

GIT Department of Computer Engineering
CSE 222 - Spring 2020 Homework-4 Report

Ali BAHAR

171044066

Problem Solution Approach Q-2

Our aim was implementina kind of Deque class which implements Deque interface and extends AbstractCollection. I have created a GTUDEaqui class. This class has innder Node class to be able to keep the datas. There is no limit to add a new element. I have implemented all the mehodes thath required. Most of the methodes had same duties so i have implemeted some of the methodes and called this methodes from the other methodes. There is two different inner iterator class. One of them goes backward when we call the next method and the other interator gose to forward.

Problem Solution Approach Q-3

- 3.1

If there is no word more ,then there will not be more method call.

First i have found a word from the sentence. Then i append the words in reverse order.

- 3.2

If there is no letter to search inside the word it means all letter have been found iside this word.

If the index is at the end of the string it means the there is some letters couldn't be found.

First i have searched the first letter inside the all word. If the letters is found then i have called the same method without this letter. If is not found i have returned false.

- 3.3

If we are end of the array it means the array has already sorted.

First find the smallest element of the array by looking the elements after the index and swap the values index'th element and the smallest element. Then call the same method with index+1.

- 3.4

First i have split the prefix string to prefix string array.then if the index'th element is operator then i have popped element from stack and evaluate the operator then pushed the answer to stack. If the index'th element is not operator the just push the stack. If index at the end of the then pop the answer form stack and return it.

- 3.5

First i have split the postfix string to postfix string array.then if the index'th element is operator then i have popped element from stack and evaluate the operator then pushed the answer to stack. If the index'th element is not operator the just push the stack. If index at the beginning of the then pop the answer form stack and return it.

- 3.6

First i have printed the shell of the array .

For example if the array was:

1 2 3 4

5 6 7 8

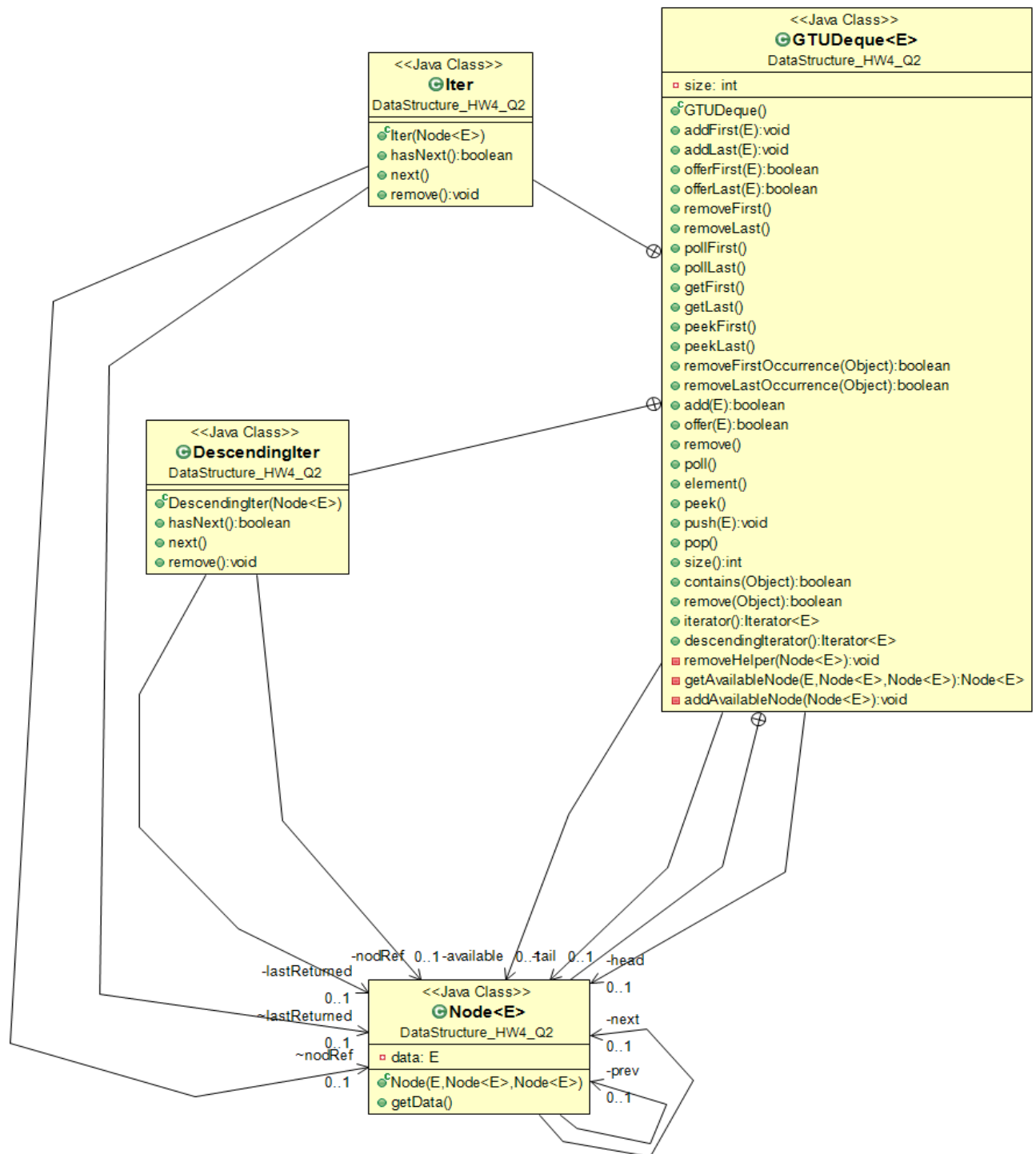
9 10 11 12

Output at the first call would be like : 1 2 3 4 8 12 11 10 9 5

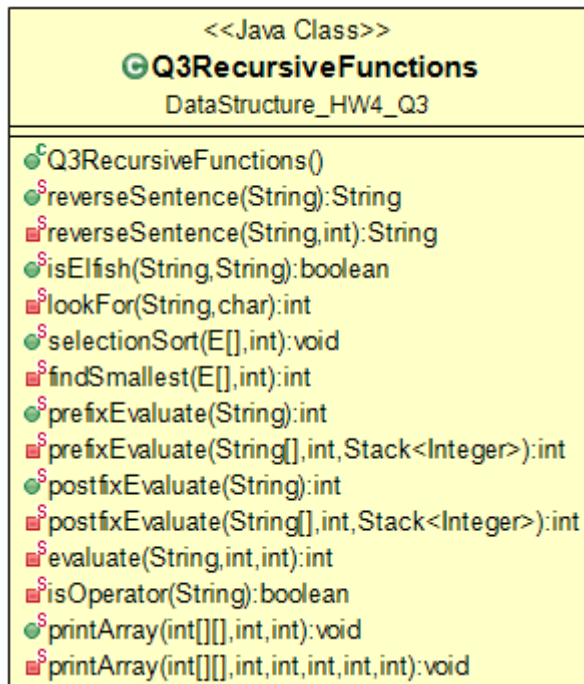
Then i have called the same method with the array which is inside this array. Example array = 6 7

If the row or column number less then 1 it means there is no array to print.

Class Diagram-Q2



Class Diagram-Q3



Test Cases-Q2

Test ID	Scenario	Expected Result	Actual Result	Pass /Fail
1	Create a new GTUDeque object and print it without calling any other methods(constructor has called)	Prints a empty set.	As Expected	Pass
2	Add some elements by using addFirst method and print this deque.	The Elements which have added should be printed. First added element is printed last.	As Expected	Pass
3	Remove all elements of the deque by using removeFirst method and try to remove more element.	Removes all the elements of the deque and throws an exception. (NoSuchElementException)	As Expected	Pass
4	Add some elements by using addLast method and print this deque.	The Elements which have added should be printed. First added element is printed first.	As Expected	Pass
5	Remove all elements of the deque by using removeLast method and try to remove more element.	Removes all the elements of the deque and throws an exception. (NoSuchElementException)	As Expected	Pass

