

ARRAY : Single container is a set of one or more items. Arrays are fixed size when declare an array with certain count of items - you can-not change it.

-Data types can be **primitives** or **class/object** types.

-**ArrayIndexOutOfBoundsException**: If you try access an index number that is higher than size of the array, it will **throw**.

```

Array char? char[] grades={ 'A', 'B', 'C', 'D' };
Array String? String[] letters={ "a", "b", "c", "d", "e" };String[] days=new String[7];
Arrays Int? int[] numbers=new int[6];
numbers[0]=100;
numbers[1]=200;

```

How to find size? String str="abc"; sys.out(str.length())

Split methods: Chop to string and return array word by word

Replace all:

ARRAY LISTS Holds multiple data . It is **resizable/dynamic**

-**ArrayLists** by default can accept any data unlike array.

ADD → adds an element to the collection

GET → gets the element from the collection using an **index**

REMOVE → deletes an element from a List using an **index**.

IndexOutOfBounds Exception: If index is not valid

SIZE → will return the number of elements in the list.

3 Exception.

-**Array store ex**: When store the wrong type of object its thrown

-**Negative size Error ex**: When create an array with a negative size thr

-**Array index out of boundary exception**: if we try to find Element with an index less than 0 or more than index size will cause this error

Array	vs	Array List
store primitive and object both.		-store only object
Size for(int i=0; num.length; i++).		-for(int i=0; num.size(); i++)
Fixed Size int[] nums={1,2,3};		-Resizable, (add, get, remove)

Sort Method: Sort the array ascending numerical order. **Array.sort**

Binary Search: Sorting-> finding index position **Arrays.binarySearch(name, "Ali")**

Array.equals: sys.out(Arrays.equals(name1, name2) True or False

Array to List: **Array.asList**

FINDELEMENT →1) Multiple matches → **return 1st WebElement**

→2) Single match → **that WebElement**

→3-No Matches → **NoSuchElementException**

FINDELEMENTS →1) Multiple matches→ **Returns List<WebElement>**

→3) Single match→ **List<WebElement> with 1 item**

→2) No matches→ **empty List<WebElement>**

BACKEND DATA VALIDATING/ TESTING

1-Database validation/test.

→Make a change in Front End Then validate in Database

→ Added new employee info in, Then need to run a query to verify the data was added to database successfully and correctly.

```

Select * from Employees
Where name='Test'
And salary = 10000;

```

-How do validation test front end?

Create a bank account entering personal info and enter password then confirm account id=1234525;

How do validation test Back end?

Check if account was added correctly and in timely manner.

```

select * from Account
Where account_id=1234525;
assertTrue(records.size()==1);

```

Loop through all the data of the account and assert that everything matches with Front End. → You registered to **facebook.com** in front end thenRun query to ensure data entered in front end matched the data back

2- UPDATE ||DELETE a Record in Database then Verify in Front_End.

You changed first name in database then verify if new first_name is visible in Front end or not

3-PARTIAL SEARCHES==> LIKE Operator

LIKE operator is used to perform partial searches. It works well with % operator. % means any 0 or More characters **DIVISION**

```

Hello. Match
--> match %eo --> match match %e%
Exm: List all employees whose last name starts with letter K. King
Select * from employees
where last_name LIKE 'K%';

```

FUNCTIONS. A)function b) Procedure

A)function → are reusable codes, that accept input and perform some action then return output/value like non-void

input→actions→output

System.out.print() → built in functions

public String getName() → Custom functions.

b) Procedure→like a void method in java that does an action but does not return

BUILDING IN FUNCTIONS IN SQL

1-Single row functions

Performs action for each and every row independently and return result for each row

Query Exm: Report with all first and last_names Uppercased.

```

SELECT UPPER(first_name),UPPER(last_name)
FROM employees;

```

2-Multiple row functions

Performs the action for multiple rows at once and returns single result

3-Aggregate functions

MIN, MAX, AVG, SUM, or COUNT use with group by

4-Group functions

API TESTING

1-What is API stands & what is ?

Application Programming Interface

*****It enables communication and data exchange between two separate software systems. It is not GUI testing won't concentrate on the look and feel of an application.

****We check response code, response message and response body**

in API Testing.In API we can control the data what we want

2- Why is getting important ?

Agile is taking over Waterfall Methodology

Faster to test than GUI testing

Without a UI, it can be tested earlier in the life cycle

Becoming much more **popular** in the industry

3-What is web service ?

