Queues in Java

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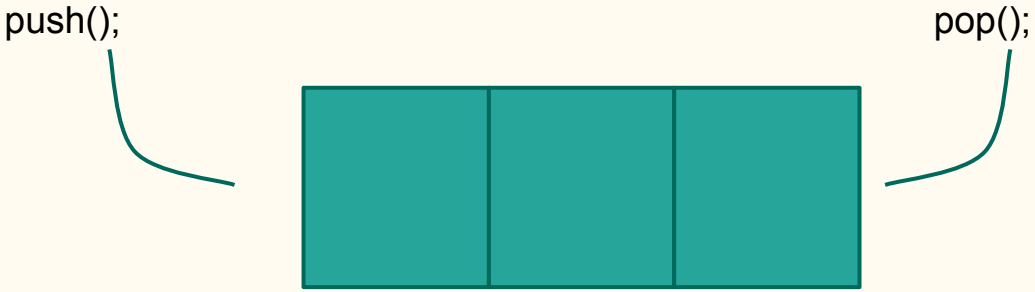
What are queues?

- Data structure
- **F**irst **I**n, **F**irst **O**ut



Queues in Java

- Queues are an interface in Java, so you cannot declare a queue.
- A linked list is an implementation of a queue already completed in Java.

```
LinkedList<Integer> aRandomQueue = new LinkedList<Integer>();
```

Queue Project

Goal: Find all the permutations of a word which the user inputs, using a list.

Input: The user should input a string.

Output: The output should be every single way that the letters of the input string could be ordered.

Example:

```
Input = cats

Output = cats    cast    ctas    ctsa    csat    csta    acts    acst    atcs    atsc
         asct    astc    tcas    tcsa    tacs    tasc    tsca    tsac    scat    scta
         sact    satc    stca    stac
```

How do I use a queue here?

Recall the method of calculating permutations in Math...

To find all ways to order the letters S, H, R, E, K:

- The first letter may be S, H, R, E, or K.
- If the first letter was S, the second letter may be H, R, E, or K.
- If the first and second letters were S and R, the third letter may be H, E, or K.

Star Guidelines

[*] = working permutation program

[**] = accepts user input without error

[***] = returns all permutations of any size, not just the size of the word

[****] = eliminates repeated permutation

(imagine permuting "noob", you'll get "noob" twice, but you should only store and print it once)

[*****] = search all the permutations to see if they are an english word

(HINT: This will use knowledge from the next unit, so don't worry about efficiency; just try to implement a simple and intuitive search)