CS 240: Data Structures and Data Management **Winter 2024**

Tutorial 03: Jan 29

1. **Expected Runtime Analysis**
   Give the best-case and expected running time for the following function. You can assume that the Shuffle operation requires $\mathcal{O}(n)$ time and the array A contains no duplicates
   Note: the *Shuffle*() function produces each permutation equally likely.

```
MonkeySort(A):
// Input: Array A of size n
// Output: None (A is sorted in-place)
shuffle(A)
if A is sorted then
    return A
else do
    MonkeySort(A)
```

2. **Analysis**
   Suppose A is an array containing n distinct elements. In addition, assume each element is in between 1 and n, inclusive. Analyze this pseudo-code to determine a tight bound on the average number of question mark (?) that are printed, rather than a runtime. You may assume n is divisible by 2.

```
mystery(A, n)
    count = 1
    for i = 1 to n-1
        if A[i] is divisible by A[0]
            count++
    for i = 1 to count
        print("?")
```