

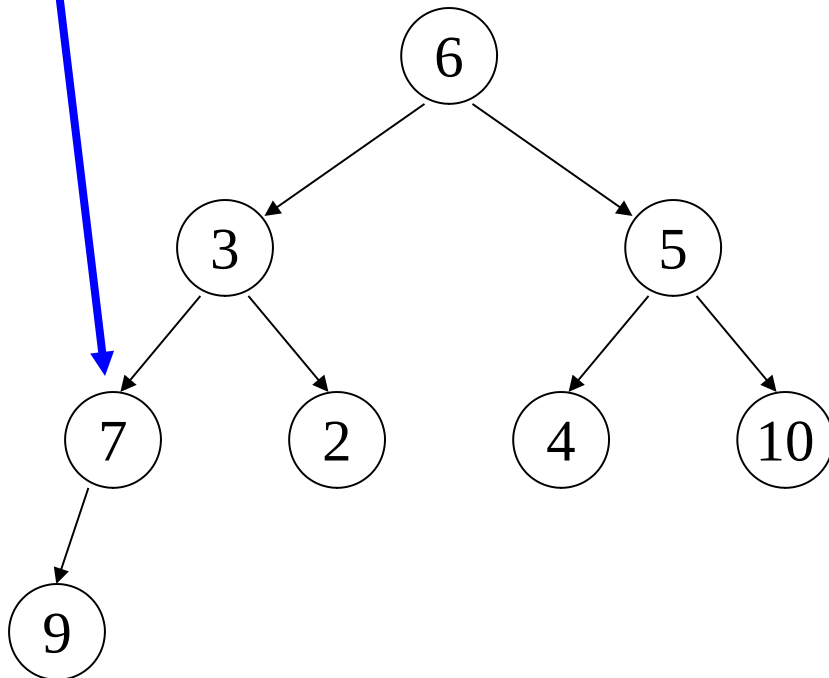
# Binary tree applications

- Heap sort

# Converting an array into a binary heap tree

6	3	5	7	2	4	10	9
0	1	2	3	4	5	6	7

*Heapify*

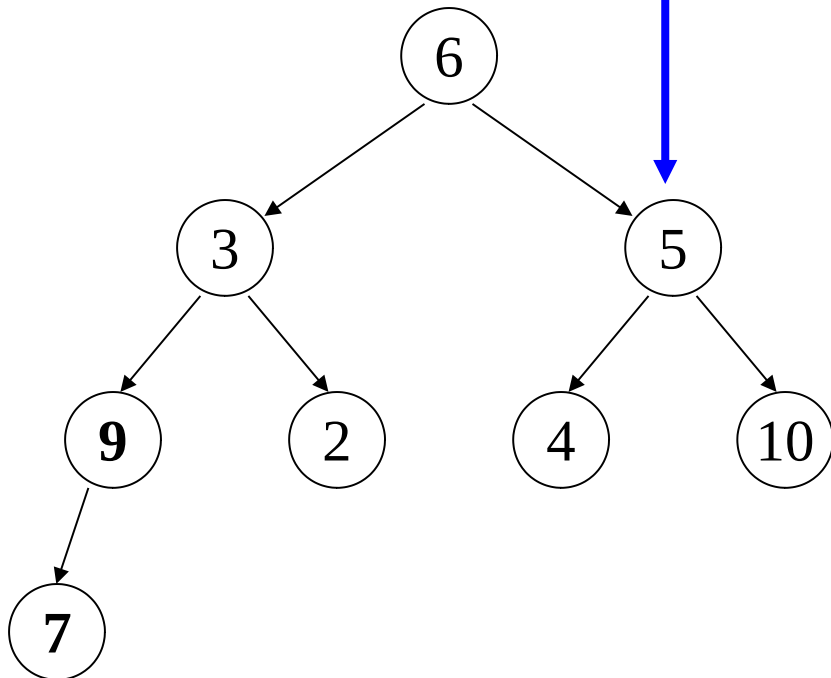


- The above array can be converted into a binary tree as follows:
- The leaves (2, 4, 9 and 10) are assumed to be heaps.

