

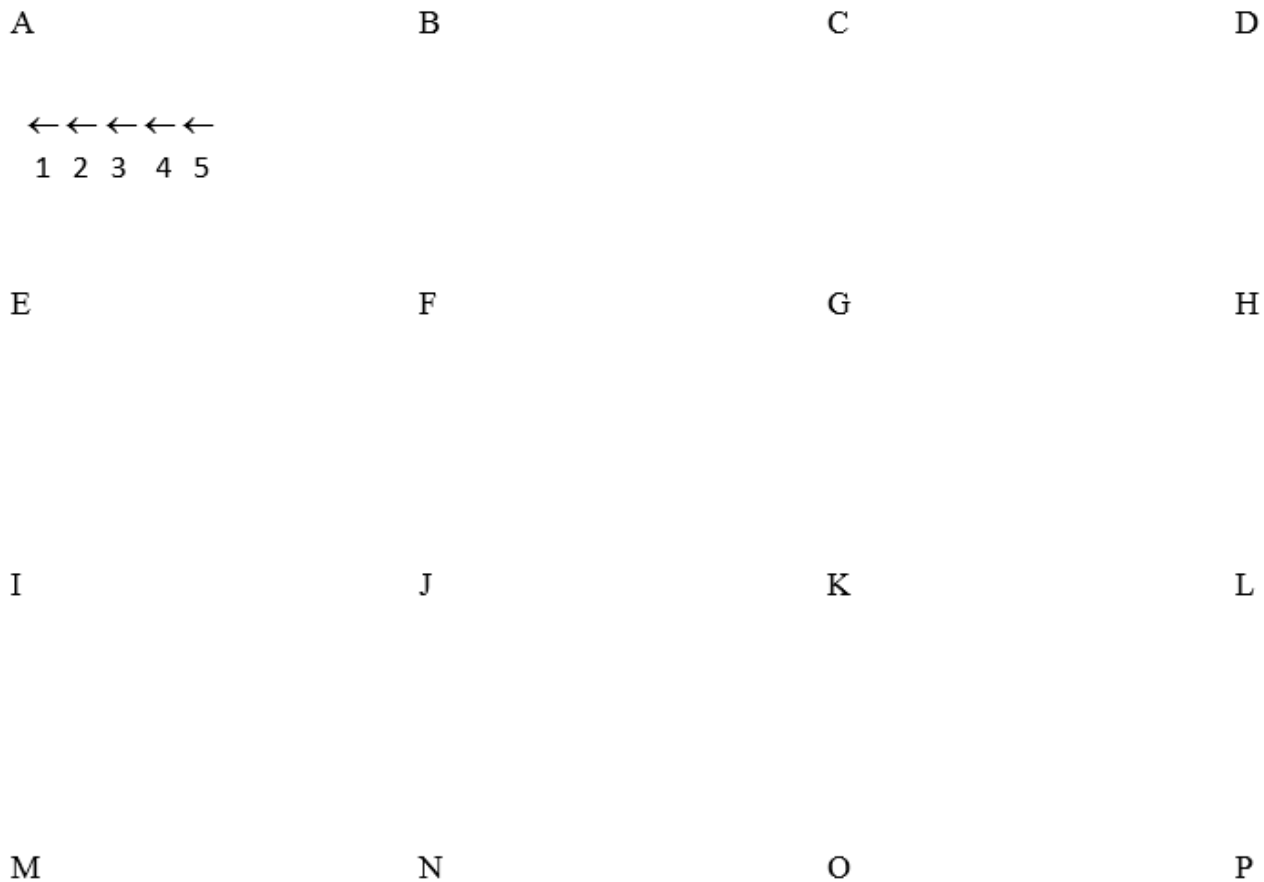
Announcements:

1. HW6 (11 problems now) due Monday; **No late days may be used for this one.**
2. Exam1 date: Tuesday Sept 30,
 - If you are allowed extra time for exams and plan to use that time, please talk with me soon about timing.
 - Exam 1 specification document is linked from Day 16 on the schedule page.
3. In my office today: 12:45-2:30, 4:00-5:00.

Main ideas from today:

1. We want to generate all permutations of the numbers 1, 2, ..., n.
2. Bottom-up algorithm. Alternate the insertion orders.

3. Johnson-Trotter. Every element has an additional piece of info, its direction (right or left).
 - a. An element is *mobile* if the element it “points to” is smaller than itself.
 - b. Largest mobile element is swapped with the element it points to.
 - c. Then reverse the direction of all larger elements.



4. Which permutation follows each of these in lexicographic order?

183647520

471638520

5. Write an algorithm for generating the next permutation, with only N and the current permutation as input.

6. If the lexicographic permutations of the numbers $[0, 1, 2, 3, 4]$ are numbered starting with 0, what is the number of the permutation 14023? How do you get this?

7. Write an algorithm which, given a permutation of the numbers $0..N-1$, calculates its (zero-based) position in the lexicographic ordering of all of the permutations of $0..n-1$.

8. In the lexicographic ordering of permutations of $[0, 1, 2, 3, 4, 5]$, which permutation is number 541? How do you get this?