The Clarke (aka. VCG) mechanism [Clarke 71]

- The Clarke mechanism chooses some outcome o that maximizes $\Sigma_i v_i(\theta_i', o)$
  - θ_i' = the type that i reports
- To determine the payment that agent j must make:
  - Pretend j does not exist, and choose o_{-j} that maximizes $\Sigma_{i \neq j} v_i(\theta_i', o_{-j})$
  - j pays $\Sigma_{i \neq j} v_i(\theta_i', o_{-j}) - \Sigma_{i \neq j} v_i(\theta_i', o)$

The Clarke mechanism is strategy-proof

- Total utility for agent j is
  $v_j(\theta_j, o) + \Sigma_{i\neq j} v_i(\theta_i', o) - \Sigma_{i\neq j} v_i(\theta_i', o_{-j})$
- But agent j cannot affect the choice of o_{-j}
- Hence, j can focus on maximizing $v_j(\theta_j, o) + \Sigma_{i\neq j} v_i(\theta_i', o)$
  - The other agents' types θ_i' are out of j's control
  - Agent j's true type θ_j is also fixed
  - Agent j will try to report a type θ_j' so that o maximizes $v_j(\theta_j, o) + \Sigma_{i\neq j} v_i(\theta_i', o)$
- But mechanism chooses o to maximize $\Sigma_i v_i(\theta_i', o)$
- Hence, if $\theta_j' = \theta_j$, o maximizes $\Sigma_i v_i(\theta_i', o) = v_j(\theta_j', o) + \Sigma_{i\neq j} v_i(\theta_i', o)$. Therefore, if $\theta_j' = \theta_j$, o maximizes $v_j(\theta_j, o) + \Sigma_{i\neq j} v_i(\theta_i', o)$.