# Converting an array into a binary heap tree

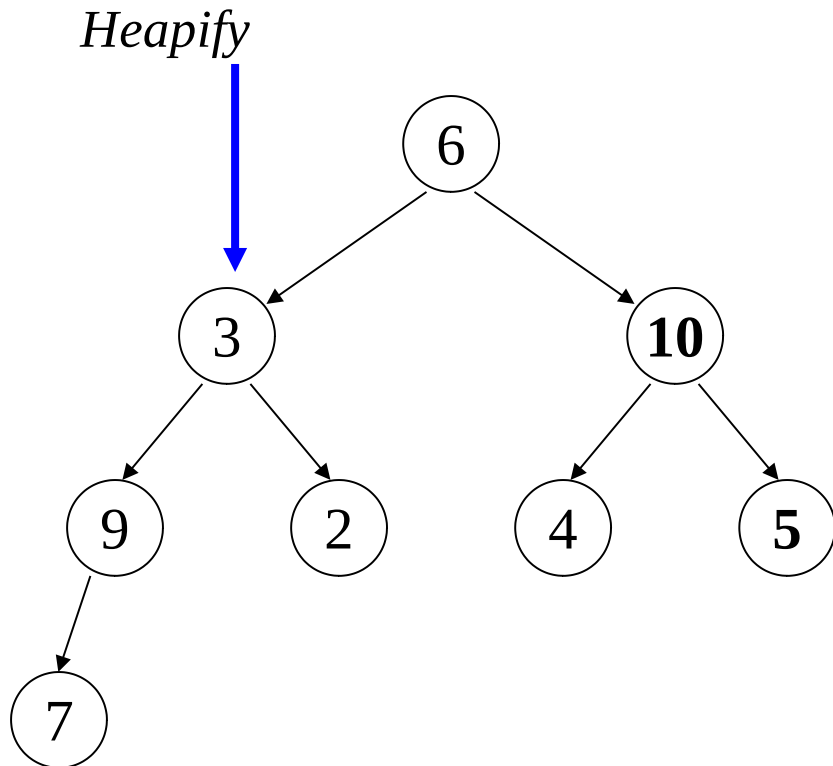
6	3	5	<b>9</b>	2	4	10	<b>7</b>
0	1	2	3	4	5	6	7

*Heapify*



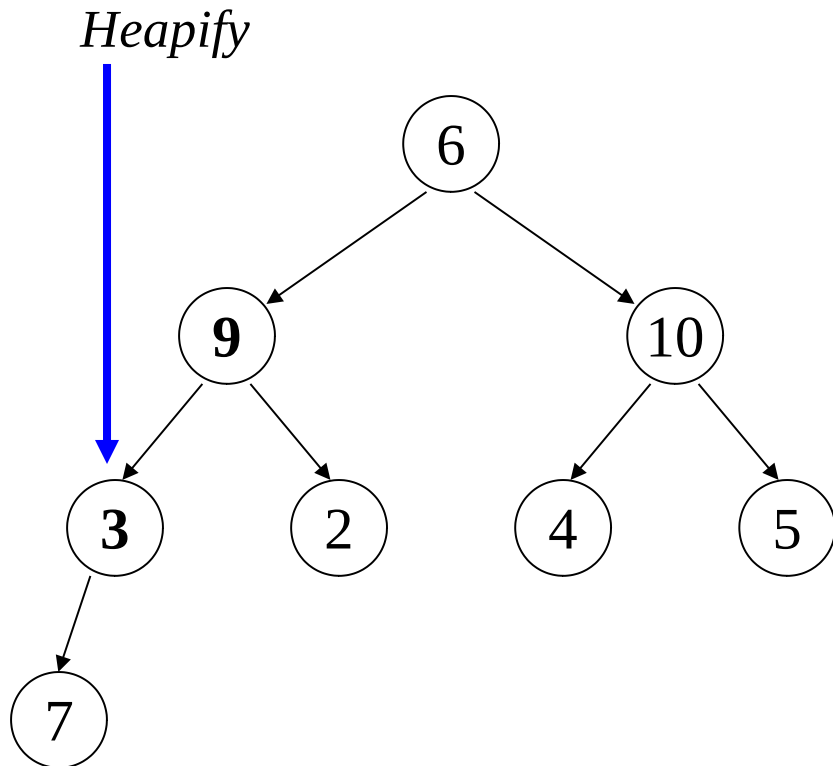
# Converting an array into a binary heap tree