6	Add some elements by using offerFirst method and print this deque.	The Elements which have added should be printed. First added element is printed last.	As Expected	Pass
7	Remove all elements of the deque by using pollFirst method and try to remove more element.	Removes all the elements of the deque and at the end returns null.	As Expected	Pass
8	Add some elements by using offerLast method and print this deque.	The Elements which have added should be printed. First added element is printed first.	As Expected	Pass
9	Remove all elements of the deque by using pollLast method and try to remove more element.	Removes all the elements of the deque and at the end returns null.	As Expected	Pass
10	Add some elements by using add method and print this deque	The Elements which have added should be printed. First added element is printed first.	As Expected	Pass
11	Remove all elements of the deque by using remove method and try to remove more element.	Removes all the elements of the deque and throws an exception. (NoSuchElementException)	As Expected	Pass
12	Add some elements by using push method and print this deque	The Elements which have added should be printed. First added element is printed last.	As Expected	Pass
13	Remove all elements of the deque by using pollFirst method and try to remove more element.	Removes all the elements of the deque and throws an exception. (NoSuchElementException)	As Expected	Pass
14	Add some elements by using offer method and print this deque	The Elements which have added should be printed. First added element is printed first.	As Expected	Pass
15	Remove all elements of the deque by using poll method and try to poll more element.	Removes all the elements of the deque and at the end returns null.	As Expected	Pass
16	Fill the deque with some elements and call getFirst method and print it.	Prints the first element of the linked-list	As Expected	Pass
17	Call getLast Method and print it.	Prints the last element of the linked-list	As Expected	Pass
18	Call peekFirst Method and print it.	Prints the first element of the linked-list	As Expected	Pass
19	Call peekLast Method and print it.	Prints the last element of the linked-list	As Expected	Pass
20	Call element Method and print it	Prints the first element of the linked-list	As Expected	Pass
21	Call peek Method and print it	Prints the first element of the linked-list	As Expected	Pass
22	Try to call getFirst method on empty deque.	Throws (NoSuchElementException)	As Expected	Pass
23	Try to call getLast method on empty deque.	Throws (NoSuchElementException)	As Expected	Pass

24	Try to call peekFirst method on empty deque.	Returns null.	As Expected	Pass
25	Try to call peekLast method on empty deque.	Returns null.	As Expected	Pass
26	Try to call element method on empty deque.	Throws (NoSuchElementException)	As Expected	Pass
27	Try to call peek method on empty deque.	Returns null.	As Expected	Pass
28	Test contains method with element which doesn't exist in deque.	Returns false.	As Expected	Pass
29	Test contains method with element which exists in deque.	Returns true	As Expected	Pass
30	Call removeFirstOccurence(element) Element exist in deque.	Element is removed.	As Expected	Pass
31	Call removeFirstOccurence(element) Element doesn't exist in deque.	Return false.	As Expected	Pass
32	Call removeLastOccurence(element) Element exist in deque.	Element is removed.	As Expected	Pass
33	Call removeLastOccurence(element) Element doesn't exist in deque.	Return false.	As Expected	Pass
34	Call remove(element) Element exist in deque.	Element is removed.	As Expected	Pass
35	Call remove(element) Element doesn't exist in deque.	Returns false.	As Expected	Pass
36	Use enhanced for loop.	All elements of the deque has printed.	As Expected	Pass
37	Print the all elements with using descendingIterator methodes(next,hasNext)	All elements of the deque has printed in reverse order.	As Expected	Pass

Test Cases-Q3

Test ID	Scenerio	Test Data	Expected Result	Actual Result	Pass /Fail
Q3.1.1	Call reverseSentence Method.	String = "This Function writes the sentence in reverse"	The words which is in string is printed in reverse order.	As Expected	Pass
Q3.1.2	Call reverseSentence Method.	String = "A computer is like air conditioning it becomes useless when you open windows"	The words which is in string is printed in reverse order.	As Expected	Pass
Q3.1.3	Call reverseSentence Method.	String = "oneWord"	There is only one word so this word should be printed.	As Expected	Pass
Q3.1.4	Call reverseSentence Method with empty String.	String = " "	There is nothing to print.	As Expected	Pass

