Collective Decision-Making in Organizations (2687)
Final Exam - Summer Term 2009

Solve 2 out of the 3 problems below. Each problem is worth up to 30 points. The bold figures indicate the maximum points per question. If you answer more than two problems, then the first two in your working sheets will be graded (so make sure to clearly cancel out any answer you don't want to be graded).

The usage of pocket calculators, textbooks, lecture notes, or dictionaries is not permitted. Notes on this exercise sheet will be disregarded during the grading. Give answers exclusively in your working sheets; please leave a margin of 2cm for comments.

Undecipherable scribbling will not be graded. Use the terminology and the mathematical tools presented in the lecture and the tutorial; make clear how you derive your results.

1. Consider an international organization with four member countries, called **A**, **B**, **C**, and **D**. The approval of a proposal requires an absolute majority. The allocation of votes is given in the following table; abstention is not allowed:

Country	A	B	C	D
Number of Votes	39	30	21	10

a) Calculate the Banzhaf power index for each country. **(10 points)**

b) Assume now that the support of more than 65% of the votes is required to approve a proposal. Compute the Banzhaf indices. **(5)**

c) Assume now that the support of at least three countries AND more than 65% of the votes is required to approve a proposal. Compute the Banzhaf indices. **(5)**

d) Explain which of the three voting systems (1. absolute majority, 2. qualified majority of 65%, 3. three country support AND 65% requirement) is preferred by which country. **(5)**

e) Assume that countries A and B will never agree with each other. Compute the Banzhaf indices under the absolute majority rule. **(5)**

2. The annual assembly of a listed company consists of four groups of shareholders (who control different voting weights), and decides by **simple** majority among three proposals, denoted A, B, and C. Here are the respective group's voting weights and preference orderings:

$$\text{Group1 (45 votes): } A > B > C$$
$$\text{Group2 (12 votes): } B > A > C$$
$$\text{Group3 (13 votes): } B > C > A$$
$$\text{Group4 (35 votes): } C > B > A$$

a) *What will be the outcome if all groups vote honestly?*(4)

b) *Explain why two groups have an incentive for unilateral strategic voting behavior.* (12)

c) *Which one of the two deviations discussed in b) constitutes a Nash equilibrium, which one is no equilibrium?* (14)

3. Consider a board consisting of two managers (**A** and **B**) who vote on two business strategies. The status quo (**SQ**) could be replaced by one of two possible strategy proposals, labeled **S1** and **S2**. A and B have opposing interests:

$$\text{A:} \quad S1 > SQ > S2$$
$$\text{B:} \quad S2 > SQ > S1$$

The decision is made via majority voting, retaining the status quo in case of a tie.

Let **D>0** denote each manager's disutility if the opposing strategy prevails, **C>D** the opportunity costs of taking part in the voting process, and **U>C** the utility for each individual if his preferred alternative prevails. The value of the SQ is normalized to zero for both players.

a) *Assume that players A and B have to decide between two options: either a player participates (and votes for the own favorite) or he abstains. Depict this decision scenario and the resulting social decisions in a matrix.*(10)

b) *Derive all three Nash equilibria of the game.* (20)