6	3	<b>10</b>	9	2	4	<b>5</b>	7
0	1	2	3	4	5	6	7



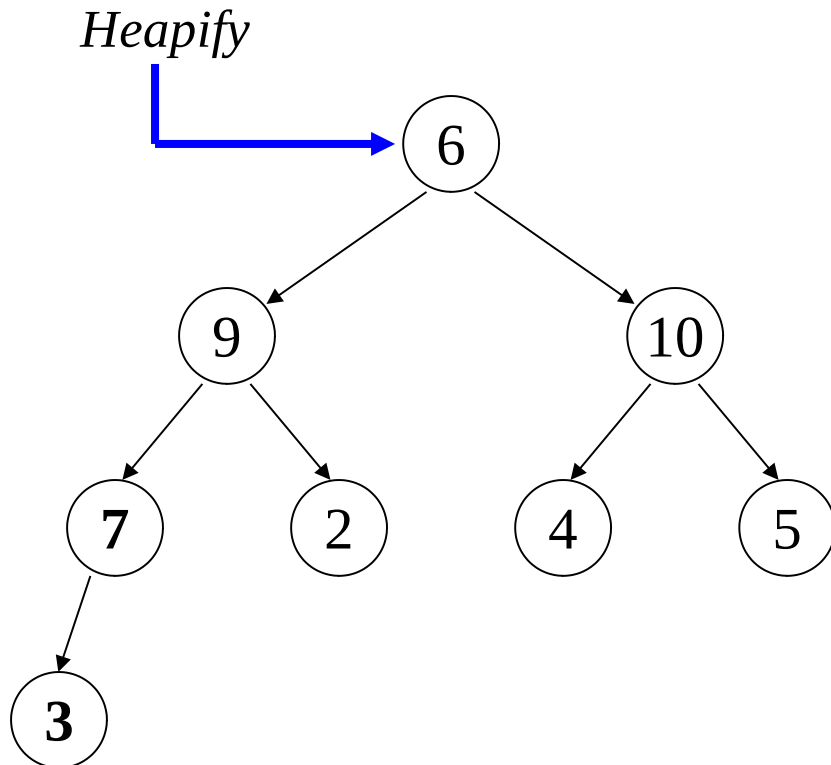
# Converting an array into a binary heap tree

6	<b>9</b>	10	<b>3</b>	2	4	5	7
0	1	2	3	4	5	6	7



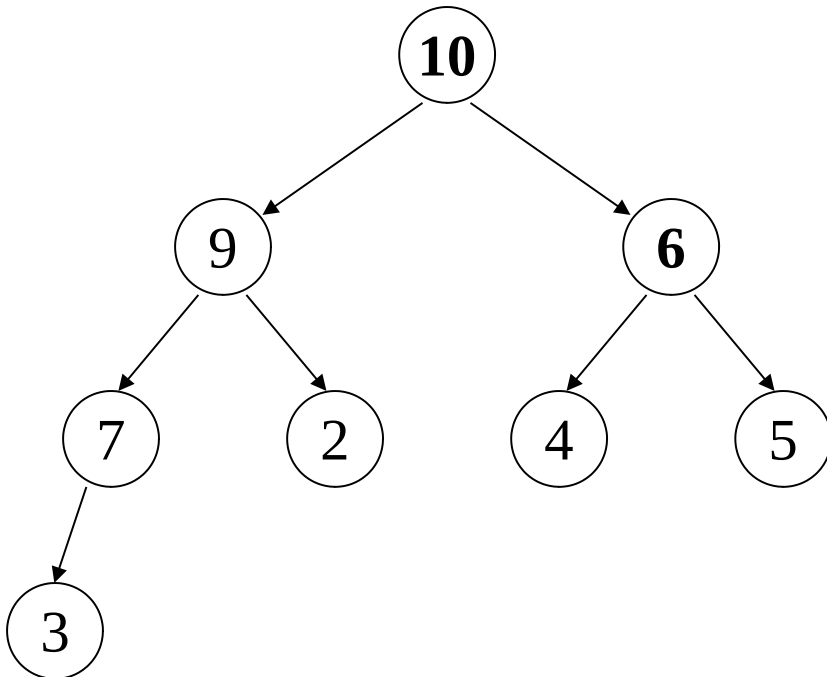
# Converting an array into a binary heap tree