Q3.2.1	Call isElfish method.	String = "whiteleaf"	Returns true	As Expected	Pass
Q3.2.2	Call isElfish method.	String = "tasteful"	Returns true	As Expected	Pass
Q3.2.3	Call isElfish method.	String = "unfriendly"	Returns true	As Expected	Pass
Q3.2.4	Call isElfish method.	String = "waffles"	Returns true	As Expected	Pass
Q3.2.5	Call isElfish method with empty string	String = ""	Returns false	As Expected	Pass
Q3.2.6	Call isElfish method.	String = "eeeeelllllll"	Returns false	As Expected	Pass
Q3.2.7	Call isElfish method.	String = "fffeee"	Returns false	As Expected	Pass
Q3.2.8	Call isElfish method.	String = "full"	Returns false	As Expected	Pass
Q3.3.1	Call selectionSort method.	Arr[] = {100,50,25,12,6,3,1,0, -1,-3,-6,-12,-25,-50,-100}	Array is sorted.	As Expected	Pass
Q3.3.2	Call selectionSort method.	Arr[] = {"zzz","zyz","zyy","aaa"}	Array is sorted.	As Expected	Pass
Q3.4.1	Call prefixEvaluate method.	Prefix = "+ 10 + / - 20 * 4 2 6 - 11 / 14 7"	Returns 21	As Expected	Pass
Q3.4.2	Call prefixEvaluate method.	Prefix = "- - 2000 55 40"	Returns 1905	As Expected	Pass
Q3.4.3	Call prefixEvaluate method.	Prefix = "- - + 2000 55 40"	Throws an exception EmptyStackException	As Expected	Pass
Q3.4.4	Call prefixEvaluate method with empty string.	Prefix = ""	Throws an exception EmptyStackException	As Expected	Pass
Q3.5.1	Call postfixEvaluate method.	Postfix = "10 20 40 2 * - 6 / + 11 + 14 7 / -"	Returns 21	As Expected	Pass
Q3.5.2	Call postfixEvaluate method.	Postfix = "2000 55 - 40 -"	Returns 1905	As Expected	Pass
Q3.5.3	Call postfixEvaluate method.	Postfix = "2000 55 - 40 - +"	Throws an exception EmptyStackException	As Expected	Pass
Q3.5.4	Call postfixEvaluate method.	Postfix = ""	Throws an exception EmptyStackException	As Expected	Pass
Q3.6.1	Call printArray method.	Arr[][]={ {1,2,3,4} {5,6,7,8} {9,10,11,12} {13,14,15,16} {17,18,19,20} }	Output = 1 2 3 4 8 12 16 20 19 18 17 13 9 5 6 7 11 15 14 10	As Expected	Pass

Q3.6.2	Call printArray method (There is just one column).	Arr[][] = { {1} {2} {3} {4} {5} {6} {7} }	Output = 1 2 3 4 5 6 7	As Expected	Pass
Q3.6.3	Call printArray method(There is just one row).	Arr[][] = {{1,2,3,4,5}}	Output = 1 2 3 4 5	As Expected	Pass
Q3.6.4	Call printArray method.(empty array)	Empty array	Nothing is printed	As Expected	Pass
Q3.6.5	Call printArray method.	Arr[][] = { {1,2,3,4,5} {12,13,14,15,6} {11,10,9,8,7} }	Output = 1,2,3,4,5,6,7,8,9,10, 11,12,13,14,15	As Expected	Pass

Running Command and Results-Q2

First initialization of deque : []

First element has been added by using addFirst method : [Muslera]

Second element has been added by using addFirst method : [Falcao, Muslera]

third element has been added by using addFirst method : [Melo, Falcao, Muslera]

fourth element has been added by using addFirst method : [Drogba, Melo, Falcao, Muslera]

There is 4 element inside this deque.

Drogba has been removed (removeFirst)

Deque : [Melo, Falcao, Muslera]

Melo has been removed (removeFirst)

Deque : [Falcao, Muslera]

Falcao has been removed (removeFirst)

Deque : [Muslera]

Muslera has been removed (removeFirst)

Deque : []

There is NoSuchElementException, because i tried to remove more element than this deque has.(testRemoveFirst)

java.util.NoSuchElementException

at DataStructure_HW4_Q2.GTUDeque.removeFirst(GTUDeque.java:126)

at Main.testRemoveFirst(Main.java:223)

at Main.main(Main.java:18)

After removing all elements from this deque : []

First element has been added by using addLast method : [Hazard]

Second element has been added by using addLast method : [Hazard, Ramos]

Third element has been added by using addLast method : [Hazard, Ramos, Casemiro]

Fourth element has been added by using addLast method : [Hazard, Ramos, Casemiro, Modric]

Fifth element has been added by using addLast method : [Hazard, Ramos, Casemiro, Modric, Marcelo]

There is 5 element inside this deque.

