Priority Queue

An Introduction

Md Awsaf Alam [1]
Ahmed Nafis Fuad[2]

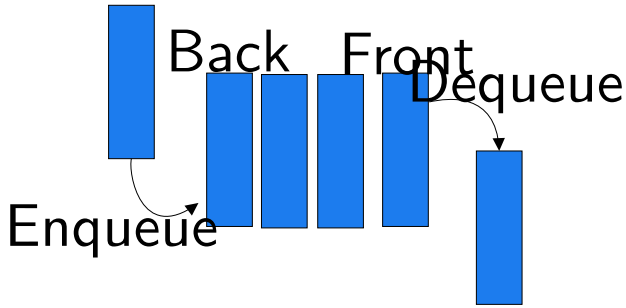
[1]Department of CSE
BUET
[2]Department of CSE
BUET

July 21, 2018

Table of Contents

What is a Queue?

A queue is an example of a linear data structure, or more abstractly a sequential collection. Queues provide services in computer science, transport, and operations research where various entities such as data, objects, persons, or events are stored and held to be processed later.



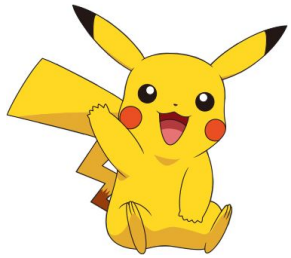
What is a Priority Queue?

A priority queue is an abstract data type which is like a regular queue or stack data structure, but where additionally each element has a "priority" associated with it. In a priority queue, an element with high priority is served before an element with low priority.

Application of Queue

1 1 1 1

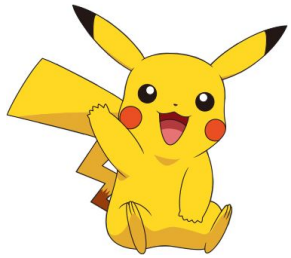
Application of Queue



1 1 1

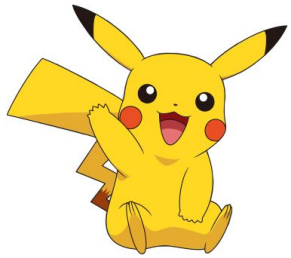
1

Application of Queue



1 1 1 1

Application of Queue



1

1

1

1

Application of Queue

1

1

1

1

Simulation

A Binary (Max) Heap is a complete binary tree that maintains the Max Heap property. Binary Heap is one possible data structure to model an efficient Priority Queue (PQ) Abstract Data Type (ADT). In a PQ, each element has a "priority" and an element with higher priority is served before an element with lower priority (ties are broken with standard First-In First-Out (FIFO) rule as with normal Queue). Try clicking ExtractMax() for a sample animation on extracting the max value of random Binary Heap above. To focus the discussion scope, we design this visualization to show a Binary Max Heap that contains distinct integers only.

Implementations of Priority Queue

- Fibonacci Heap
- Binary Heap

Blocks

Sample Block

This is a sample block.

Sample Alert Block

This is a sample alert block.

Example

Sample example.

Blocks

Sample Block

This is a sample block.

Sample Alert Block

This is a sample **alert block**.

Example

Sample example.

Blocks

Sample Block

This is a sample block.

Sample Alert Block

This is a sample alert block.