6	9	10	<b>7</b>	2	4	5	<b>3</b>
0	1	2	3	4	5	6	7



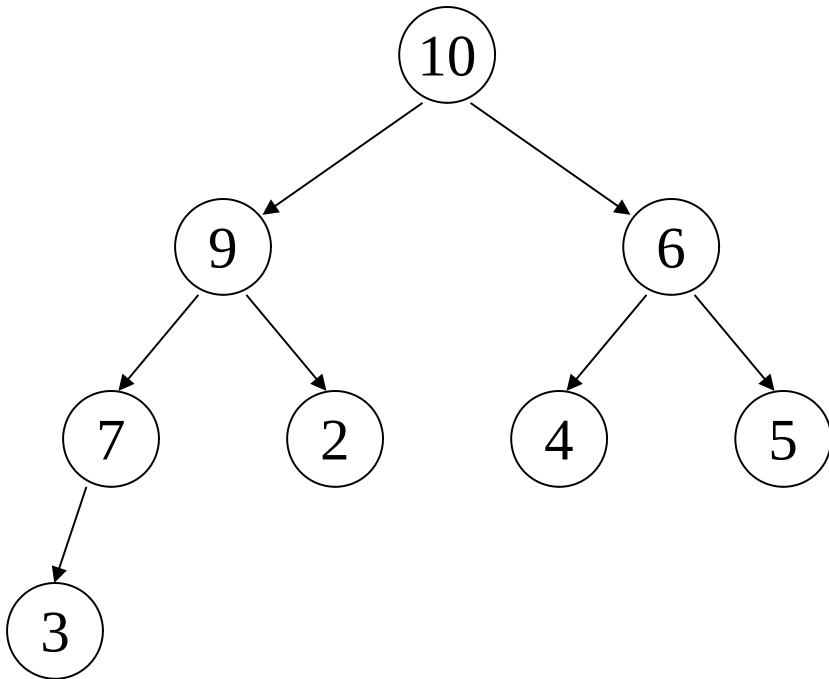
## Converting an array into a binary heap tree

