Modify the algorithm of max-heap such that two elements are pushed in each iteration

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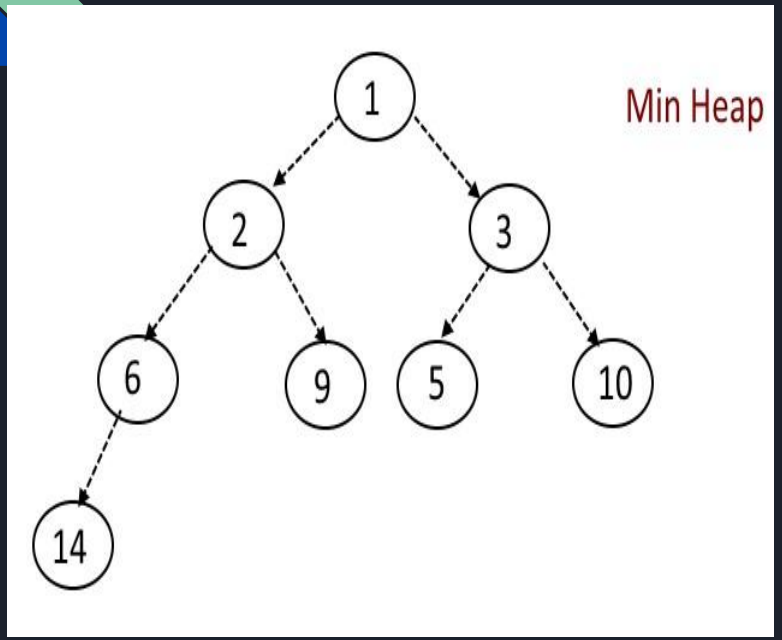
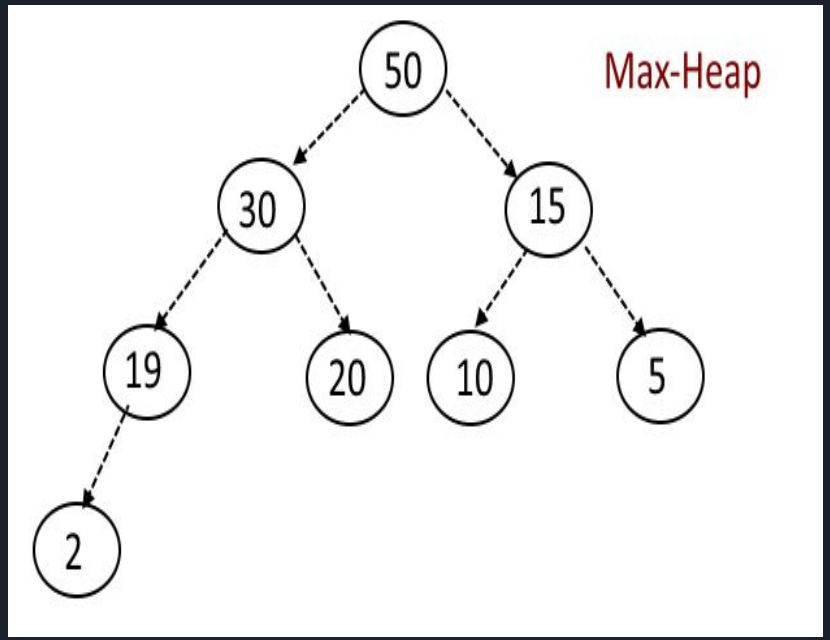
INTRODUCTION

- Heap is a very important data structure in computer science.
- It is used for an efficient implementation of a priority queue.
- Heap sort makes use of heaps is one of the best sorting algorithms as it is in place and has no worst case quadratic scenarios.
- A Heap can be defined as a partially ordered tree. It is ordered because the every node in the heap satisfies a property.
- There are mainly two types of heaps - Minheap and Maxheap.
- In a minheap, the value of the parent is lesser than the value of its children and vice-versa for the maxheap.
- Heaps are used to store data as they have a logarithmic run time for both the insert and delete operations.
- Heaps are also used to reduce run time in graph algorithms.

- Example of minheap and maxheap :





Approach :

```
MAX-HEAP-INSERT(A, key1, key2)
heap-size[A] = heap-size[A]+2
index = heap-size[A]
A[index-1] = key1
A[index] = key2
i = index-1
while(i > 1 and A[parent(i)] < A[i])
        exchange A[parent(i)] and A[i]
        i = parent(i)
i = index
```