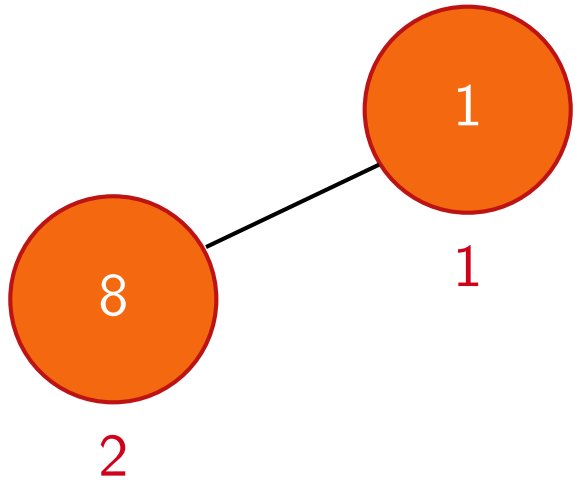
Example

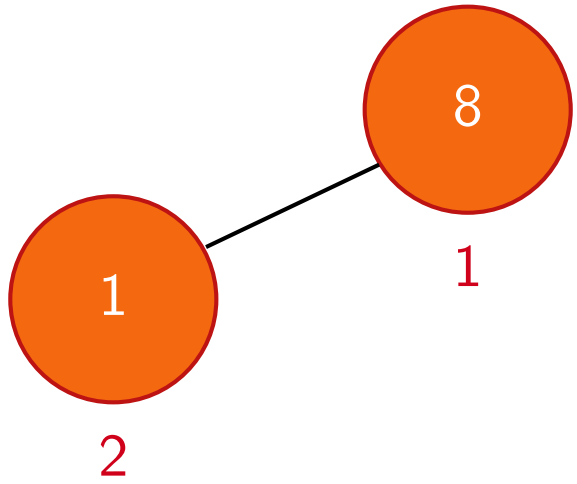
Sample example.

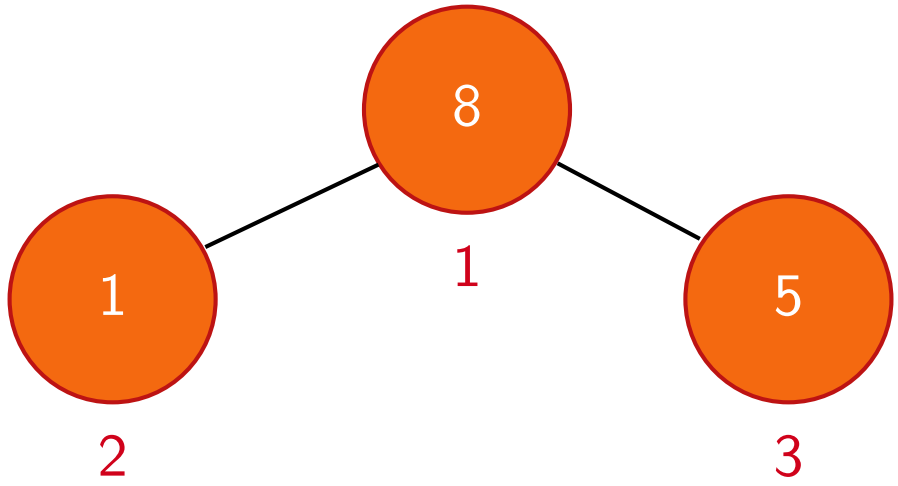
Definition

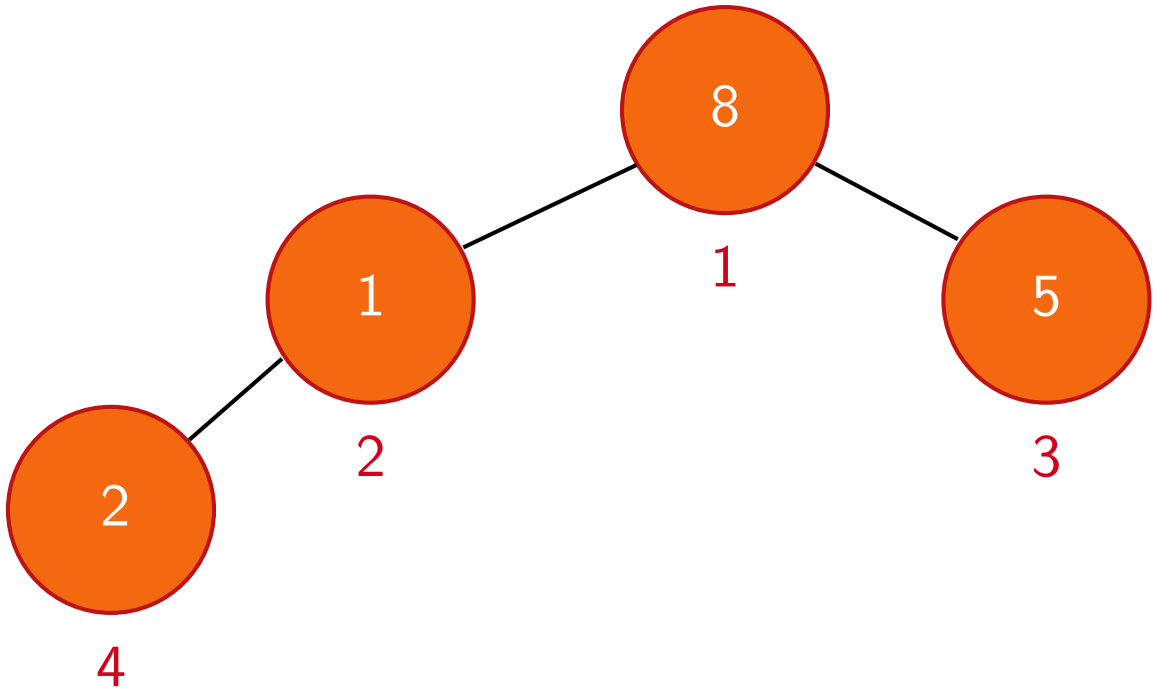
A Binary (Max) Heap is a complete binary tree that maintains the Max Heap property. Binary Heap is one possible data structure to model an efficient Priority Queue (PQ) Abstract Data Type (ADT). In a PQ, each element has a "priority" and an element with higher priority is served before an element with lower priority (ties are broken with standard First-In First-Out (FIFO) rule as with normal Queue). Try clicking ExtractMax() for a sample animation on extracting the max value of random Binary Heap above. To focus the discussion scope, we design this visualization to show a Binary Max Heap that contains distinct integers only.

