CSE 6369 - Multiagent Systems
Final Project Handout
'Fair' Distribution of Resources in a Coalitional Game

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Problem Statement:
In a resource acquisition scenario, N agents have the opportunity to collaborate in purchasing an item of value $10000. Each of the agents has a different amount of resources available that it can contribute to the purchase and more than 50%(majority) of the total resources are required to purchase the item. Build a system that produces a 'fair' distribution of the proceedings resulted from the purchase to all the agents in the grand coalition.

Constraints:
N > 1.
Resource R_i for an agent i should be a positive integer.

Sample Input #0:
4 45 25 15 15

Sample Output #0:
Payoff for agent 1: $5000
Payoff for agent 2: $1666.67
Payoff for agent 3: $1666.67
Payoff for agent 4: $1666.67

Sample Input #1:
2 35 65

Sample Output #1:
Payoff for agent 1: $0
Payoff for agent 2: $10000

Sample Input #2:
5 20 20 20 20 20

Sample Output #2:
Payoff for agent 1: $2000
Payoff for agent 2: $2000
Payoff for agent 3: $2000
Payoff for agent 4: $2000

Payoff for agent 5: $2000

Sample Input #3:
5 20 30 10 10 30

Sample Output #3:
Payoff for agent 1: $2333.33
Payoff for agent 2: $3166.67
Payoff for agent 3: $666.667
Payoff for agent 4: $666.667
Payoff for agent 5: $3166.67

Description of Sample Test Case:

In the Sample test case #1, the agent 2 itself has the majority number of resources to purchase the item. Hence, it gets the total proceedings.

In the Sample test case #2, each agent has same number of resources and require any other two agents to collaborate in order to gain the majority. Hence, the proceedings are distributed equally.