Heap

- Introduction

Heap에 저장되어 있는 요소들은 트리 형태로 표현되며 요소의 정렬 방식에 따라 max-heap(내림차순), min-heap(오름차순)으로 나뉩니다. 트리 형태이기 때문에 요소 간에는 부모, 자식의 관계가 존재합니다.

- Declaration

|  |  |
| --- | --- |
| **ORDER BY** | **Constructor** |
| default : ASC | * var heap = new Heap(); |
| DESC |

- Methods

|  |  |
| --- | --- |
| **No** | **Method & Description** |
| 1 | heap::isEmpty()  • This method returns if heap is empty. |
| 2 | heap::size()  • This method returns the number of elements in this heap. |
| 3 | heap::pushMax(value)  • This method inserts the specified element into this heap.  • This method is used in max-heap which its elements are ordered by ASC. |
| 4 | heap::pushMin(value)  • This method inserts the specified element into this heap.  • This method is used in min-heap which its elements are ordered by DESC. |
| 5 | heap::popMax()  • This method removes the very first element from this heap.  • This method is used in max-heap which its elements are ordered by ASC. |
| 6 | heap::popMin()  • This method removes the very first element from this heap.  • This method is used in min-heap which its elements are ordered by DESC. |
| 7 | heap::clear()  • This method nullifies this heap and make all variables initial. |
| 8 | heap::state()  • This method shows state of this heap. |
| 9 | heap::makeMaxHeap(array)  • This method makes normal array into max-heap. |
| 10 | heap::makeMinHeap(array)  • This method makes normal array into min-heap. |

1. heap::isEmpty()

* Description

This isEmpty() method is used to check if this heap is empty.

* Declare

Following is the declaration heap.isEmpty() method.

|  |
| --- |
| var heap = new Heap();  var ret = heap.isEmpty(); |

* Parameter

NA

* Return Value

The method returns ‘true’ if this heap is empty, or ‘false’ if this heap is not empty.

* Exception

NA

* Example

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|  |

1. heap::size()

* Description

This size() method is used to get the number of elements in this heap.

* Declare

Following is the declaration heap.size() method.

|  |
| --- |
| var heap = new Heap();  var size = heap.size(); |

* Parameter

NA

* Return Value

The method returns the number of elements in this heap.

* Exception

NA

* Example

|  |
| --- |
|  |

1. heap::pushMax(value)

* Description

This pushMax(value) method is used to insert the specified element into this heap.

* Declare

Following is the declaration heap.pushMax(value) method.

|  |
| --- |
| var heap = new Heap();  heap.pushMax(1);  heap.pushMax(2); |

* Parameter

value – The element to be inserted to this heap.

* Return Value

NA

* Exception

NA

* Example

|  |
| --- |
|  |

1. heap::pushMin(value)

* Description

This pushMax(value) method is used to insert the specified element into this heap.

* Declare

Following is the declaration heap.pushMin(value) method.

|  |
| --- |
| var heap = new Heap();  heap.pushMin(1);  heap.pushMin(2); |

* Parameter

value – The element to be inserted to this heap.

* Return Value

NA

* Exception

NA

* Example

|  |
| --- |
|  |

1. heap::popMax()

* Description

This popMax() method is used to remove the very first element from this heap.

* Declare

Following is the declaration heap.popMax() method.

|  |
| --- |
| var heap = new Heap();  heap.popMax(); |

* Parameter

NA

* Return Value

The method returns the first element from this heap.

* Exception

The method returns null if heap is empty.

* Example

|  |
| --- |
|  |

1. heap::popMin()

* Description

This popMin() method is used to remove the very first element from this heap.

* Declare

Following is the declaration heap.popMin() method.

|  |
| --- |
| var heap = new Heap();  heap.popMin(); |

* Parameter

NA

* Return Value

The method returns the first element from this heap.

* Exception

The method returns null if heap is empty.

* Example

|  |
| --- |
|  |

1. heap::clear()

* Description

This clear() method is used to nullify this heap and make all variables initial.

* Declare

Following is the declaration heap.clear() method.

|  |
| --- |
| var heap = new Heap();  heap.clear(); |

* Parameter

NA

* Return Value

NA

* Exception

NA

* Example

|  |
| --- |
|  |

1. heap::state()

* Description

This state() method shows state of the heap.

* Declare

Following is the declaration heap.state() method.

|  |
| --- |
| var heap = new Heap();  heap.state(); |

* Parameter

NA

* Return Value

NA

* Exception

NA

* Example

|  |
| --- |
|  |

1. heap::makeMaxHeap(array)

* Description

This makeMaxHeap(array) method makes normal array into max-heap.

* Declare

Following is the declaration heap.makeMaxHeap(array) method.

|  |
| --- |
| var heap = new Heap();  var arr = [1, 2, 3];  heap.makeMaxHeap(arr); |

* Paremeter

array – The array is to be reconstructed to max-heap.

* Return Value

NA

* Exception

The method returns null if inserted array is empty.

* Example

|  |
| --- |
|  |

1. heap::makeMinHeap(array)

* Description

This makeMinHeap(array) method makes normal array into min-heap.

* Declare

Following is the declaration heap.makeMinHeap(array) method.

|  |
| --- |
| var heap = new Heap();  var arr = [1, 2, 3];  heap.makeMinHeap(arr); |

* Parameter

array – The array is to be reconstructed to min-heap.

* Return Value

NA

* Exception

The method returns null if inserted array is empty.

* Example

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|  |