MAT 118 Spring 2017
Practice Final Exam

1. [17 pts] Consider the following preference schedule for an election between candidates A, B, C:

# voters:	6	1	2	3
1st	A	C	B	C
2nd	B	B	C	A
3rd	C	A	A	B

   (a) Which candidate wins using the plurality method?
   (b) Use the Borda count method to determine the outcome.
   (c) Use the plurality-with-elimination method to determine the outcome.
   (d) Finally, apply the method of pairwise comparisons to determine the outcome.

2. Use NNA starting at C to find a Hamilton circuit for the following, and give its total weight.
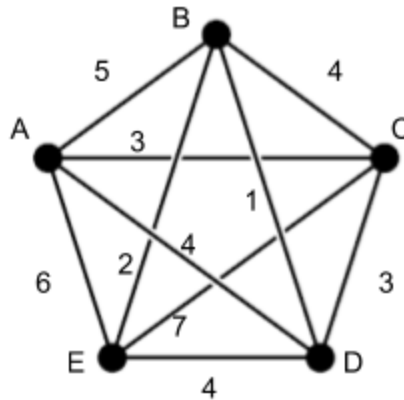
3. Consider the weighted voting system [19; 9, 8, 1, 1].

   (a) List the sequential coalitions and underline the pivotal players. Then compute the Shapley-Shubik power distribution.
   (b) List the winning coalitions and underline the critical players. Using this information compute the Banzhaf power distribution.

4. Consider the sequence 4, 9, 14, 19, …

   (a) Is this sequence arithmetic, or geometric?
   (b) Compute the sum of the first 100 terms of the sequence.

5. Abe and Barb are dividing a $9 sandwich which is ½ chicken parm and ½ vegetarian. Barb likes the chicken parm part 2 times as much as the vegetarian part, while Abe is vegetarian.


   (a) Make a table that records how much money the different flavor halves of the sandwich are worth to Abe and Barb, in dollars.
   (b) Draw and describe a cut that Abe can make if he is acting as the divider in the divider-chooser method.

6. Draw 4 spanning trees of the following graph:
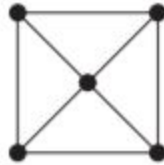
7. An exponentially growing population sequence has initial $P_0 = 2$ and $R = 3$. What is P_5?

8. On the following graph, draw the degrees of each vertex, and then give an eulerization.
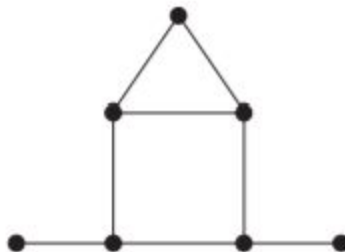
9. In a logistic growth model, $r = \frac{1}{2}$. If the carrying capacity is 100, is there a non-zero population amount that can be in equilibrium (i.e. $p_0 = p_1 = p_2 = …$)?