Algorithms and Data Structures

Summer Semester 2024

For discussion on Wednesday, May 22, 2022

1. In class, we took the file

   `https://github.com/mjwestcott/Goodrich/blob/master/ch07/doubly_linked_base.py`

   as a template to implement a `Stack` class. You can find the resulting code at

   `https://mids.ku.de/oliver/teaching/ku/summer2024/algorithms/code/2024-05-15_stack.py`

   Using a similar approach, implement a `Queue` class in Python that uses a linked list internally.

2. (GTG Exercise R-6.5) Implement a function that reverses a list of elements by pushing them onto a stack in one order, and writing them back to the list in reversed order.

3. (GTG Exercise R-6.8) Suppose an initially empty queue Q has executed a total of 32 enqueue operations, 10 first operations, and 15 dequeue operations, 5 of which raised `Empty` errors that were caught and ignored. What is the current size of Q?

4. (GTG Exercise C-6.20) Describe a nonrecursive algorithm for enumerating all permutations of the numbers $\{1, 2, \ldots, n\}$ using an explicit stack.

5. (GTG Exercise C-6.21) Show how to use a stack S and a queue Q to generate all possible subsets of an n-element set T nonrecursively.