# QUALITY GATE TEST (SENIOR LEVEL)

### Strings

### Questions

- What method used for string concatenation?

+ и .concat()

А ещё StringBuilder, StringBuffer, String.concat(), String.format(), Streams, String.join()

 Before JDK-9 создание экземпляра класса StringBuilder, серию вызовов StringBuilder::append() и преобразование результата в строку при помощи вызова StringBuilder::toString() в финале. Java 9 был [JEP 280](https://openjdk.java.net/jeps/280), новый механизм конкатенации строк: все манипуляции с StringBuilder исчезают и заменяются одной инструкцией invokedynamic. В качестве bootstrap-метода при этом используется один из методов класса [java.lang.invoke.StringConcatFactory](https://docs.oracle.com/en/java/javase/17/docs/api/java.base/java/lang/invoke/StringConcatFactory.html).

- What is the better form of string concatenation, why?  
- Can you change a character of a String without copying?

- Are strings mutable in java?  
No. The String is immutable in Java because of the security, synchronization and concurrency, caching, and class loading. The reason of making string final is to destroy the immutability and to not allow others to extend it. The String objects are cached in the String pool, and it makes the String immutable.

### 2. Arrays

Given the following example array:

int[] intArray = new int[14];

intArray[3] = 5;

intArray[4] = 3;

intArray[13] = 14;

- What is the first index of array? 0  
- What is the length of array of above example? 14  
- What will be the default value of indexes with no value assigned? 0  
- Can you resize an array in Java without creating a new array? no

int[] intArray = { -2, 4, 4, 3, 3, 1, 0, -5, 7, -8 };

- Find first non-repeating integer in an array (coding)

- Rearrange array in decreasing order (coding)  
- Right rotate the array by one index (coding)  
- Maximum sum subarray using loops (coding)  
- Maximum sum subarray using divide and conquer (coding)

### Stacks

* What is the storage/retrieve order used in stacks?

Какой порядок хранения/извлечения используется в стеках LIFO

- What is the first value is to remove?

- What are the most common methods of a stack?

push() -добавить, pop() - извлечь, peek() -кто последний, empty() – пустой ли стек?, int search(Object o) – количество pop(), чтобы перевести элемент в вершину стека

- Implement a stack using array (coding)

- Next greater element using a stack (coding)

**4. Write code,**   
 which converts the decimal number 139 into its binary representation, without using embedded number conversions

**5. Iterations**

How you can traverse data structures (Collections)? List at least 4-5 examples.

**6. Big-O-Notation**Please list the possible Big-O-Notation variants, with a short code example, if possible.

**7. Linked List**

Create a simplified linked list (codig), without using Java library interfaces/classes.

* What are the basic operations of a linked list?
* What are the advantages/disadvantages of linked lists?
* How Collections are implemented in Java (regarding lists)?
* Reverse a linked list

### 8. Factorial for-loop to recursion

Factorial of n is the product of all positive descending integers.

For example: 3! = 3\*2\*1 = 6

Below is the implementation using for loop. Please write the same using recursion.

class FactorialLoop {

public static void main(String args[]) {

int i,fact = 1;

int number = 5; // It is the number

// to calculate factorial

for (i=1; i<=number; i++) {

fact = fact \* i;

}

System.out.println("Factorial of "

+ number + " is: " + fact);

}

}

### 9. What is CRUD?

**10. What is a REST API?**  
**Please write an example of the CRUD operations with HTTP resource equivalents (for example to handle ’people’ data).**  
**11. How Spring Boot dependency injection works?**  
**12. What type of design patterns you know?**  
**13. What Scopes are existing in Spring Boot?**  
**14. JPA entity**  
Create a JPA entity class for an entity of ’Employee’, based ont he following description (Its a plus, if you can use auto increment for Id):

Employee(@Id id, String name, String position, int salary, Employee reportingToEmployee)

- Please write a Repository interface based on CrudRepository for the given ’Employee’ entity.

### 15. Please describe the possible relationships between database tables or entities 16. What is application context in spring? 17. What roles have the different parts of an MVC design pattern? 18. Which gives more flexibility and why: using inheritance or using interfaces? 19. Write an example to try-with-resources block https://www.baeldung.com/java-try-with-resources

introduced in Java 7 — allows us to declare resources to be used in a *try* block with the assurance that the resources will be closed after the execution of that block. The resources declared need to implement the *AutoCloseable* interface.

**try** (**PrintWriter** writer = **new** **PrintWriter**(**new** **File**("test.txt"))) { writer.println("Hello World"); }

**try** (**Scanner** scanner = **new** **Scanner**(**new** **File**("test.txt"))) { **while** (scanner.hasNext()) { System.out.println(scanner.nextLine()); } } **catch** (FileNotFoundException fnfe) { fnfe.printStackTrace(); }

We can declare multiple resources just fine in a *try-with-resources* block by separating them with a semicolon:

**try** (**Scanner** scanner = **new** **Scanner**(**new** **File**("testRead.txt"));

**PrintWriter** writer = **new** **PrintWriter**(**new** **File**("testWrite.txt"))) {

**while** (scanner.hasNext()) {

writer.print(scanner.nextLine());

}

}

### 20. Write an example for thread-safe Singleton class.

public class Singleton {

private static Singleton instance = null;

private Singleton() {

}

public static synchronized Singleton getInstance() {

if (instance == null) {

instance = new Singleton();

}

return instance;

}

}