Java ArrayDeque

1. Overview

An ArrayDeque is a dynamic array that allows us to add or remove an elements form both sides. An ArrayDeque implementation can be used as a Stack (Last-in-First-Out) or a Queue (First-in-First-Out).

Null elements are not allowed in the ArrayDeque.

2. How to declare ArrayDeque

The syntax for declaring an ArrayDeque is as follows.

```
ArrayDeque<E> variable_name = new ArrayDeque<E>();
```

ArrayDeque should be declared with generic <E>, which forces to have only specified type of objects in ArrayDeque. E should be class name. For example, “Integer” instead of “int”.

An example is as follows.

```
ArrayDeque<String> data = new ArrayDeque<String>();
```

3. The Main Methods of ArrayDeque

Table 1 shows the main methods of ArrayDeque.

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Modifier/Type	Method and Description
boolean	add(E element) Inserts the specified element at the end of this deque
void	addFirst(E element) Inserts the specified element at the front of this deque
void	addLast(E element) Inserts the specified element at the end of this deque
void	clear() Removes all of the elements from this deque
boolean	contains(Object o) Returns true if this deque contains the specified element
E	getFirst() Retrieves, but does not remove, the fist element of this deque
E	getLast() Retrieves, but does not remove, the last element of this deque
boolean	isEmpty() Returns true if this deque contains no elements
Iterator<E>	iterator() Returns an iterator over the elements in this deque
boolean	offer(E elements) Inserts the specified elements at the end of this deque
boolean	offerFirst(E elements) Inserts the specified elements at the front of this deque
boolean	offerLast(E elements) Inserts the specified elements at the end of this deque

Table 1. (continue).

Modifier/Type	Method and Description
E	peek() Retrieves, but does not remove, the head of the queue represented by this deque, or returns null if this deque is empty.
E	peekFirst() Retrieves, but does not remove, the first element of this deque, or returns null if this deque is empty.
E	peekLast() Retrieves, but does not remove, the last element of this deque, or returns null if this deque is empty.
E	poll() Retrieves and remove, the head of the queue represented by this deque, or returns null if this deque is empty.
E	pollFirst() Retrieves and remove, the first element of this deque, or returns null if this deque is empty.
E	pollLast() Retrieves and remove, the last element of this deque, or returns null if this deque is empty.
E	remove() Retrieves and removes the head of the queue represented by this deque.
E	removeFirst() Retrieves and removes the first element of this deque.
E	removeLast() Retrieves and removes the last element of this deque.
E	pop() Pops an element from the stack represented by this deque.
void	push(E element) Pushes an element onto the stack represented by this deque.
int	size() Returns the number of elements in this deque,

4. An example of ArrayDeque

Figure 1 shows an example program of ArrayDeque, and Figure 2 shows the output of the example program.

```
import java.util.ArrayDeque;

public class TestArrayDeque{
    String[] original = {"red", "blue", "blue", "green", "yellow", "blue"};
    ArrayDeque<String> colors = new ArrayDeque<String>();

    public static void main(String[] args) {
        TestArrayDeque tad = new TestArrayDeque ();
        tad.example();
    }

    public TestArrayDeque (){
        for(int i = 0; i < original.length; i++){
            colors.add(original[i]);
        }
    }

    public void example() {
        System.out.println(colors);
        colors.offerFirst("pink");
        System.out.println(colors + " after offerFirst");
        System.out.println(colors.peekLast());
        colors.pollLast();
        System.out.println(colors + " after pollLast");
        colors.removeFirst();
        System.out.println(colors + " after removeFirst");
    }
}
```

Figure 1. An Example Program of ArrayDeque.

```
[red, blue, blue, green, yellow, blue]
[pink, red, blue, blue, green, yellow, blue] after offerFirst
blue
[pink, red, blue, blue, green, yellow] after pollLast
[red, blue, blue, green, yellow] after removeFirst
```

Figure 2. The Output of The Example Program of ArrayDeque.