Assignment #3:
Due February 20 (keep a copy of your work with you!)

1. An array \( A[1, 2, ..., n] \) contains all the integers from 0 to \( n \) except one. It would be easy to determine the missing integer in \( O(n) \) time by using an auxiliary array \( B[0, ..., n] \) to record which numbers appear in \( A[1, 2, ..., n] \). In this problem, however, we cannot access an entire integer in \( A[1, 2, ..., n] \) with a single operation. The elements of \( A[1, 2, ..., n] \) are represented in binary, and the only operation we can use to access them is "fetch the \( j^{th} \) bit of \( A[i] \)" , which takes constant time. Show that by using only this operation, we can still determine the missing integer in \( O(n) \) time.

2. Show switch settings for the following output permutation: [3,5,7,8,6,2,1,4] in an 8×8 switch using the algorithm described in class: Show the settings for all switches. The input permutation is [1,2,3,4,5,6,7,8] as usual.

3. Problem 4-5
4. Problem 4-6
5. Exercise 9.3-1
6. Exercise 9.3-8
7. Challenge Problem: 9-2