Marcelo has been removed (removeLast)

Deque : [Hazard, Ramos, Casemiro, Modric]

Modric has been removed (removeLast)

Deque : [Hazard, Ramos, Casemiro]

Casemiro has been removed (removeLast)

Deque : [Hazard, Ramos]

Ramos has been removed (removeLast)

Deque : [Hazard]

Hazard has been removed (removeLast)

Deque : []

There is NoSuchElementException, because i tried to remove more element than this deque has.(testRemoveLast)

java.util.NoSuchElementException

at DataStructure_HW4_Q2.GTUDeque.removeLast(GTUDeque.java:151)

at Main.testRemoveLast(Main.java:249)

at Main.main(Main.java:33)

After removing all elements from this deque : []

First element has been added by using offerFirst method : [Messi]

Second element has been added by using offerFirst method : [Suarez, Messi]

third element has been added by using offerFirst method : [Griezmann, Suarez, Messi]

fourth element has been added by using offerFirst method : [Dembele, Griezmann, Suarez, Messi]

There is 4 element inside this deque.

Dembele has been removed (pollFirst)

Deque : [Griezmann, Suarez, Messi]

Griezmann has been removed (pollFirst)

Deque : [Suarez, Messi]

Suarez has been removed (pollFirst)

Deque : [Messi]

Messi has been removed (pollFirst)

Deque : []

pollFirst has returned null

First element has been added by using offerLast method : [Rodallega]

Second element has been added by using offerLast method : [Rodallega, Barrow]

Third element has been added by using offerLast method : [Rodallega, Barrow, Recep]

Fourth element has been added by using offerLast method : [Rodallega, Barrow, Recep, Stachowiak]

Fifth element has been added by using offerLast method : [Rodallega, Barrow, Recep, Stachowiak, Zeki]

There is 5 element inside this deque.

Zeki has been removed (pollLast)

Deque : [Rodallega, Barrow, Recep, Stachowiak]

Stachowiak has been removed (pollLast)

Deque : [Rodallega, Barrow, Recep]

Recep has been removed (pollLast)

Deque : [Rodallega, Barrow]

Barrow has been removed (pollLast)

Deque : [Rodallega]

Rodallega has been removed (pollLast)

Deque : []

pollLast has returned null

First element has been added by using add method : [Merih]

Second element has been added by using add method : [Merih, Caglar]

Third element has been added by using add method : [Merih, Caglar, Cengiz]

Fourth element has been added by using add method : [Merih, Caglar, Cengiz, Ozan]

Fifth element has been added by using add method : [Merih, Caglar, Cengiz, Ozan, Yusuf]

There is 5 element inside this deque.

Merih has been removed (remove)

Deque : [Caglar, Cengiz, Ozan, Yusuf]

Caglar has been removed (remove)

Deque : [Cengiz, Ozan, Yusuf]

Cengiz has been removed (remove)

Deque : [Ozan, Yusuf]

Ozan has been removed (remove)

Deque : [Yusuf]

Yusuf has been removed (remove)

Deque : []

There is NoSuchElementException, because i tried to remove more element than this deque has.(testRemove)

java.util.NoSuchElementException

at DataStructure_HW4_Q2.GTUDeque.removeFirst(GTUDeque.java:126)

at Main.testRemove(Main.java:336)

at Main.main(Main.java:60)

After removing all elements from this deque : []

First element has been added by using push method : [Cenk]

Second element has been added by using push method : [Dorukhan, Cenk]

third element has been added by using push method : [Omer, Dorukhan, Cenk]

fourth element has been added by using push method : [Irfan, Omer, Dorukhan, Cenk]

There is 4 element inside this deque.