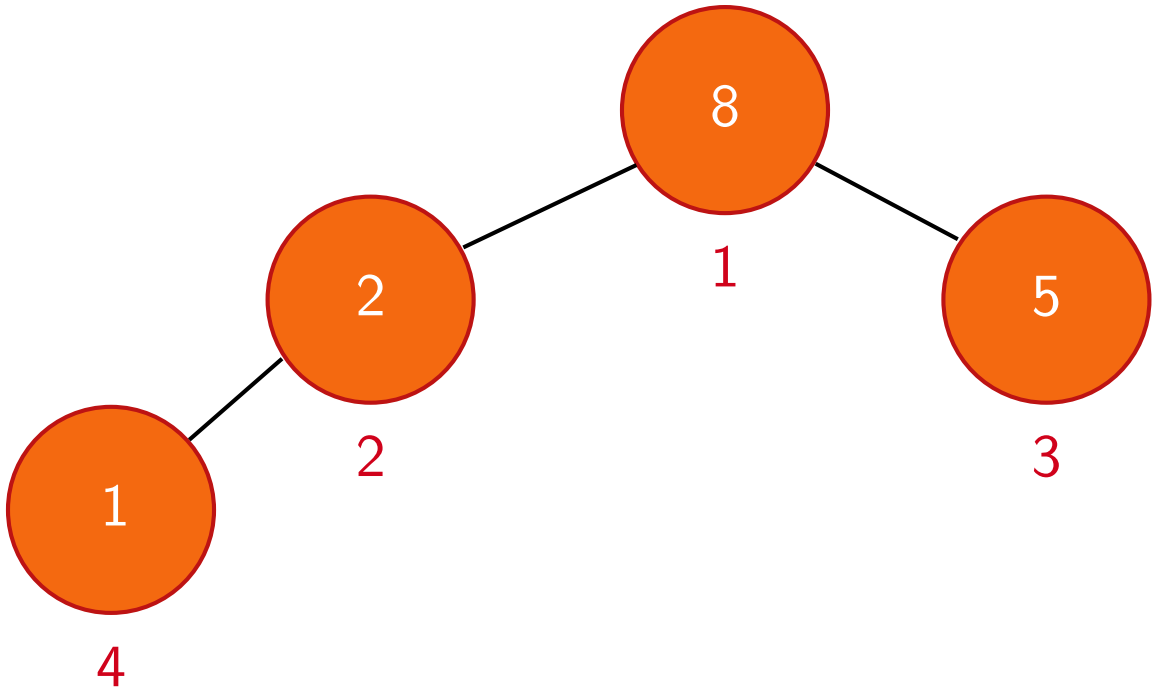
1

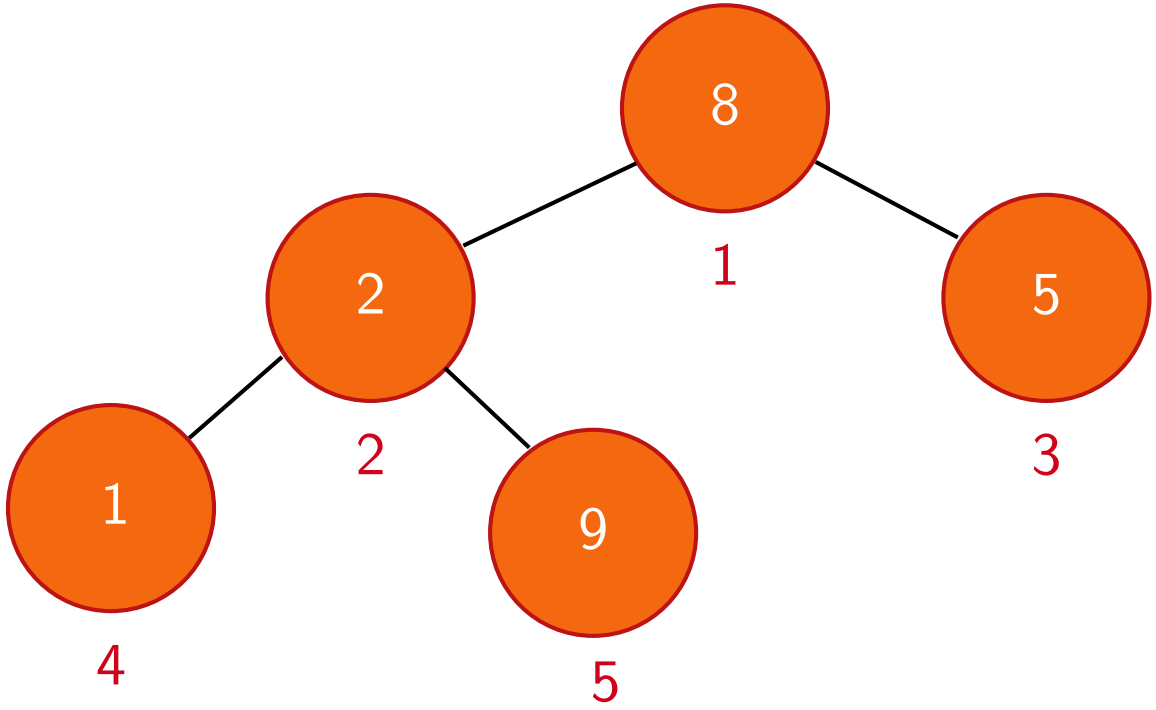

1
8
1
2