<b>10</b>	9	<b>6</b>	7	2	4	5	3
0	1	2	3	4	5	6	7



## Heap sort

	0	1	2	3	4	5	6	7
a[ ]:	10	9	6	7	2	4	5	3
	Heap							

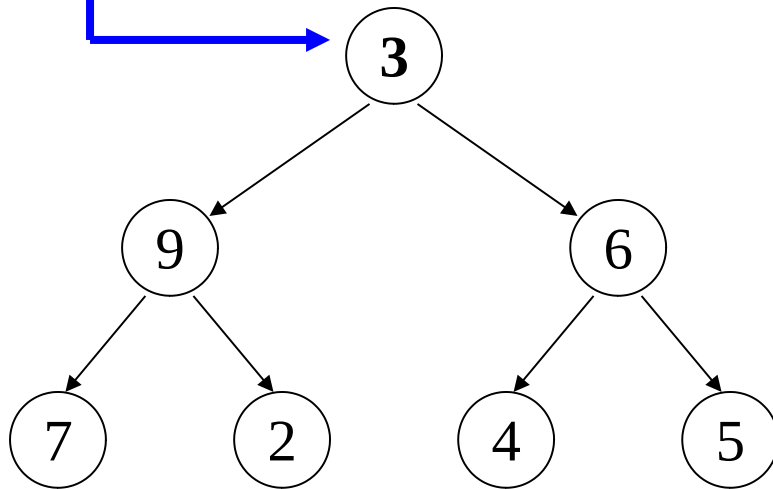




## Heap sort

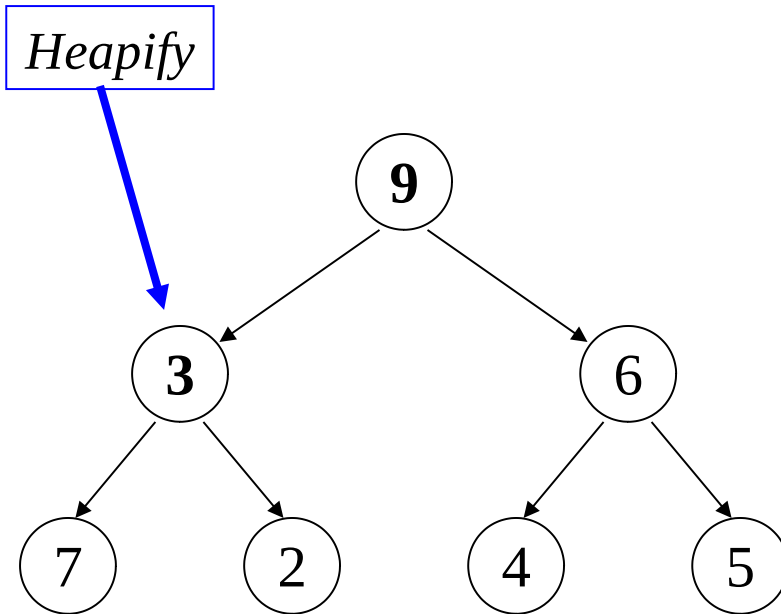
	0	1	2	3	4	5	6	7
a[ ]:	3	9	6	7	2	4	5	<b>10</b>
	Not heap						Sorted	

*Heapify*



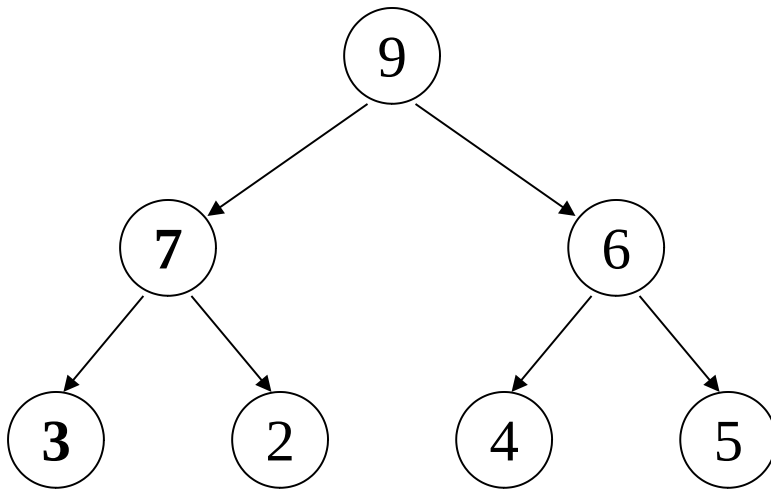
## Heap sort

	0	1	2	3	4	5	6	7
a[ ]:	9	3	6	7	2	4	5	10
	Not heap						Sorted	



## Heap sort

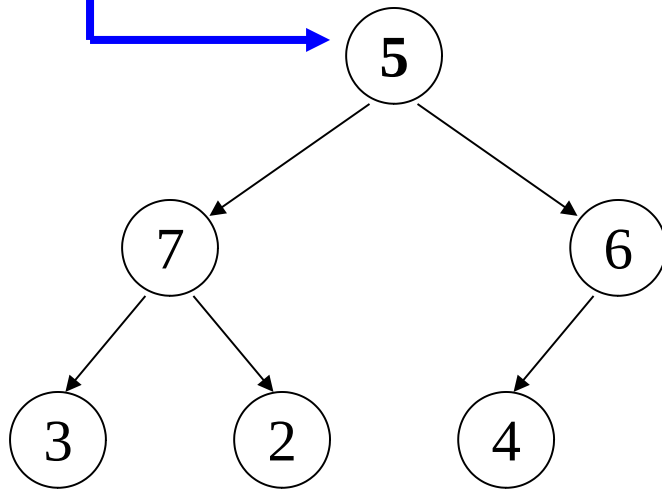
	0	1	2	3	4	5	6	7
a[ ]:	9	7	6	3	2	4	5	10
	Heap						Sorted	



