

The background of the slide features a close-up photograph of several dried flower skeletons (likely from a hydrangea) resting on a dark, reflective surface. The flowers are light-colored, showing intricate vein patterns, and their reflection is visible on the surface below. The entire scene is bathed in a deep blue light, creating a bokeh effect with out-of-focus light spots in the background.

# COMP 2402

## Implementation DEMO

# Java Collections Framework Reference

List				
	<code>get(i)</code>	<code>set(i, x)</code>	<code>add(i, x)</code>	<code>remove(i)</code>
<code>ArrayList</code>	$O(1)$	$O(1)$	$O(1 + n - i)$	$O(n - i)$
<code>LinkedList</code>	$O(1 + \min\{i, n - i\})$			

Deque				
	<code>addFirst(x)</code>	<code>removeFirst()</code>	<code>addLast(x)</code>	<code>removeLast(x)</code>
<code>ArrayDeque</code>	$O(1)$			
<code>LinkedList</code>	$O(1)$			

Queue			
	<code>add(x)</code>	<code>remove()</code>	<code>element()</code>
<code>ArrayDeque</code>	$O(1)$		
<code>LinkedList</code>	$O(1)$		
<code>PriorityQueue</code>	$O(\log n)$	$O(\log n)$	$O(1)$

# Java Collections Framework Reference

Set			
	<code>add(x)</code>	<code>remove(x)</code>	<code>contains(x)</code>
HashSet	$O(1)$		
TreeSet	$O(\log n)$		

SortedSet			
	<code>headSet(y)</code> <sup>1</sup>	<code>tailSet(x)</code> <sup>1</sup>	<code>subSet(x, y)</code> <sup>1</sup>
TreeSet	$O(\log n)$		

Map <sup>2</sup>			
	<code>get(k)</code>	<code>put(k, v)</code>	<code>containsKey(k)</code>
HashMap	$O(1)$		
TreeMap <sup>3</sup>	$O(\log n)$		

# Java Collections Framework Reference

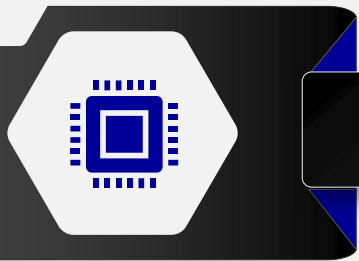
class



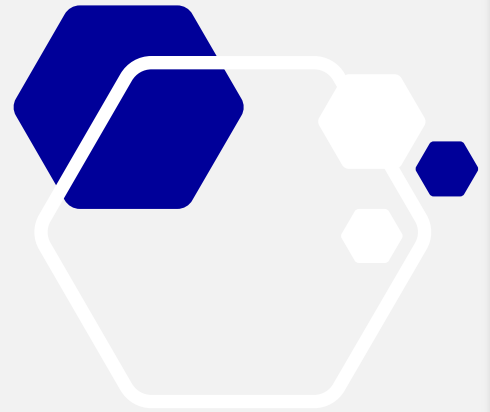
Collections			
<code>sort(list)</code>	<code>min(c)/max(c)</code>	<code>reverse(list)</code>	<code>binarySearch(list, x)</code> <sup>4</sup>
$O(n \log n)$	$O(n)$	$O(n)$	$O(\log n)$

`Collections.sort(mylist);` ← Sorts the specified list into ascending order





## ListDemo.java & SetDemo.java



> javac ListDemo.java

← to compile

> java ListDemo

← to run

With sets order is not guaranteed.

# Demonstration

```
> javac ListDemo.java  
> java ListDemo
```

← to compile

← to run

attribute

```
> java ListDemo 100000000
```

Adding 100000000 values...done (2.732694899s)

```
> java ListDemo 100000
```

Adding 100000 values...done (0.0066799000000000001s)

Adding 100000 values at the front...done (0.322008199s)

```
> java ListDemo 1000000
```

Adding 1000000 values...done (0.0279675010000000002s)

Adding 1000000 values at the front...done (65.229541s)

Huge difference!

Now change implementation from ArrayList to LinkedList

```
> java ListDemo 1000000
```

Adding 1000000 values...done (0.1105192000000000001s)

Adding 1000000 values at the front...done (0.1201882000000000001s)

```
> java ListDemo 100000
```

Using 200000 calls to contains()...done (35.2039442s)

Very slow ☹️

# Demonstration

> java SetDemo 100000

Adding 100000 elements to HashSet ...done (0.0240651000000000002s)

Searching 200000 elements...done (0.01108030000000000001s)

Adding 100000 elements to TreeSet ...done (0.0842638s)

Searching 200000 elements...done (0.05290440000000000004s)

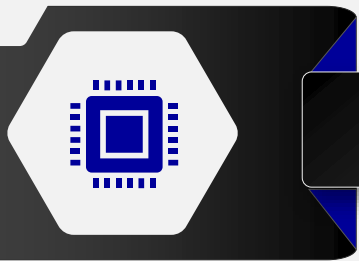
> java SetDemo 10000000

Adding 10000000 elements to HashSet ...done (1.098738s)

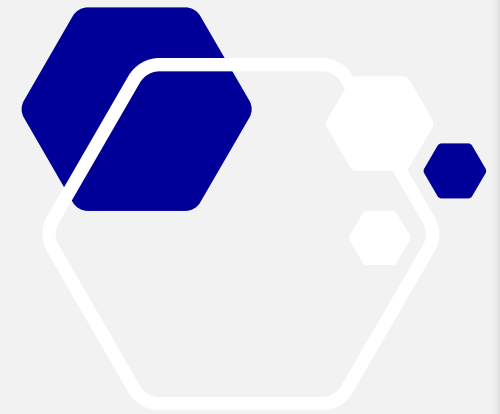
Searching 20000000 elements...done (0.3798946s)

Adding 10000000 elements to TreeSet ...done (2.732916300000000003s)

Searching 20000000 elements...done (2.5870101s)



## WordFun.java



This program opens a file and parses it into words.  
It returns the content of the file as a giant list of strings.

```
> java WordFun TreasureIsland.txt
```

the book is copyright free so  
we can freely use it as test data

shell command to count # of words:

```
> wc -w TreasureIsland.txt
```

```
> cat TreasureIsland.txt | Measure-Object -Word
```

PowerShell



# Basic PowerShell Commands

<b>cat</b>	Get-Content	Gets the contents of a file.
<b>cd</b>	Set-Location	Sets the current working location to a specified location.
<b>chdir</b>	Set-Location	Sets the current working location to a specified location.
<b>clc</b>	Clear-Content	Deletes the contents of an item, but does not delete the item.
<b>clear</b>	Clear-Host	Clears the display in the host program.
<b>cp</b>	Copy-Item	Copies an item from one location to another.
<b>ls</b>	Get-ChildItem	Gets the files and folders in a file system drive.
<b>man</b>	help	Displays information about Windows PowerShell commands and concepts.
<b>md</b>	mkdir	Creates a new item.
<b>rm</b>	Remove-Item	Deletes files and folders.