Module Three

Learning Objective

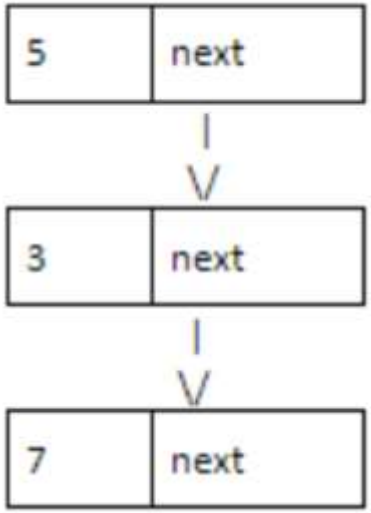
By the end of this module, you will meet these learning objective:

- Describe how the use of an algorithm affects specific data structures

Module Overview

Welcome to Module Three! Lists, stacks, and queues are common data structures that are used in many applications. Lists, along with arrays and vectors, are commonly used as the underlying storage for other data structures. Understanding how the data is stored and understanding the algorithms for inserting, removing, and searching are important in most data structures. Understanding how the data is stored and the algorithms for inserting, removing, and searching is important in most data structures.

For example, in a linked list, the previous node needs to be known to perform a remove operation in constant time. In a singly linked list, the previous node must be retained since there is no way to get to it from the next node. In a doubly linked list, however, you are able to get a pointer to the previous node from the current node, making the implementation of the algorithm easier.



Linked list functions are often implemented recursively, which is sometimes challenging to understand. Try to trace through a few iterations of a recursive function until you feel that you understand what is happening. It will be important to keep track of the values of all the variables and what is being passed into the function.

Stacks and queues are similar to each other, but a stack is a LIFO (last in, first out) data structure whereas a queue is a FIFO (first in, first out) data structure. If a stack and queue are implemented with a doubly linked list, the only differences are where the element is inserted into the list and where it is removed from the list. The other functionality in the data structures will be the same.

Module at a Glance

This is the recommended plan for completing the reading assignments and activities within the module. Additional information can be found in the module Resources section and on the module table of contents page.

1. Review the Module Three resources.

2. Complete the Module Three activities in zyBooks.
3. Complete the Module Three assignment.
4. Complete Project One Milestone One.