

Data structure:Theoretical Approach

Durgesh Raghuvanshi

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B-Tech Department of Computer Science, IILM Academy of Higher Learning, Greater Noida, Uttar Pradesh, India **ABSTRACT** Run with accordance with significance. The first if these this paper explains about the basic terminologies used in this paper in data structure. Better running times will be other constraints, such as memory use which will be paramount. The most appropriate data structures and algorithms rather than through hacking removing a few statements by some clever coding. Data structures serve as the basis for abstract data types (ADT). "The ADT defines the logical form of the data type. The data structure implements the physical form of the data type." Different types of data structures are suited to different kinds of applications, and some are highly specialized to specific tasks. For example, relational databases commonly use B-tree indexes for data retrieval, while compiler implementations usually use hash Data structures serve as the basis for abstract data types (ADT). "The ADT defines the logical form of the data type.

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- 1 Introduction Data structures serve as the basis for abstract data types (ADT). "The ADT defines the logical form of the data type. The data structure implements the physical form of the data type." Different types of data structures are suited to different kinds of applications, and some are highly specialized to specific tasks. For example, relational databases commonly use B-tree indexes for data retrieval, while compiler implementations usually use hash tables to look up identifiers. Data structures provide a means to manage large amounts of data efficiently for uses such as large databases and internet indexing services. Usually, efficient data structures are key to designing efficient algorithms. Some formal design methods and programming languages emphasize data structures, rather than algorithms, as the key organizing factor in software design. Data structures can be used to organize the storage and retrieval of information stored in both main memory and secondary memory. Data structures are generally based on the ability of a

2 Sequential Search When data items are stored in a collection such as a list, we say that they have a linear or sequential relationship. Each data item is stored in a position relative to the others. In Python lists, these relative positions are the index values of the individual items. Since these index values are ordered, it is possible for us to visit them in sequence. This process gives rise to our first searching technique, the sequential search. Starting at the first item in the list, we simply move from item to item, following the underlying sequential ordering until we either find what we are looking for or run out of items. If we run out of items, we have discovered that the item we were searching for was not present.

Algorithm Complexity:

cell1	cell2	cell3
cell4	cell5	cell6
cell7	cell8	cell9