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while(i > 1 and A[parent(i)] < A[i])
      exchange A[parent(i)] and A[i]
      i = parent(i)
```

Input : A = [50 19 15]
Insert (A ,30,20)

Output : A = [50 30 15 19 20]

Time Complexity :

- Time taken for each insertion of two elements at a time is O(2*log n).

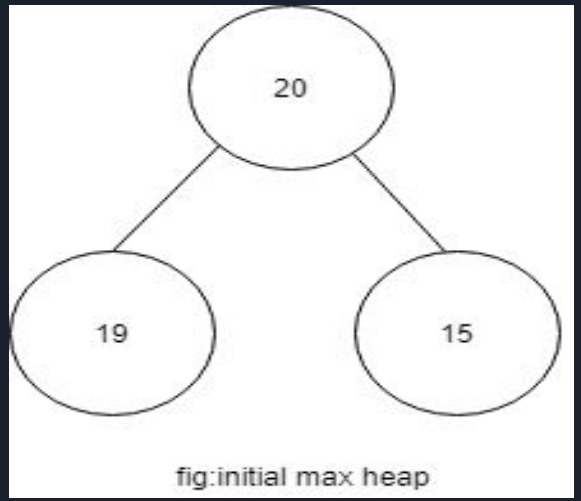

fig:initial max heap

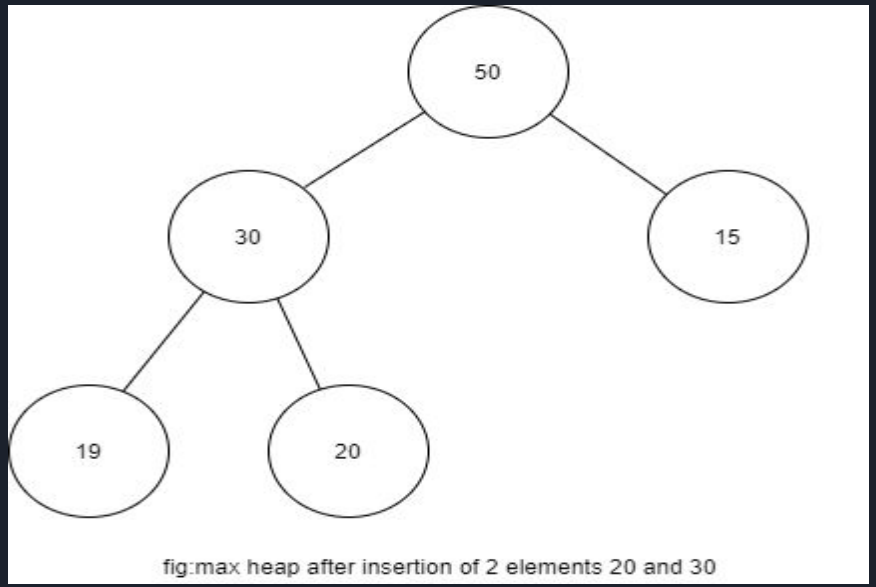

fig:max heap after insertion of 2 elements 20 and 30

Conclusion and results:

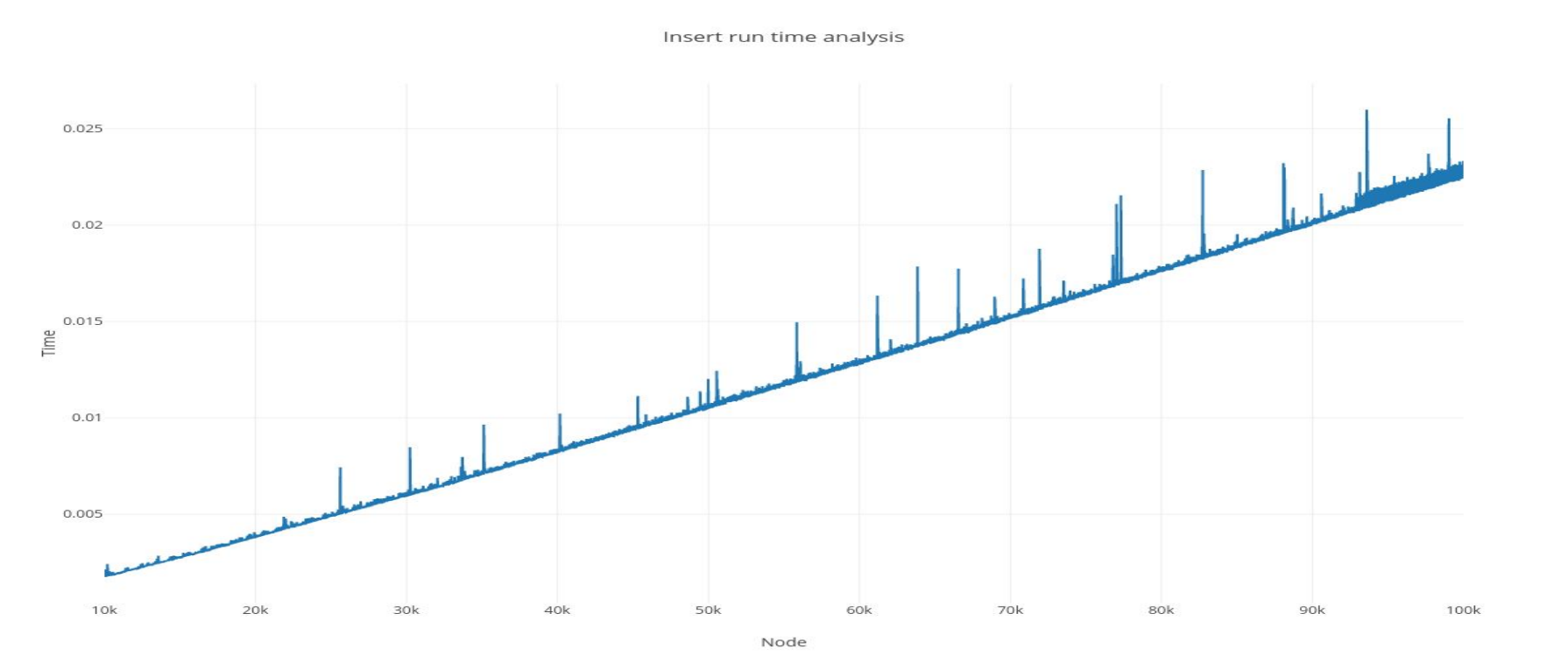

Fig : Runtime of the insertion operation