Problem 4 (due Monday, October 26)

Jack and Jill play the following game which results in a 6 digit number: Jill starts by picking a non-zero digit, the first digit of the number. Then Jack and Jill alternate picking the next digits, each time they can choose any digit which has not been used before. Jack wins if the 6 digit number is a prime, Jill wins otherwise. For example, suppose Jill picks 8, then Jack picks 0, then Jill picks 9, then Jack picks 4, then Jill picks 6, and finally Jack picks 1. We get the number 809461, which is a prime number, so Jack wins. Which player has a strategy to win regardless of how the other plays?

Only one solution was received, form Yuqiao Huang. His solution analyses many cases, and some of them are left for the reader. A shorter solution is provided in the following link Solution