Cenk has been removed (pop)

Deque : [Irfan, Omer, Dorukhan]

Dorukhan has been removed (pop)

Deque : [Irfan, Omer]

Omer has been removed (pop)

Deque : [Irfan]

Irfan has been removed (pop)

Deque : []

There is NoSuchElementException, because i tried to remove more element than this deque has.(testPop)

java.util.NoSuchElementException

at DataStructure_HW4_Q2.GTUDeque.removeLast(GTUDeque.java:151)

at Main.testPop(Main.java:359)

at Main.main(Main.java:75)

After removing all elements from this deque : []

First element has been added by using offer method : [Rodallega]

Second element has been added by using offer method : [Rodallega, Barrow]

Third element has been added by using offer method : [Rodallega, Barrow, Recep]

Fourth element has been added by using offer method : [Rodallega, Barrow, Recep, Stachowiak]

Fifth element has been added by using offer method : [Rodallega, Barrow, Recep, Stachowiak, Zeki]

There is 5 element inside this deque.

Rodallega has been removed (poll)

Deque : [Barrow, Recep, Stachowiak, Zeki]

Barrow has been removed (poll)

Deque : [Recep, Stachowiak, Zeki]

Recep has been removed (poll)

Deque : [Stachowiak, Zeki]

Stachowiak has been removed (poll)

Deque : [Zeki]

Zeki has been removed (poll)

Deque : []

poll has returned null

Deque : [Inan, Amrabat, Bruma, Kaya, Inan, Ujfalusi, Riera, Elmander, Inan, Baros]

getFirst : Inan

getLast : Baros

peekFirst : Inan

peekLast : Baros

element : Inan

peek : Inan

Deque : []

getFirst method threw an exception because the deque was empty.

java.util.NoSuchElementException

at DataStructure_HW4_Q2.GTUDeque.getFirst(GTUDeque.java:202)

at Main.main(Main.java:122)

getLast method threw an exception because the deque was empty.

java.util.NoSuchElementException

at DataStructure_HW4_Q2.GTUDeque.getLast(GTUDeque.java:215)

at Main.main(Main.java:129)

peekFirst : null

peekLast : null

element method threw an exception because the deque was empty.

java.util.NoSuchElementException

at DataStructure_HW4_Q2.GTUDeque.element(GTUDeque.java:329)

at Main.main(Main.java:140)

peek : null

Deque: [Inan, Amrabat, Bruma, Kaya, Inan, Ujfalusi, Riera, Elmander, Inan, Baros]

contains("Ali") : false

contains("Inan") : true

contains("Bahar") : false

contains("Ujfalusi") : true

contains("Bruma") : true

Deque: [Inan, Amrabat, Bruma, Kaya, Inan, Ujfalusi, Riera, Elmander, Inan, Baros]

removeFirstOccurrence("Inan") : true

after removeFirstOccurrence("Inan") : [Amrabat, Bruma, Kaya, Inan, Ujfalusi, Riera, Elmander, Inan, Baros]

removeFirstOccurrence("Ali") : false

after removeFirstOccurrence("Ali") : [Amrabat, Bruma, Kaya, Inan, Ujfalusi, Riera, Elmander, Inan, Baros]

removeFirstOccurrence("Kaya") : true

after removeFirstOccurrence("Kaya") : [Amrabat, Bruma, Inan, Ujfalusi, Riera, Elmander, Inan, Baros]

Deque: [Amrabat, Bruma, Inan, Ujfalusi, Riera, Elmander, Inan, Baros]

removeLastOccurrence("Inan") : true

after removeLastOccurrence("Inan") : [Amrabat, Bruma, Inan, Ujfalusi, Riera, Elmander, Baros]

removeLastOccurrence("Ali") : false

after removeLastOccurrence("Ali") : [Amrabat, Bruma, Inan, Ujfalusi, Riera, Elmander, Baros]

removeLastOccurrence("Riera") : true

after removeLastOccurrence("Riera") : [Amrabat, Bruma, Inan, Ujfalusi, Elmander, Baros]

Deque: [Amrabat, Bruma, Inan, Ujfalusi, Elmander, Baros]

remove("Inan") : true

after remove("Inan") : [Amrabat, Bruma, Ujfalusi, Elmander, Baros]

remove("Ali") : false

after remove("Ali") : [Amrabat, Bruma, Ujfalusi, Elmander, Baros]

Deque: [Amrabat, Bruma, Ujfalusi, Elmander, Baros]

Amrabat

Bruma

Ujfalusi

Elmander

Baros

All elements of the deque has printed with enhanced for loop.

