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DECISION ANALYSIS – SHORT EXERCISES X – SOCIAL CHOICE THEORY – PROPERTIES, PARADOXES, AND POWER INDICES

I. Indicate the truth (T) or falsity (F) for the below statements.

a) For three individuals, there is no unrestricted domain voting rule that is liberal and Paretian	T
b) The plurality rule is independent with respect to irrelevant alternatives	F
c) The Borda rule for four players is strategyproof	T
d) The Banzhaf power index satisfies the null player property	T

II. Consider the following preferences of 13 voters: 6: A > C > B, 3: B > C > A, 1: B > A > C, **3**: **C > B > A**. Determine the results using the Borda count. How to manipulate the preferences of the three voters in bold to make candidate B the winner.

Borda count		
Results: BSc(A) = 13	BSc(B) = 14	BSc(C) = 12
Manipulation: 3: B > C > A		
BSc(A) = 6·2 + 3·0 + 1·1 + 3·0.		
BSc(B) = 6·0 + 3·2 + 1·2 + 3·2.		
BSc(C) = 6·1 + 3·1 + 1·0 + 3·1.		

III. Consider the following simple game: [6; 4, 3, 2, 1] (the numbers in the brackets mean a rule requires 6 votes to pass, and voter A can cast four votes, B three votes, C two, and D one. Compute the Shapley-Shubik power indices for all voters.

Order	Piv.	Order	Piv.	Order	Piv.	Order	Piv.
ABCD	B	BACD	A	CABD	A	DABC	B
ABDC	B	BADC	A	CADB	A	DACB	C
ACBD	C	BCAD	A	CBAD	A	DBAC	A
ACDB	C	BCDA	D	CBDA	D	DBCA	C
ADBC	B	BDAC	A	CDAB	A	DCAB	A
ADCD	C	BDCA	C	CDBA	B	DCBA	B

Party	SS index
A	10/24
B	6/24
C	6/24
D	2/24