API making 2 systems communicate and giving access to resources of one system to another.

If that communication(**Request/Response**) is **happening through the web/internet - IT is a WEB SERVICE.**

*** IF an API uses INTERNET for Communication it is a WEB SERVICE**

***ALL WebServices are APIs but not ALL APIs are WebServices**

4-What are the advantages of Web Services?

Some of the advantages of web services are:

- Interoperability**: Web services are accessible over network and runs on HTTP/SOAP protocol and uses XML/JSON to transport data, hence it can be developed in any programming language. Web service can be written in java programming and client can be PHP and vice versa.
- **Reusability**: One web service can be used by many client applications at the same time.
- **Easy to deploy** and integrate, just like web applications.
- Multiple service versions can be running at same time.

4-How do web services communicate with each other?

Request & Response

Connect to server send request and receive response what we do

5-What are the components of Request?

Request =====>

Response

-

1-What is data driven framework?

You store your test data in external data sources.
I used Excel file, Databases, Cucumber Scenario Outline with Examples, TestNG DataProviders as a data source.

2-When do you want to go for DDF?

Whenever we need to test a module in aut(Application Under Test) with multiple sets of Data/Parameters/inputs.
Then I know I need to design DDF

3-How do you get data from Excel file? Is excel included to core java?

Using **Apache POI** libraries. Not include it is external jar file
`FileInputStream inStream=new FileInputStream(XLFilePath);`
`XSSFWorkbook wb=new XSSFWorkbook(inStream);`
`XSSFSheet sheet=wb.getSheet("Sheet1");`
`String data=sheet.getRow(0).getCell(0).getStringCellValue();`

4) When did you use XL read/write?

When i **design Data driven framework**,
I find excel to be very convenient.
I store my test data into excel and read data using java code.
I also insert results back into excel.

5-How to write to excel file?

```
FileInputStream inStream=new FileInputStream(XLFilePath);
XSSFWorkbook wb=new XSSFWorkbook(inStream);
XSSFSheet sheet=wb.getSheet("Sheet1");
XSSFCell cell= sheet.getRow(0).getCell(0);
if(cell==null){
    sheet.getRow(0).createCell(0); }
cell.setCellValue("Test");
//save changes:
FileOutputStream outStr=new FileOutputStream(XLFilePath);
wb.write(outStr); wb.close();
```

6-How do you choose a External source for DDF?

usually it depends on several factors.
Like what data source other teammates are using to maintain data.
If i am using Cucumber features, I create Scenario Outline with Examples table. If i am using testNG, i go for DataProvider
Excel is another great way of maintaining and designing DDT.

7-How do you create a folder using Java?

using **File class**.
`File folder=new File(OneFolderPath); folder.mkdir();`
`File folder=new File(ManyFolderPath); folder.mkdirs();`

8- How to create a text file using Java?

using **File Class**
`File file=new File(Filepath.txt); file.createNewFile();`

9- XSSFWorkbook vs HSSFWorkbook?

XSSFWorkbook --> xls extension files
HSSFWorkbook --> xlsx extension file

SQL AND MY SQL- PRIMARY KEY-FOREIGN KEY

1-What sql stand on?

- sql -> structured query language
- SQL is a language that is used to work with
Databases and manipulate data.

2-What is database ?

- We store data into separate tables that are related to each other.
- Data is organized into database tables.
- All data needs to be stored somewhere
- where it is **secure, easy to read, fast** to read.

How are they related?
`tableA id, -name, -salary -job_id tableB job_id, salary`

3-Primary key and Foreign key?

Primary key --> unique column in every table in a database.
-can only accept non-duplicated values and cannot be NULL.

Foreign Key --> is a column that comes from a different table and using Foreign key tables are related to each other.
Null, duplicated, cannot add data which is not in PK
****--Foreign key is the primary key of another table

Unique Key -> Only Unique value

5-Null Value ?

Null -> Can have null values
Not NULL -> cannot have null value

6-Give any database example system ?Database management sy

Microsoft SQL server --> licensed
MySql --> Open source database
Oracle Db --> Licensed
..

7-What kind of data base system did you use?? SQL what kind of database system? ?

RDBMS --> Relational Database management system.
is tables are related to each other using Primary and foreign keys

8- Database schema?