## Heap sort

	0	1	2	3	4	5	6	7
a[ ]:	5	7	6	3	2	4	9	10
	Not heap						Sorted	

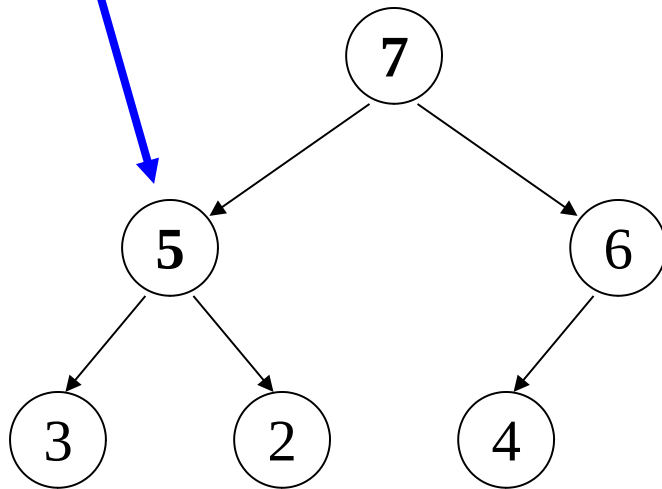
*Heapify*



## Heap sort

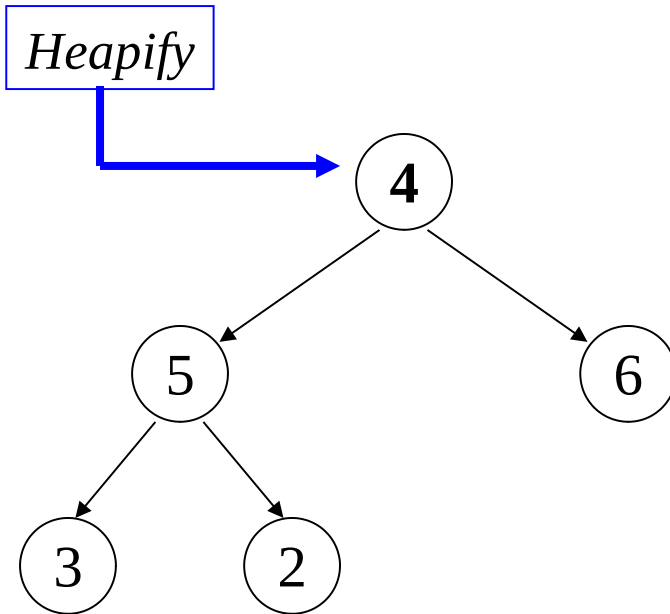
	0	1	2	3	4	5	6	7
a[ ]:	7	5	6	3	2	4	9	10
	Heap						Sorted	