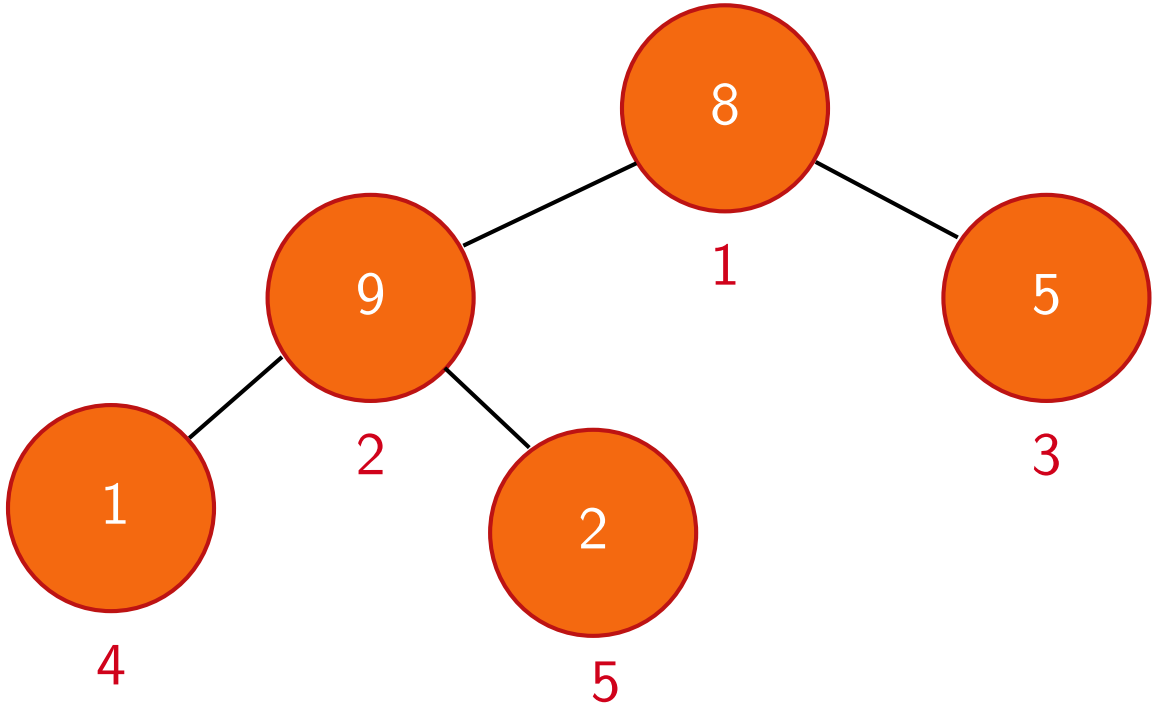

8
1
1
2

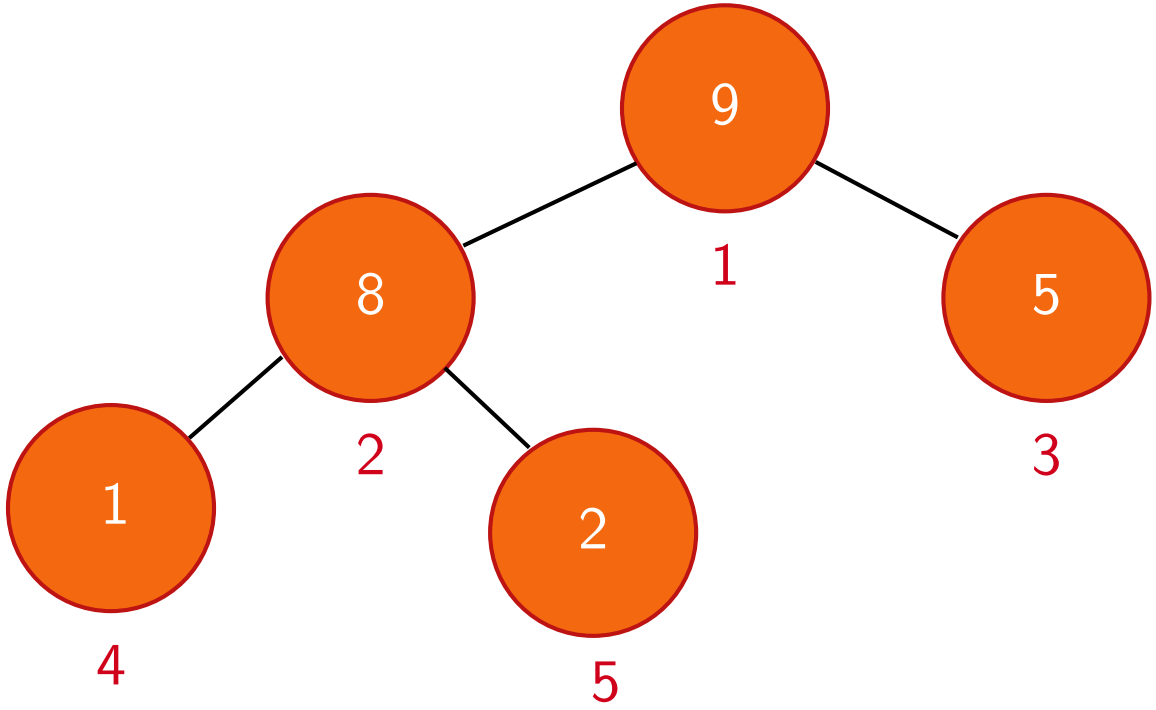

8
1
5
1
2
3