-->It is a illustration of tables and how they are related.
-->it is like a diagram with all tables and column names,
Employees --> Employee_id

9-What is the sql syntax ?

```
SELECT
INSERT
UPDATE
DELETE
```

JOINS:When you retrieve data from multiple tables, we use SQL JOINS.

INNER JOIN:Multiple tables and It returns ONLY MATCHING dat
OUTER JOINS
LEFT OUTER JOIN:Multiple tables and It returns left table matched records
RIGHT OUTER JOIN: Returns all records from the right table (table2)
FULL OUTER JOIN:Return all records when there is a match in either left or right
SELF JOIN:Regular join, but the table is joined with itself. (KESISME)

API TESTING

2 Types of WebService Protocols?

Web services are of two kinds: Simple Object Access Protocol (SOAP) and
Representational State Transfer (REST). SOAP defines a standard
communication protocol (set of rules) specification for XML-based
message exchange.

2 Types of WebService communication (protocol) :

SOAP ----->use **XML** language which is **outdate**
REST----->use **JSON, XML, TEXT** format which is **popular**
and %80 percent company use it

How do web services communicate with each other?

Request ===== Response

What are the components of Request?

Request icerik.	Respond icerik
Method	Headers
Headers.	Body
Body	Status Code

SOAP vs REST WEBSERVICES

REST(Representational State of Transfer) is a lightweight option for developing
web services using the HTTP protocol.

-REST is very data driven, compared to SOAP, -
SOAP is strongly function driven.

REST: Developed to overcome the limitations of SOAP, and to make it
more web services Lightweight. IT is FASTER

REST:Represented in multiple Formats JSON, XML, TEXT.
More FLEXIBLE

-Both give an outline
-SOAP is not popular anymore :{
-80% of the market is using **REST** :}
-SOAP is **XML** Response, **REST** is **XML and JSON**
-REST is purely **http** protocol
We can hit the link on the browser and see the results.

1) How to get data from database using java?

Using JDBC Api. JDBC Libraries/jar file

2) Steps to connect to database?

Connection connection=DriverManager.getConnection.....
(ConnectionStringURL,UserName,Password);

3) How to run an SQL query against database?

Statement stmt=connection.createStatement();
ResultSet rs=stmt.executeQuery("Select * from employees");

4) What are types of ResultSet?

--> Forward Only(default)
--> Scroll Insensitive(U can scroll up and down)
--> Scroll Sensitive(U can scroll up and down)

5) What actions you can do with ResultSet?

next(), last, absolute, relative, beforelast/first

6) How to find out number of records returned?

--> rs.last();
--> int rowCount=rs.getRow();

7) How to print all values from a column?

while(rs.next()){
print rs.getString("column1");
}

8) How to get scrollable resultSet?

Statement stmt=connection.createStatement(ResultSet.TypeScrollInsensitive,
ResultSet.readOnly);
ResultSet rs=rs.executeQuery("Select * from cities");
rs.absolute(5); // goto specific row

9) Metadata?

Data about Data?

10) Types of Metadata?

1- DataBase Metadata 2- ResultSet Metadata

11) ResultSet Metadata use?

-Get column count, their datatypes, Column names

12) How to read column name?

-ResultSetMetaData mrs=rs.getMetaData();
print mrs.getColumnName(1);

13) How to get number of columns?

ResultSetMetaData mrs=rs.getMetaData();
print mrs.getColumnCount();

14-What type of Database?

Oracle 12c - MySQL 5.7

SQL DML- DDL

1 - Table can contain multiple foreign keys? Yes

Can multiple primary keys? technically yes, but not so often

- Primary key column ? Unique values, Not Null
- Foreign K column --> Duplicate, Null, insert only data that exists in a table where it is a primary key

2- What type of database system you have exp with?

--> RDBMS --> Relational Database management system

--> MySQL 5.7
--> Oracle 11G
--> No-SQL databases: MongoDB free, open source, popular in startups, it used JSON store and manipulate data

3- Data types in SQL ?

Number(9), Integers, char, varchar, varchar2, boolean, date, currency

4-PL/SQL --> oracle.

It is another flavor of SQL and it is used to create database TRIGGERS and FUNCTIONS

5-What is a Trigger?

A trigger is a pl/sql block structure which is fired when a DML statements like Insert, Delete, Update is executed on a database table. A trigger is triggered automatically when an associated DML statement is executed.

