1. Stacking

After the : is what the stack contains, in order. First in, last out.

push(3): [3]  
push(4): [4, 3]  
pop(): [3]  
push(pop()\*5): [15]  
push(10): [10, 15]  
push(pop()/4): [2, 15]

The last operation is 10/4, which is 2.5, but java cuts off decimals and rounds down, so 2.

1. Queuing

After the : is what the queue contains, in order. First in, first out.

push(1): [1]  
push(pop()+6): [7]  
push(18): [7, 18]  
push(pop()/2): [18, 3]

Same disclaimer here, 7/2 is 3.5, which becomes 3.   
pop(): [3]  
pop(): []

1. Find in deque

The deque isn’t guaranteed sorted, so we have to go through the list one element at a time, but since it’s a deque, we can do two elements at a time, the first and the last. Deque has an iterator and descending iterator method, which creates an iterator starting at the head and tail respectively, the one from the tail going through the deque in reverse order, so we use that. Check the head and tail, if no match, use the iterator’s next() method, and check that, and so on, until you’ve iterated at most size/2 times, in which case the iterators would have crosses and you can stop, at O(n/2) time.

8. Time complexity

Brackets: The time complexity is O(n), where n is the number of chars is the input String, because of the main for loop which iterates through each char contained within the String. Nothing inside of the loop adds time complexity. The space complexity is O(k), where k is equal to the number of elements contained within the stack when it overflows, because stack.push() could possibly require creating a new stack and copying every element in the stack over to a new one when the stack fills.

Dna-Rna: Almost the same answer, here. Time complexity is O(n) with the same n and the same reason as with brackets. Space complexity is also O(n), because for every iteration through the for loop, queue.add() is called, which creates a single new node. Within a for loop that runs n times, queue.add() is called n times, leading to n memory spaces allocated.

Rna-Protein: The same answer as Dna-Rna. Time complexity of O(n) with the same n and reason, and a space complexity of O(n) because every element in the string is ultimately added to a queue through the convert() method, which again requires a space to be created for each one, leading to O(n) space required.