

1. Explain the Condorcet Winner Criterion
2. In order to choose which type of music to listen to in a student center music lounge, a Condorcet vote is held by the 15 students present. Below are the preference schedules for the students. Is there a Condorcet winner and if so, which music type?

	Number of Students		
	6	5	4
First choice	classical	rock	rock
Second choice	jazz	jazz	classical
Third choice	rock	classical	jazz

Use the preference schedule of 23 voters shown below to answer questions 3-7.

	Number of Voters			
	8	5	6	4
First choice	A	C	B	B
Second choice	C	A	C	A
Third choice	B	B	A	C

3. Which candidate, if any, wins in a majority rule election?
4. If a rank method is used, which candidate, if any, wins in a straight plurality election?
5. Who is the winner using Sequential Runoff with an Agenda of B, C, A.
6. Who wins using the Borda Count Method
7. Can the four voters in the last column vote strategically to change the outcome of question 13 to one they would like better? Why or why not?

A seventeen-member committee must elect one of four candidates: R, S, T, or W. See the preference schedule below.

	Number of Members			
	6	4	3	4
First choice	R	S	T	W
Second choice	S	R	S	T
Third choice	T	T	R	S
Fourth choice	W	W	W	R

8. R wins using the plurality method. Could those members who most prefer W vote strategically in some way to change the outcome in a way that will benefit them?

An 11-member committee must choose one of the four applicants, K, L, M, and N, for membership on the committee. Use this table to answer questions 9 and 10.

	Number of Members		
	6	2	3
First choice	K	M	M
Second choice	L	L	N
Third choice	N	K	L
Fourth choice	M	N	K

9. The committee members have preferences among the applicants as given in the table. If the committee uses pairwise sequential voting with the agenda K, L, M, N, applicant K wins. Is it possible that another agenda will yield a different winner?
10. The committee uses the Borda count method. The committee members have preferences among the applicants as given in the table. Who wins the election?

Consider an 11-member committee that must choose one of three alternatives, X, Y, or Z, using the Hare system. Their schedule of preferences is shown below.

	Number of Voters		
	5	4	2
First choice	Z	X	Y
Second choice	Y	Y	X
Third choice	X	Z	Z

11. Who wins? Is it possible for the group of five voters to change the outcome in a way that would benefit them?

Twenty-nine voters must choose from among three alternatives, A, B, and C, using the Borda count method. The voters' preference schedules are shown below.

	Number of Voters			
	12	8	6	3
First choice	B	C	A	C
Second choice	C	A	B	B
Third choice	A	B	C	A

12. Who wins Borda count? Can the group of six voters change their preference list to produce an outcome they like better?
13. Give an example of a weighted voting system that has a dummy voter but no dictator.

14. Explain why the weighted voting system [13: 10, 6, 5, 3, 2] is not a legitimate weighted voting system.
15. Given the weighted voting system [30: 20, 17, 10, 5], list all winning coalitions.
16. In a weighted voting system, is a voter with veto power the same as a dictator? Explain why or why not.
17. Given the weighted voting system [5: 3, 2, 1, 1, 1], find which voters of the coalition {P1, P3, P4, P5} are critical.
18. Is voter P3 a critical voter in the coalition {P1, P2, P3} of the weighted voting [15: 10, 6, 5, 3, 2]? Why or why not?
19. Evaluate sC_3 .
20. Given the weighted voting system [4: 1, 2, 3], list all winning coalitions.
21. Which of the following describe legitimate weighted voting systems?
 - I [16: 13, 8, 6, 4]
 - II [15: 10, 8, 7, 5]

22. A weighted voting system can have dummy voters without a dictator.
 - A) True
 - B) False

23. Which voters in the system [38: 20, 15, 12, 5] have veto power?
 - A) A only
 - B) A and B
 - C) A, B, and C
 - D) None

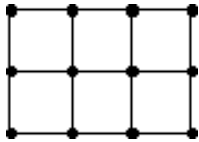
24. Given the weighted voting system [38: 20, 15, 12, 5], list all winning coalitions?

25. Given the weighted voting system [9: 6, 4, 2], which of the voters are dummy voters?

26. A committee has four voters with the system [30: 20, 17, 10, 5]. Which voters are critical in the coalition {P1, P3, P4}?

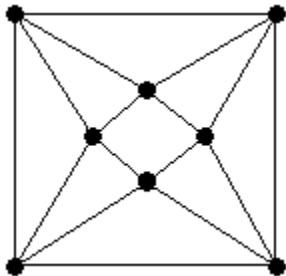
A blast from the past.....

27. Add wiggly edges to find an efficient Eulerization of the following graphs.



28. In some states, license plates use a mixture of letters and numerals. How many possible plates could be constructed using three letters followed by three numerals?

29. In the graph below, add wiggly edges to indicate a Hamiltonian circuit.



Use the first fit (FF) bin-packing algorithm to pack the following weights into bins that can hold no more than 9 lbs.

30. Use the order-requirement digraph below (with time given in minutes) and the priority list $T_1, T_2, T_3, T_4, T_5, T_6$ to answer questions

