

4.2. What Are Linear Structures?

We will begin our study of data structures by considering four simple but very powerful concepts. Stacks, queues, deques, and lists are examples of data collections whose items are ordered depending on how they are added or removed. Once an item is added, it stays in that position relative to the other elements that came before and came after it. Collections such as these are often referred to as **linear data structures**.

Linear structures can be thought of as having two ends. Sometimes these ends are referred to as the “left” and the “right” or in some cases the “front” and the “rear.” You could also call them the “top” and the “bottom.” The names given to the ends are not significant. What distinguishes one linear structure from another is the way in which items are added and removed, in particular the location where these additions and removals occur. For example, a structure might allow new items to be added at only one end. Some structures might allow items to be removed from either end.

These variations give rise to some of the most useful data structures in computer science. They appear in many algorithms and can be used to solve a variety of important problems.

You have attempted 1 of 1 activities on this page

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(Objectives.html)

(WhatIsAStack.htm)