




Week 4 Assignment - Array-Based Sequences, Stacks, and Queues

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Due Monday by 6:40pm **Points** 10 **Submitting** a file upload
Available until Oct 5 at 6:40pm

Please follow the submission guidelines. Please complete all of the following:

1. Let A be an array of size $n \geq 2$ containing integers from 1 to $n-1$, inclusive, with exactly one repeated. Write a function that returns the integer in A that is repeated. The underlying algorithm should be optimal. You cannot use any advanced data structures (e.g., sets). You can use an array if you wish. In your comments, indicate the worst case running time and space using Big-O notation. Array documentation is at <https://docs.python.org/3/library/array.html>  (<https://docs.python.org/3/library/array.html>) To use an array, use the following import statement: `from array import array`
Examples:
`array('i', [1, 2, 3, 4, 4]), Repeated: 4`
`array('i', [1, 2, 1]), Repeated: 1`
`array('i', [1, 1]), Repeated: 1`
2. Write a function **remove_all_occurrences(data, value)**, that removes all occurrences of value from a given list. The worst-case running time of the function must be **$O(n)$** on a list with n elements.
3. Write a stack class using a single queue as an instance variable, and only constant additional local  memory within the function. Indicate in the comments the running time of the push(), pop(), and top() methods for your design? Use the following: [array_queue-1.py](#) 
4. Write a function called reverseMe that takes a stack as a parameter and reverses the order of the items in the stack. The only auxiliary storage class that you can use is the ArrayStack (no lists, tuples, etc). If your method works, when you pop all of items from the stack, the items will be popped in the same order as you put them on. For example, if you push the values 1,2,3,4,5 onto the stack, call reverseMe, then when you pop off all of the items, they will come out in order 1,2,3,4,5. Your function cannot return anything. It must modify the parameter passed to it. Use the following: [array_stack.py](#) 