6-DML & DDL commands in SQL

DML -> Data manipulation language. Working with data directly.
DDL -> Data definition language you are working with structure and rules of database/table/tables

A) DML. How manipulate->
SELECT (read),
INSERT (add/post)
UPDATE,
DELETE (rows)

B) DDL. How Define->
CREATE : Table/database..
ALTER Table: Add new columns, delete some columns, change the datatype, rename the
DROP Table : Delete whole table with data in it
TRUNCATE Table: Delete whole table data in it but the structure of table remains

7-DDL vs DML.

--> **DDL** commands cannot be restore/undone
--> **DML** command actions can be restored

8-Difference between UNION vs UNION ALL?

UNION --> removes duplicates, sorts the results
UNION ALL-> keeps duplicates, does not sort results

TIPS:The WHERE clause appears immediately after the FROM clause.

What is inner join?
Inner join is used when retrieving data from multiple tables and will return only matching data based on joining condition.

What is outer join?
Outer joins are used when retrieving data from multiple tables and will return both matching(inner) and non-matching data based on joining condition.(either from left or right tabl

API TESTING

1-What is CRUD operation/methods/HTTP METHODS?

4 methods involve in **Api Testing** like

Create- GET - Retrieves the data from a specified source
Read- POST - Sends new data to a specified source
Update PUT - Updates info for a specified source
Delete DELETE - Removes data from a specified source

2-What is groovy?

Groovy is a scripting language which internally includes all the java libraries

Postman works? --> CHROME add on
SoapUI --> Groovy]

RestAssured

3- Tool for API testing ?

Rest : postman, rest-assured, apache client
Soap : java libraries, uft api, soap ui
Soap ui -> rest, soap

4 -Can you give a scenario ?

PING, POST, GET
Given Service is up and running
When I perform POST request with laptop information
Then Status code should be 200 OK
When I perform GET request with id
Then Response should contain all posted data

HTTP STATUS CODE

5-How could be Efficient API testing quality ?

A well-constructed API test suite answers questions such as:

- 1-Does the service **respond quickly** enough for the intended users?
- 2-Will the server respond with the **correct values**? (Positive Testing)
- 3-How will the service **handle exceptions** and illegal values? (Negative Testing)
- 4-Is the **service stable** under expected and unexpected user loads? (JMETER, LoadRunner)

Quick Review

Make sure API application is up and running on local Tomcat server.

1-How do you perform GET request?

RestAssured.when().get(URI);

2-You want JSON return?

given().accept(ContentType.JSON).when().get(URI);

3-How do you capture the return value?

String body =
given().accept(ContentType.JSON).when().get(URI).thenReturn().
body().asString(); //yazi ise

4-How do you get status code?

Response response = given().accept(ContentType.JSON).when().get(URI);
Assert.assertTrue(response.getStatusCode()==200); response.asString();

5-How do you use assertions in RestAssured?

1. Hamcrest library we use for =====> Matchers 2. **J-Unit, TestNG**

6-How do assert status code using Hamcrest?

given().accept(ContentType.JSON).when().get(URI).then().
assertThat().statusCode(200);

7-How do assert Id is 500 using Hamcrest?

given().accept(ContentType.JSON).when().
get("/{ id }").then().assertThat().body("id",equalTo(500));

===== <https://reqres.in/api/users?page=3>

Get the return body/resource from this URI then: 1. **Print page, per_page, total, total_pages**

THROWABLE interface. Has 2 classs

1- **ERROR** => not meant to be handled

Ex: **StackOverflowError** => When stack is out of memory is full
 Virtual machines Error
Heap-OutOfMemory Error

2- **EXCEPTION** => meant to be Handled

2 **KIND EXCEPTIONS** ==> We can handle try catch block

1. **Checked Exceptions/Compile TimeException** =>
 must be handled other wise can't compile, you can not move on
 Ex. page.sleep SQL Exception
 Ex: Thread.sleep(), ClassNotFound Exception

2. **Unchecked Exceptions/RunTimeException**
 Not necessary can be handled.
 Every single exception class that extends to RuntimeException are unchecked exceptions. To do Custom exception we have to extend RuntimeException.
 Arithmetic Exception, IOException Index Out Of Boundary Exception
 Null Pointer exception Array Out Of Boundary Exception

```
try
{
//DO SOMETHING. //If there is only try finally block must put
}
catch(SomeException ex). //But if try+catch not necessary to use
{
//DO SOMETHING
}
finally
{
//DO SOMETHING
}
```

