

### Homework 3: Coalitional Games

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Consider an electoral college with four parties  $A$ ,  $B$ ,  $C$ , and  $D$  with 45, 25, 15, and 15 representatives respectively, which can form coalitions to form a simple-majority government (at least 51 votes) and obtain control over a \$1 trillion budget. Assuming that the value of the winning coalition is

$$v(C) = \begin{cases} 10^{12}, & \text{if } |C| \geq 51, \\ 0, & \text{otherwise,} \end{cases}$$

#### Problem 1 Fair Distribution

**10 pts.**

Find the Shapley value to fairly divide the total budget amongst all parties.

#### Problem 2 Coalition Stability

**10 pts.**

Find the set of all stable coalitions (core) in the above game.