*Heapify*



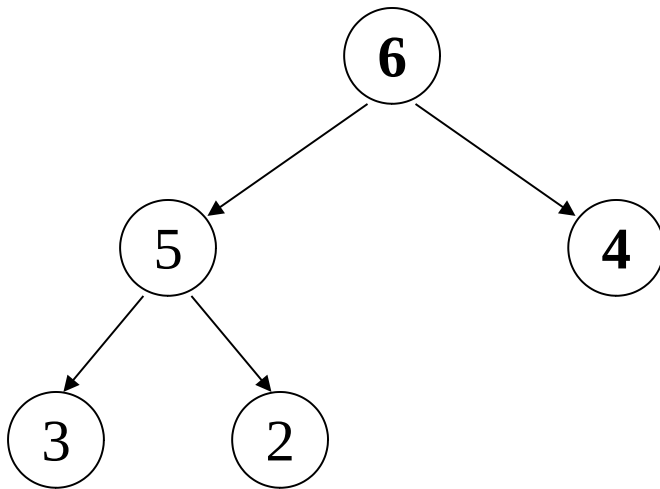
## Heap sort

	0	1	2	3	4	5	6	7
a[ ]:	4	5	6	3	2	7	9	10
	Not heap					Sorted		



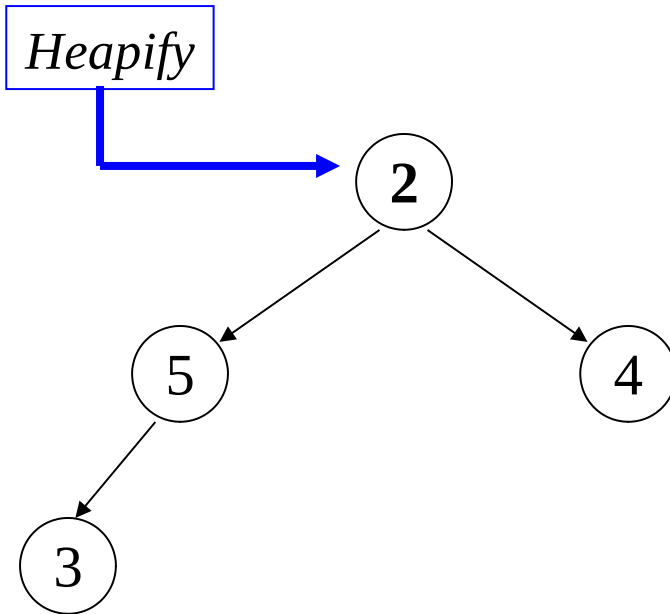
## Heap sort

	0	1	2	3	4	5	6	7
a[ ]:	<b>6</b>	5	<b>4</b>	3	2	7	9	10
	Heap					Sorted		



## Heap sort

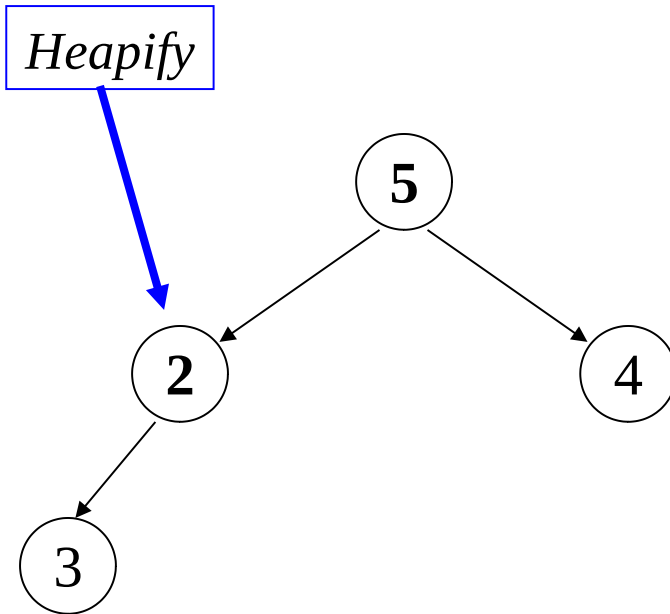
	0	1	2	3	4	5	6	7
a[ ]:	2	5	4	3	<b>6</b>	7	9	10
	Not heap				Sorted			