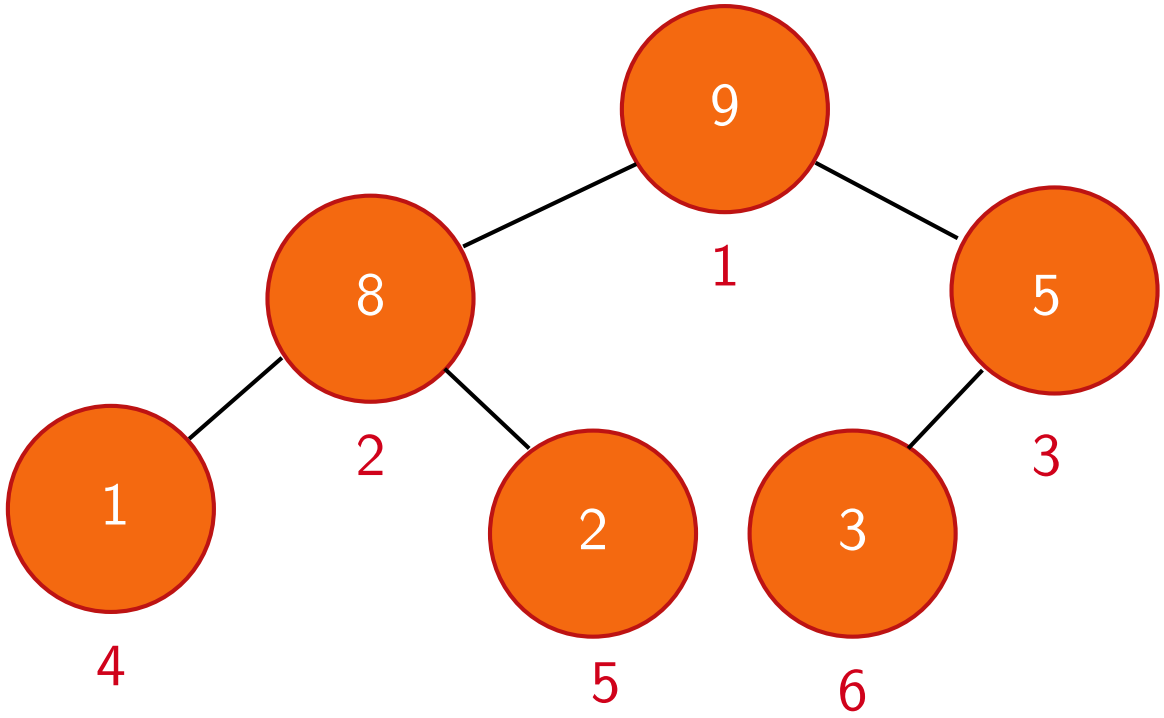

8
1
5
2
2
3
4

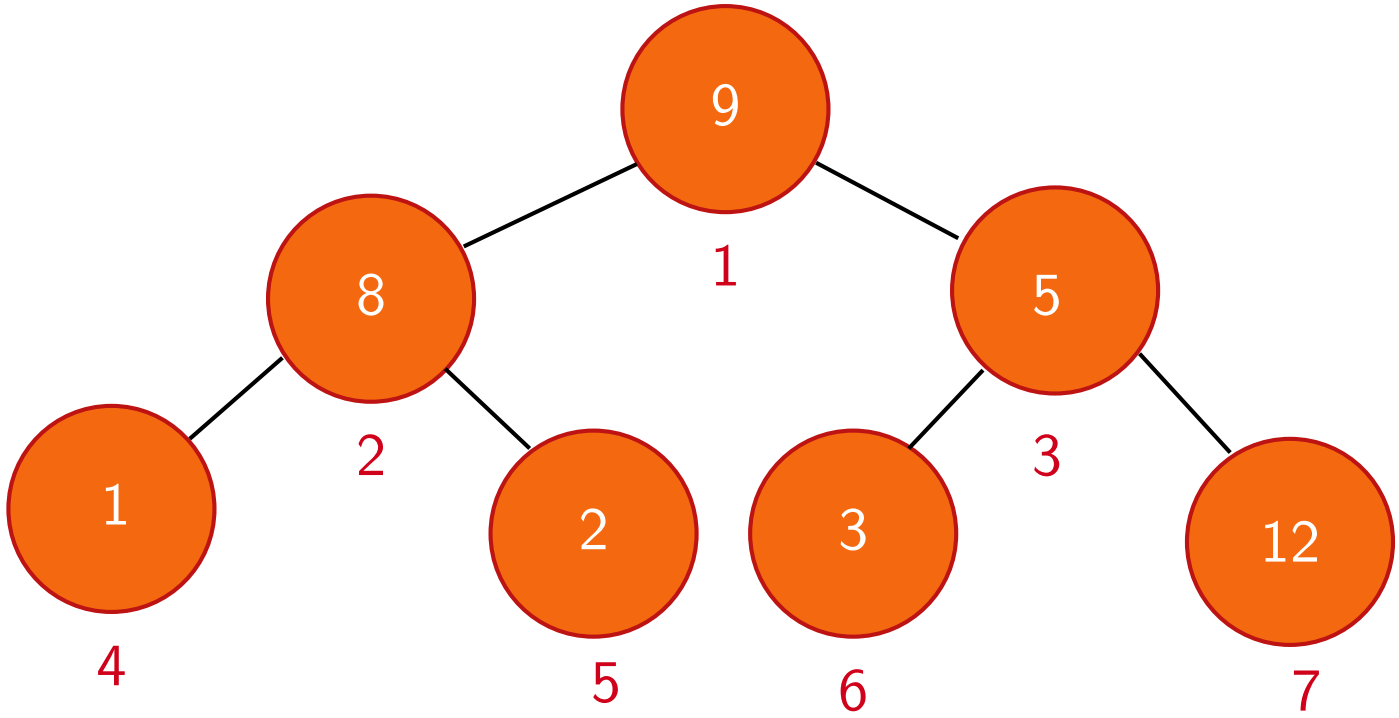

8
1
