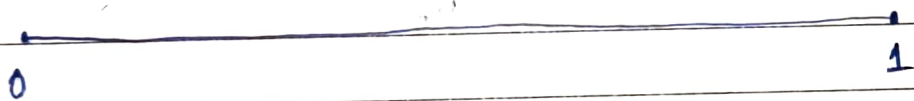


The electoral competition!

(Hotelling Game) (Median Voter Theorem) \rightarrow

- \rightarrow Two vendors at a beach, selling identical product, identical price.
- \rightarrow Vendors choose where to setup their carts.
- \rightarrow Beach goers buy from the closest cart.

Now let's see how these vendors locate themselves on the beach if their aim is to maximize the profit (gain max. customer)

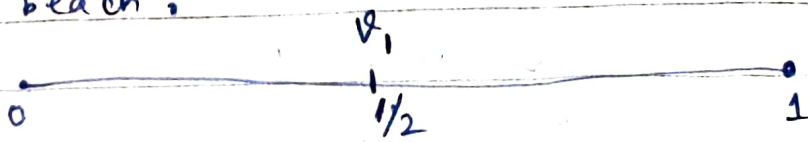


Assume that beach is from length 0 to 1.

Problem: Both players (vendors) have an infinite no. of strategies (locations).

Solⁿ: Sometimes proving what must be true about all equilibria greatly narrows the number of possibilities.

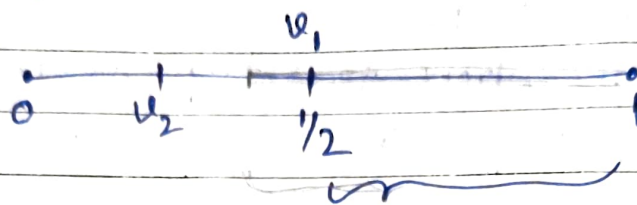
If vendor 1 locate himself ~~to~~ at the center of the beach:



then v_1 guarantees himself at least half of the business.

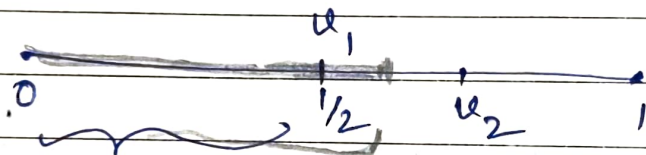
because

if v_2 locates himself on the left of v_1 then,



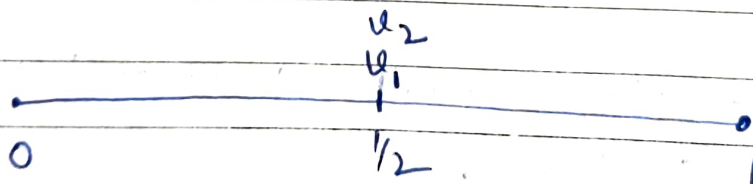
v_1 gets all the customers from the right.

if v_2 locates himself on the right



v_1 gets all the customers from the left.

if v_2 locates himself at the center



then also v_1 gets half of the business considering customers will purchase from both of the carts.

Equilibrium Properties:

- $v_1 \geq 1/2$

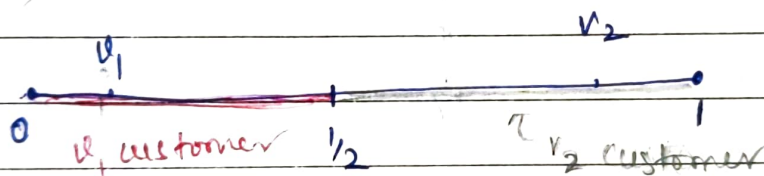
Any equilibrium must give vendor 1 at least half of the business.

- $v_2 > 1/2$ → same true for v_2 .
- $v_1 + v_2 = 1$ → but both collectively should get a total of 100% of the business in equilibrium

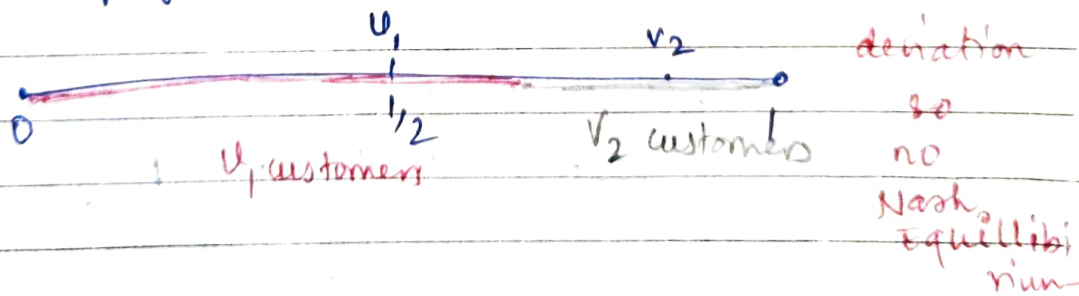
$v_1 = 1/2$, $v_2 = 1/2$ ⇒ Both getting half business possible in two ways

- ① v_1 and v_2 have the same position
- ② v_1 and v_2 are equidistant from the center.

Equidistant:



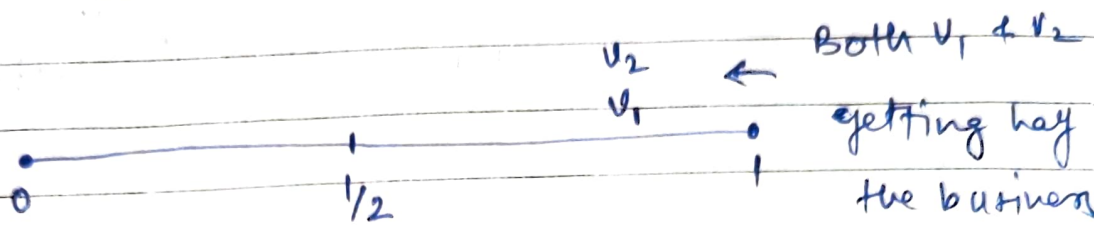
This is not Nash Equilibrium because v_1 can preferably deviate to center to gain more profit.



Same way v_2 also want to deviate.

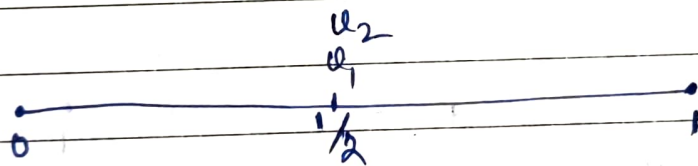
So v_1 and v_2 are equidistant from the center is not NE.

v_1 & v_2 ~~have~~ ^{at} the same position:



but v_1 or v_2 prefers to move to center position to get more than half of business, So no NE.

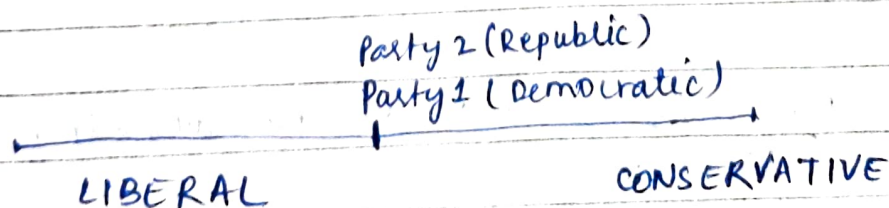
if they both locate themselves to $1/2$:-



Here both getting half business.

If anyone moves, it gets less business, so no vendor wants to deviate, so this is NE.

Now, this is exactly the same thing that happens in politics at the times of elections.



To win the election, I need to situate myself at the median point.