

Data Structures

Vector Homework

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Problem #1: Right rotation

- Consider our Vector class. Add member function: `void right_rotate()`
- The function rotates the whole array 1 step right
- Example
- Assume array content is: 0 1 2 3 4
- After a right rotation it will be: 4 0 1 2 3
 - Observe 4 rotated back to head of the array
- Be careful to not expand the array capacity

Problem #2: Left rotation

- Consider our Vector class. Add member function: `void left_rotate()`
- The function rotates the whole array 1 step left
- Example
- Assume array content is: 0 1 2 3 4
- After a right rotation it will be: 1 2 3 4 0
 - Observe 0 rotated back to tail of the array
- Be careful to not expand the array capacity

Problem #3: Right rotation with steps

- Implement `void right_rotate(int times)`
- This one applies the right rotation times time
- Assume array content is: 0 1 2 3 4
- `right_rotate(2)` \Rightarrow it will be: 3 4 0 1 2
- The challenge: times can be up to: 2000000000
- Your code should be efficient to some extent

Problem #4: Deleting a position

- Implement method `int pop(int idx)` in the vector class
- It returns the deleted value
- Remove this element from the array
- Assume array is: 4 0 1 2 3
- `pop(2)`
 - Return value 1
 - New array: 4 0 2 3

Problem #5: Improved search

- Assume our vector is huge and we do many find() calls for almost a few small repetitive values
- One way to improve the code speed is: each time you find the value, you **shift** it one step to the **left**
- Eventually, the values that are queried a lot, will move to the head of array
- Implement method: int find_transposition(int value)
 - It returns the found position, but consider moving it one step to the left
- Example: 10 20 30 40 50. find_transposition(3)
 - New array 10 30 20 40 50
 - Return 1

“Acquire knowledge and impart it to the people.”

“Seek knowledge from the Cradle to the Grave.”