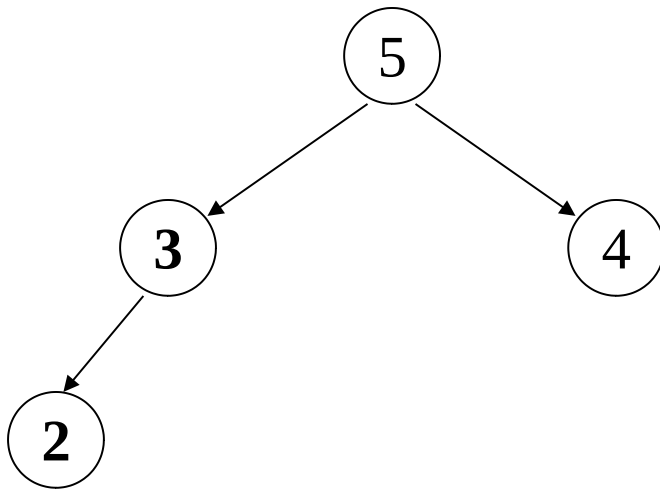
## Heap sort

	0	1	2	3	4	5	6	7
a[ ]:	5	2	4	3	6	7	9	10
	Not heap				Sorted			



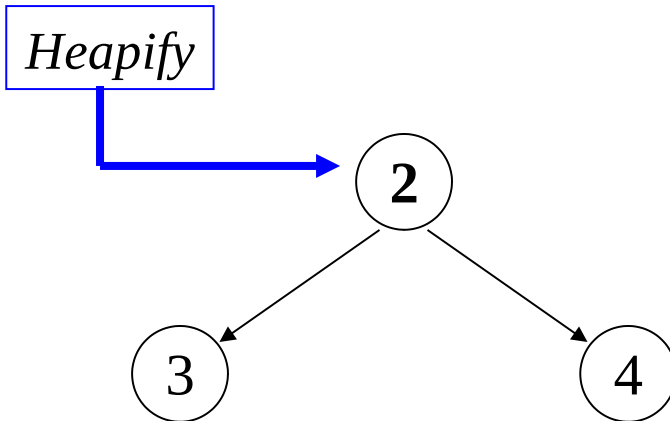
## Heap sort

	0	1	2	3	4	5	6	7
a[ ]:	5	3	4	2	6	7	9	10
	Heap				Sorted			



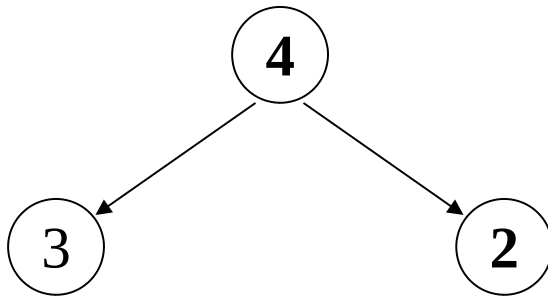
## Heap sort

	0	1	2	3	4	5	6	7
a[ ]:	2	3	4	5	6	7	9	10
	Not heap			Sorted				



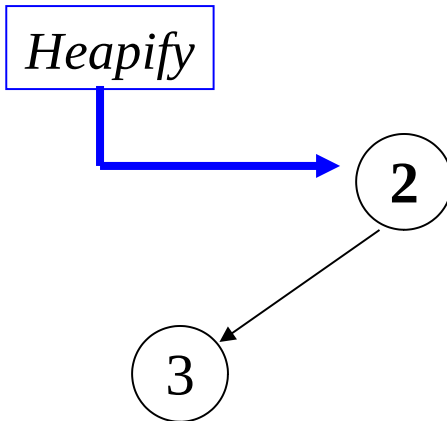
## Heap sort

	0	1	2	3	4	5	6	7
a[ ]:	4	3	2	5	6	7	9	10
	Heap			Sorted				



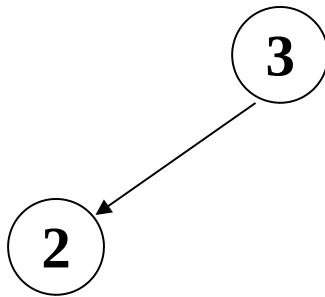
## Heap sort

	0	1	2	3	4	5	6	7
a[ ]:	2	3	4	5	6	7	9	10
	Not heap		Sorted					



## Heap sort

	0	1	2	3	4	5	6	7
a[ ]:	3	2	4	5	6	7	9	10
	Heap		Sorted					



## Heap sort

	0	1	2	3	4	5	6	7
a[ ]:	2	3	4	5	6	7	9	10
	Heap			Sorted				

2

## Heap sort

	0	1	2	3	4	5	6	7
a[ ]:	2	3	4	5	6	7	9	10
	Sorted							