**2000 Problems**

**Problem A: Bank Robbers**

The First National Bank has just been robbed (the position of the bank on the map is marked). The clerk pressed the silent alarm to the police station. The police immediately sent out police cars to establish road blocks at the major street junctions leading out of town. Additionally, 2 police cars were dispatched to the bank.

See the [**attached map**](http://www.comap.com/highschool/contests/himcm/bwmap2.jpg).

The Bank is located at the corner of 8th Ave. and Colorado Blvd. and is marked with the letter B. The main exits where the two road blocks are set up are at the intersection of Interstate 70 and Colorado Blvd, and Interstate 70 (past Riverside Drive). These are marked with a RB1 and RB2 symbol.

* Assume the robbers left the bank just before the police cars arrived. Develop an efficient algorithm for the police cars to sweep the area in order to force the bank robbers (who were fleeing by car) into one of the established road blocks.
* Assume that no cars break down during the chase or run out of gas.
* Further assume that the robbers do not decide to flee via other transportation means.

**Problem B: Elections**

It is almost election time and it is time to revisit the electoral vote process. The constitution and its amendments have provided a subjective method for awarding electoral votes to states. Additionally, a state popular vote, no matter how close, awards all electoral votes to the winner of that plurality. Create a mathematical model that is different than the current electoral system. Your model might award fractional amounts of electoral votes or change the methods by which the number of electoral votes are awarded to the states. Carefully describe your model and test its application with the data from the 1992 election (in the [**attached table**](http://www.comap.com/highschool/contests/himcm/1992Election.gif)). Justify why your model is better than the current model.