1. Use the following election to show that the Hare system is manipulable.

<div align="center">

Ballots

1st	A	B	C	C	D
2nd	B	A	B	B	B
3rd	C	C	A	A	C
4th	D	D	D	D	A

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2. The Gibbard-Satterwaite theorem states that the following four properties of voting systems cannot hold simultaneously.

   (i) Elections always have a unique winner.   (iii) It is not manipulable.

   (ii) It satisfies the Pareto condition   (iv) It is not a dictatorship.

   Which of the above four properties are satisfied by a dictatorship?

3. Assume that the following ballots give the voters' true preferences, and the Borda count is being used. List all the voters who *cannot* manipulate this election, in the sense of making a change in their individual ballot will not yield a single winner who is preferred by that voter. Explain your answer.

<div align="center">

Ballots

1st	A	E	F	C	B
2nd	B	A	D	D	C
3rd	F	B	E	E	D
4th	C	F	A	F	F
5th	D	B	C	A	E
6th	E	D	C	B	A

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4. A test question presents you with five possible answers, and asks you to select the three that fit best. How many ways are there for you to answer the question?

5. Voters A, B, C, D use the weighted voting system [64: 40, 40, 27, 21]. How many voter permutations are there? List all voter permutations, determine the pivotal voter, and calculate each voter's Shapley-Shubik power index.

6. Four voters A, B, C, D use the weighted voting system [51: 30, 25, 24, 21]. Make a table showing all winning coalitions in the left column. In the next column, put the number of votes by which that coalition exceeds the quota. This make it easier to identify the critical voters in the third column, which you should do as well. Determine the Banzhaf index of each voter.