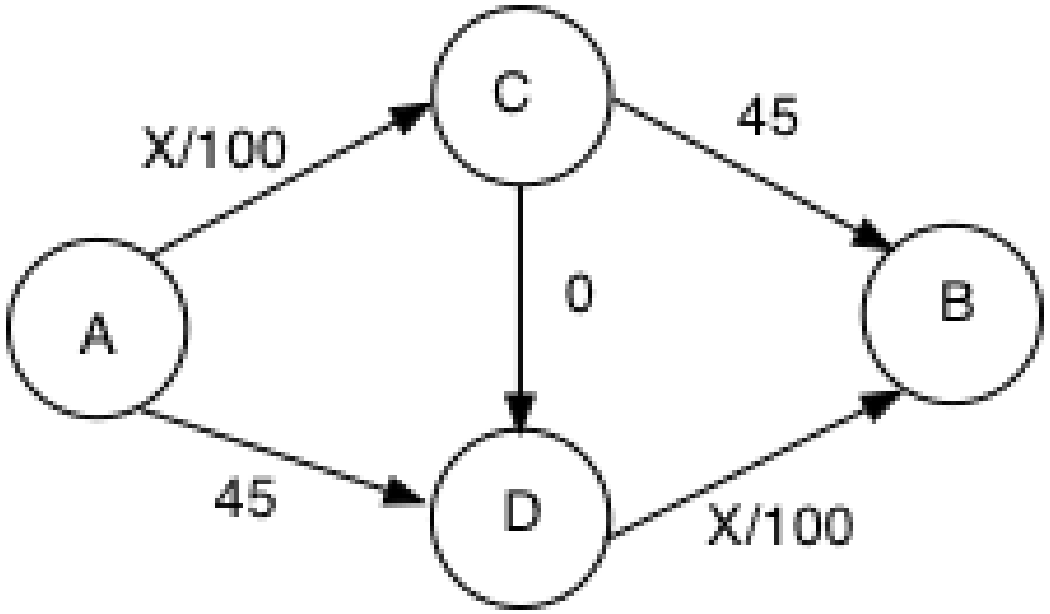
Modeling the Network as a game



- Players: {1,2,3……..4000}
- Strategy Set for player *i*={ACB,ADB}
- Payoff= Negative of time taken.

NASH Equilibrium of this game?

Slight modification in the game



Players?

Strategies

Payoffs

Nash Equilibrium?

Some examples

In transportation

- Stuttgart, Germany (1969): The traffic worsened until a newly built road was closed
- New York City (1990): On Earth Day 42nd Street was closed and traffic flow improved.
- Seoul, Korea (2002): A 6 lane road was torn down to improve traffic flow.

In other areas:

- In electricity network
- In internet traffic.