Zero-sum Games and Nash Equilibrium

- (x^*, y^*) is a NE $\Rightarrow u_2(x^*, y^*) \geq u_2(x^*, y)$ for all $y \in A_2$
  $\Rightarrow u_1(x^*, y^*) \leq u_1(x^*, y)$ for all $y \in A_2$
  $\Rightarrow u_1(x^*, y^*) = \min_y u_1(x^*, y) \leq \max_x \min_y u_1(x, y)$.
- (x^*, y^*) is a NE $\Rightarrow u_1(x^*, y^*) \geq u_1(x, y^*)$ for all $x \in A_1$
  $\Rightarrow u_1(x^*, y^*) \geq \min_y u_1(x, y)$ for all $x \in A_1$
  $\Rightarrow u_1(x^*, y^*) \geq \max_x \min_y u_1(x, y)$.
- Repeat for player 2.
- What have we proven?