Deque: [Amrabat, Bruma, Ujfalusi, Elmander, Baros]

Baros

Elmander

Ujfalusi

Bruma

Amrabat

All elements of the deque has printed with descending iterator methods(next,hasNext).

*****End of the Test*****

Running Command and Results-Q3

Test Q3.1.1

Original string was : This function writes the sentence in reverse

After reversing : reverse in sentence the writes function This

Test Q3.1.2

Original string was : A computer is like air conditioning it becomes useless when you open windows (LinusTorvalds)

After reversing : (LinusTorvalds) windows open you when useless becomes it conditioning air like is computer A

Test Q3.1.3

Original string was : oneWord

After reversing : oneWord

Test Q3.1.4(empty string)

Original string was :

After reversing :

Test Q3.2.1

The word : whiteleaf

isElfish : true

Test Q3.2.2

The word : tasteful

isElfish : true

Test Q3.2.3

The word : unfriendly

isElfish : true

Test Q3.2.4

The word : waffles

isElfish : true

Test Q3.2.5(Empty String)

The word :

isElfish : false

Test Q3.2.6

The word : eeeeeIIIIIIII

isElfish : false

Test Q3.2.7

The word : fffeee

isElfish : false

Test Q3.2.8

The word : full

isElfish : false

Test Q3.3.1

(Integer)The array was : [100, 50, 25, 12, 6, 3, 1, 0, -1, -3, -6, -12, -25]

(Integer)After sort method : [-25, -12, -6, -3, -1, 0, 1, 3, 6, 12, 25, 50, 100]

Test Q3.3.2

(String)The array was : [zzz, zyz, zyy, aaa]

(String)After sort method : [aaa, zyy, zyz, zzz]

Test Q3.3.3

(Integer)The array was : [10, -2, 21, 34, -6, 0, 12, 12, 1, -1, 100, -100]

(Integer)After sort method : [10, -2, 21, 34, -6, 0, 12, 12, 1, -1, 100, -100]

Test Q3.3.4

(String)The array was : [Ali, Bahar, GTU, 171044066]

(String)After sort method : [Ali, Bahar, GTU, 171044066]

Test Q3.4.1

The prefix expression was : + 10 + / - 20 * 4 2 6 - 11 / 14 7

Answer : 21

Test Q3.4.2

The prefix expression was : - - 2000 55 40

Answer : 1905

Test Q3.4.3 (This example throws an exception)

The prefix expression was : - - + 2000 55 40

There is a Syntax ERROR of prefix expression !

Test Q3.4.4 (Empty String)(This example throws an exception)

The prefix expression was :

There is a Syntax ERROR of prefix expression !

Test Q3.5.1

The postfix expression was : 10 20 4 2 * - 6 / + 11 + 14 7 / -

Answer : 21

Test Q3.5.2

The postfix expression was : 200 55 - 40 -

Answer : 105

Test Q3.5.3 (This example throws an exception)

The postfix expression was : 2000 55 - 40 - +

There is a Syntax ERROR of postfix expression !

Test Q3.5.4 (Empty String)(This example throws an exception)

The postfix expression was :

There is a Syntax ERROR of postfix expression !

Test Q3.6.1

The actual Array :

1 2 3 4

5 6 7 8

9 10 11 12

13 14 15 16

17 18 19 20

Output :

1 2 3 4 8 12 16 20 19 18 17 13 9 5 6 7 11 15 14 10

Test Q3.6.2(There is just one column)

The actual Array :

1

2

3

4

5

6

7

Output :

1 2 3 4 5 6 7

Test Q3.6.3(There is just one row)

The actual Array :

1 2 3 4 5

Output :

1 2 3 4 5

Test Q3.6.4(Empty Array)

The actual Array :

Output :

Test Q3.6.5

The actual Array :

1 2 3 4 5

12 13 14 15 6

11 10 9 8 7

Output :

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15