

Project

Math 203 Contemporary Mathematics

Due on November 21

Instructions: *You may work on the project individually, or you may work on it in groups of up to three members. Each group submits one project.*

During the week of November 14–18 you can submit a preliminary version of the project. I will not grade it, but I will look it over and give you feedback. Also, remember that you can e-mail me any questions that arise as you are working on the project.

* * *

Suppose you are put in charge of the Arnold Schwarzenegger campaign for the Presidency in 2008 (Congress passes a bill allowing the Austrian, or any foreign-born citizen, to run.) With your job comes many responsibilities, and you have been asked to carry out the following tasks:

1. In an effort to secure his support in Missouri, Arnold plans to go on a five city tour throughout the state, starting and ending in the capitol. The cities he plans to visit are Kansas City, St. Louis, Springfield, Bowling Green, and Jefferson City. Using the sorted-edges algorithm and the nearest neighbor algorithm, determine an efficient tour through these cities minimizing the distance traveled.
2. You are planning 20 second commercial spots for the election. You plan to have Arnold read excerpts from his speeches (you can find these excerpts on the course homepage.) Since Arnold is busy campaigning, you need to determine how long it will take to read each excerpt. For each excerpt, read it aloud in your best Arnold voice at least ten times, and use a stopwatch or a clock to measure how long it takes. Use your results to provide, for each excerpt, a 95% confidence interval for the “true” reading time.
3. In order to do part (2), you had to determine, for each excerpt, the average reading time. In the following, assume that these are good estimates for the actual reading times. Use the first-fit decreasing and the worst-fit decreasing bin-packing algorithms to schedule the excerpts into 20 second commercial spots. Determine which algorithm is better in this situation, and also mention how many commercials you will need to include each of the excerpts.

4. In order to choose a vice presidential running mate, Arnold has formed a 20 person focus group to choose from his 4 favorite possible running mates. His favorite running mates are Rudy Giuliani, Jesse “The Body” Ventura, Donald Trump, and John McCain. We will denote the possible vice presidents with their last initial (G, V, T, and M). The 20 person focus group votes as follows:

Count	7	6	4	3
Vote	G	M	V	T
	M	G	T	G
	T	V	M	V
	V	T	G	M

Determine the winner using the plurality with runoff voting scheme. Is there a winner? If so, who is it? Also, find the winner using the Borda count, Sequential Pairwise voting with the agenda G,M,T,V, and using the Hare voting system.

With this information, which candidate should Arnold choose?

5. A few days before the presidential election, political analysts have determined that races in 42 of the 50 states are locks for either Arnold or his opponent, Hillary Rodham Clinton. Counting electoral college votes from these 42 states has Arnold and Hillary tied with 197 votes. The election, therefore, comes down to the eight states below. The number to the right of each state is the probability that Arnold wins that state. What is the expected number of electoral college votes for Arnold? (Note that you will have to look up the number of votes each of these states receives.)

It takes 270 electoral college votes to win the election; do you expect Arnold to win?

State	Probability Arnold Wins
California	0.51
Arizona	0.54
Florida	0.53
Iowa	0.44
Missouri	0.52
New Hampshire	0.46
Ohio	0.48
Wisconsin	0.45