

Bellevue University

Heap Data Structure and Applications of it

Timothy Jelinek

CS420-T301 Data Structures

7/12/2024

Heap data structures are useful and efficient, which leads to them being very popular. Heaps are very useful with priority queues. Heap operations are used to maintain nodes within in heap table. These operations are also used in algorithms. When working with data, it is very important to study and understand heaps and heap operations. This paper will talk about heaps and heap operations as conveyed by several credible sources.

A popular data structure is a heap, which is a tree data structure, which uses the heap property in all of its nodes. These structures have children that are less than their parent node in a min heap, or more than their parent node in a max heap. If you want a heap that has decreasing values when moving down the tree, you would use a max heap. On the contrary, if you want a heap that has increasing values as you move down the heap, you would use a min heap. Heaps are very efficient and easy to use, which is why many people use them, but there are also disadvantages to using them.

Heaps are very useful, and for great reasons, but they can also have issues or downsides to them. Heaps are great to use for adding or removing data. The heap data structure is also great at allowing data employees to use priority queues. Heap structures would not be ideal if you are using flexible data, as heaps are meant to hold elements in a specific order. It is also not ideal to use a heap data structure if you have limited memory, as they use memory dynamically, which can also make it hard to manage the memory being used by the heap and can cause errors. Heap operations are great to use to manage heaps and can be very useful to know when it comes to storing data in them.

Heaps are very popular and have many situations in which they are used.

People that use heap in their employment have multiple heap operations at their disposal. The operation of heapify allows these workers to use array to create heaps. Another operation they have is an insertion operation for the need of adding an element to a heap they already have. If they have the ability to add elements, they also need an operation to remove elements, which is a deletion operation, which can be used to delete the element marked as the highest priority. The final most popular heap operation discussed in these articles is the peek operation that is used to search for and find the element marked as the highest priority. All of this information is important to fully understand, so that you can use it when working with data.

Heaps and heap operations are very useful when storing data. GeeksforGeeks and Medium have gone into depth about heaps and heap operations, how they are used, and why they are useful. Heaps are a very popular data structure due to their efficiency and ease of use. Algorithms and other real-world applications incorporate heaps. These articles are a great source of information to learn more about heaps and heap operations.

Sources:

GeeksforGeeks. (2024, March 30). *Heap data structure*. GeeksforGeeks.

<https://www.geeksforgeeks.org/heap-data-structure/>

Khan, M. A. (2023, January 1). HEAP Operation in Data Structure & Algorithms -
Muhammad Ali Khan - Medium. *Medium*.

[https://medium.com/@malizamankhan/heap-operation-in-data-structure-
algorithms-9308a31a9ab2](https://medium.com/@malizamankhan/heap-operation-in-data-structure-algorithms-9308a31a9ab2)