2
2
5
3
1
4

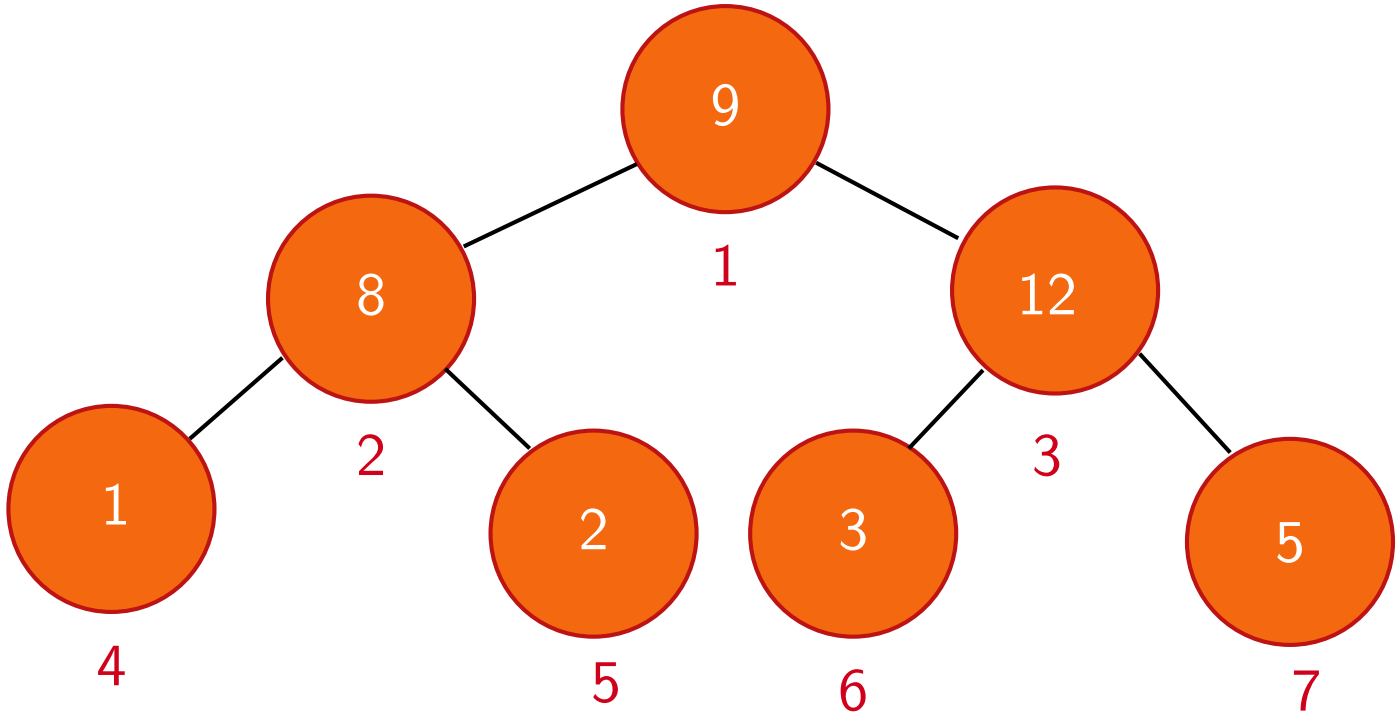

8
1
2
2
5
3
1
4
9
5

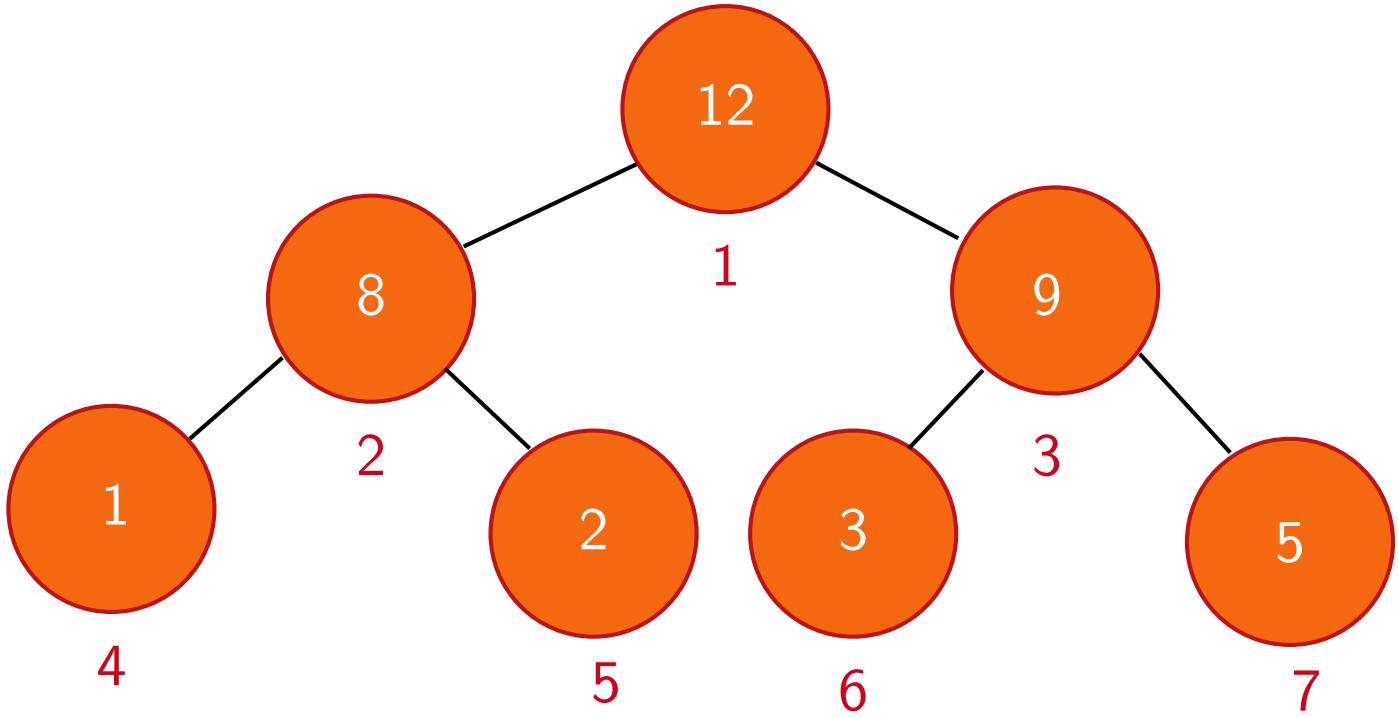

8
1
9
2
5
3
1
4
2
5


9
1
8
5
2
3
1
2
4
5


9
1
8
5
2
1
2
3
3
4
5
6


9
1
8
5
2
3
1
2
3
12
4
5
6
7


9
1
8
12
2
3
1
2
3
5
4
5
6
7


12
1
8
9
2
3
1
2
3
5
4
5
6
7

The End

Any Questions?