

GEBZE TECHNICAL UNIVERSITY
#CSE 222

DATA STRUCTURES AND ALGORITHMS

HOMEWORK 4

MUSEUM SECURITY SYSTEM

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TIME COMPLEXITY

1.UsernameManager Class

- checkIfValidUsername method = $\Omega(n)$
 - Three if statements : `username.isEmpty()` = $O(1)$
 - : `character.isLetter()` = $O(1)$
 - : `username.length()` = $O(1)$
 - `Substring()` = $O(1)$
- Recursive function = It depends how many calls it = $\Omega(n)$

1.Password1Manager Class

- isValidPassword method = $O(n)$
 - If statements = $O(1)$
 - 2 for loops = $O(n) + O(n) = O(n)$
- containsUserNameSpirit method = $O(n^2)$
 - 2 for statements = $O(n) + O(n^2) = O(n^2)$
 - $O(n^2)$ cause of `contains()` because `contains()` = $O(n)$
- isBalancedPassword method = $O(n)$
 - If statement = $O(1)$
 - For loop = $O(n)$
- isPalindromePossibleRecursion method = $\Omega(n)$
 - If statements = $O(1)$
 - Recursive function = It depends how many calls it = $\Omega(n)$

1.Password2Manager Class

- isValidPassword method = $O(1)$
 - If statement = $O(1)$
- isExactDivisionRecursion method = $\Omega(n^2)$
 - 2 If statements = $O(1)$
 - For loop = $O(n)$ * recursive call

OUTPUT RESULTS

Officer1:

```
C:\Users\br3yt\Downloads\openjdk-17.0.2\bin\java.exe -javaagent:D:\Program Files
Checking all validations for sibelgulmez
The username and passwords are valid. The door is opening, please wait...
```

Officer2:

```
Checking all validations for
It should have at least 1 character
Exception in thread "main" java.lang.RuntimeException Create breakpoint : The username is invalid due to not contains only letter or length is less than 1.Try again...
    at org.homework4.business.concretes.OfficerManager.checkAllValidations(OfficerManager.java:29)
    at org.homework4.tests.TestClass.main(TestClass.java:29)
```

Officer3:

```
Checking all validations for sibel1
It should have letters only.
Exception in thread "main" java.lang.RuntimeException Create breakpoint : The username is invalid due to not contains only letter or length is less than 1.Try again...
    at org.homework4.business.concretes.OfficerManager.checkAllValidations(OfficerManager.java:29)
    at org.homework4.tests.TestClass.main(TestClass.java:29)
```

Officer4:

```
Checking all validations for sibel
It should have at least 8 characters
Exception in thread "main" java.lang.RuntimeException: The string password is invalid due to password is not at least 8 characters long or
password not contains only letter and bracket or
password not contains at least 2 brackets.Try again...
    at org.homework4.business.concretes.OfficerManager.checkAllValidations(OfficerManager.java:33)
    at org.homework4.tests.TestClass.main(TestClass.java:29)
```

Officer5:

```
Checking all validations for sibel
It should have at least 2 brackets
Exception in thread "main" java.lang.RuntimeException: The string password is invalid due to password is not at least 8 characters long or
password not contains only letter and bracket or
password not contains at least 2 brackets.Try again...
    at org.homework4.business.concretes.OfficerManager.checkAllValidations(OfficerManager.java:33)
    at org.homework4.tests.TestClass.main(TestClass.java:29)
```

Officer6:

```
Checking all validations for sibel
It should have letters too
Exception in thread "main" java.lang.RuntimeException: The string password is invalid due to password is not at least 8 characters long or
password not contains only letter and bracket or
password not contains at least 2 brackets.Try again...
    at org.homework4.business.concretes.OfficerManager.checkAllValidations(OfficerManager.java:33)
    at org.homework4.tests.TestClass.main(TestClass.java:29)
```

Officer7:

```
Checking all validations for sibel
It should have at least 1 character from the username
Exception in thread "main" java.lang.RuntimeException Create breakpoint : The string password is invalid due to password not contains at least one letter of the username.Try again...
    at org.homework4.business.concretes.OfficerManager.checkAllValidations(OfficerManager.java:43)
    at org.homework4.tests.TestClass.main(TestClass.java:29)
```

Officer8:

```
Checking all validations for sibel  
It should be balanced  
Exception in thread "main" java.lang.RuntimeException Create breakpoint : The string password is invalid due to two brackets are not matching.Try again...  
    at org.homework4.business.concretes.OfficerManager.checkAllValidations(OfficerManager.java:47)  
    at org.homework4.tests.TestClass.main(TestClass.java:29)
```

Officer9:

```
Checking all validations for sibel  
It should be possible to obtain a palindrome from the password1.  
Exception in thread "main" java.lang.RuntimeException Create breakpoint : The string password is invalid due to there is no palindrome  
    at org.homework4.business.concretes.OfficerManager.checkAllValidations(OfficerManager.java:51)  
    at org.homework4.tests.TestClass.main(TestClass.java:29)
```

Officer10:

```
Checking all validations for sibel  
It should be between 10 and 10,000.  
Exception in thread "main" java.lang.RuntimeException Create breakpoint : The integer password is invalid due to the password is not between 10 and 10000.Try again...  
    at org.homework4.business.concretes.OfficerManager.checkAllValidations(OfficerManager.java:39)  
    at org.homework4.tests.TestClass.main(TestClass.java:29)
```

Officer11:

```
Checking all validations for sibel  
Exception in thread "main" java.lang.RuntimeException Create breakpoint : The integer password is invalid due to there is no exact denominations.Try again...  
    at org.homework4.business.concretes.OfficerManager.checkAllValidations(OfficerManager.java:55)  
    at org.homework4.tests.TestClass.main(TestClass.java:29)
```