Q-What is different between Error and exception
 Error must handle 100% such outOfMemory exc/File not Found exc can use also try catch

Q- try / catch / finally blocks
 * Try catch handles an exception. *Finally block runs no matter W
 *To avoid finally block => System.exit(1);

=====

THROW --> throw manually, explicitly/creating a problem/exception
 Creating problem throwing an exception-
 Throw we can only use within the **method body OR static B**.
 under try throw new **ArithmeticException**("Something went wrong!!!");

THROWS --> declaring/ an exception/-Throws we can only use within the **method signature**. (throwing out of that method)
void sample() throws ArithmeticException
 [Any kind of exception we can use for both of them] [Anything you can throws] [Throws not real handling problem, real problem handling is try catch]

DATA MANIPULATION LANGUAGE -DML

1-How to use **SELECT** command?
SELECT column1, column2, ...
FROM table_name;

2-How to **INSERT** (add/post) new record to users table?
 Task: Insert "Users: user_id, username, password, email"
INSERT into Users
 values(123,'admin','abc123','imadmin@gmail.com');

3-How to **UPDATE** command?
UPDATE Users SET email = 'sysadmin@gmail.com'
WHERE userID=123;

4-How to **DELETE** command:
DELETE from Users
WHERE username='abc123'; describe countries;
INSERT into countries values('TR','Turkey',3);
INSERT into countries values('TR','Turkey',1); select * from countries;
UPDATE countries SET region_id=1
WHERE country_id='TR';
DELETE FROM countries **WHERE** country_id='TR';

DATA DEFINITION LANGUAGE -DDL

1-How to **CREATE** command?
CREATE TABLE Persons (
 PersonID int,
 LastName varchar(255),

2-How to **ALTER** command?
 ALTER table, you can change col name, change data type, add columns etc etc ALTER TABLE Users modify pwd varchar(15);

3-How **DROP** table table_name?
DROP TABLE table_name;
 delete whole table data along with structure and everything
Note: Be careful before dropping a table. Deleting a table will result in loss of complete information stored in the table!

4-How to **TRUNCATE** ?empty table but leave the structure
TRUNCATE TABLE Users;
DELETE FROM Users;

FILTERING ORDERING COMMANDS:

Select_from-where-group_by-having -order_by
 you want to filter the rows before grouping, you add a **WHERE clause**.
 However, to filter groups, you use the **HAVING** clause
 You often use the HAVING clause with the GROUP BY clause and also you can use it in the **SELECT statement** only. If you use a HAVING clause, without a GROUP BY clause, the HAVING clause behaves like the **WHERE clause**.

API TESTING

What is RestAssured ?
 REST Assured is a **Java library** that provides a domain-specific language (DSL) to automated the API tests

1-How automate API testing in your project?
 In my project I used **Maven** and **pom.xml** is our dependency and profile xml file. I added In pom.xml
 - **JUnit library** - It is our test framework
 - **Hamcrest library** - For assertion methods (junit 3-4 support, not yet 5)
 - **Rest Assured library** - It is our REST API testing library
 - For running the test from command prompt with maven I also added All Api Tests profile at the end of the pom.xml.
 We can run all tests with "mvn test -PalApiTests" command.

2- What is Hamcrest?
 Hamcrest is a framework for creating matcher objects.
 very readable, is easy to write and to understand, readable!
 Generates detailed output when its matchers fail,
 Output : java.lang.AssertionError:
 Expected: a value greater than <10>
 but: <7> was less than <10>

3- What is Serialization. Deserialization
Serialization --> When you have an Object from a class and MAP it to a JSON format in your RESTful API. We do by using POJO class/ plain old java
Deserialization --> It is opposite

4-What is Authentication/belgeleme and Authorization/onaylanma?
Authentication : is verifying that you are who you are pretending
Authorization : is verifying if you have permission for acces

5-Two types of Authentication:
 -> Basic. -> Pre-Emptive.

6-How it works Basic Credentials Authorization?
 1) Using headers
 2) using auth() method in RestAssured
 --> auth().preemptive()- .basic(username,password)

7-What is SSL --> Secure Socket Layer??
 It works with Certificates. Once SSL layer is established between client and server, the whole communication will be encrypted abc --> qhw354q238uadsrha3i45has
Steps:
 1. CLIENT request server to identify itself SERVER/API
 2. SERVER send the browser its copy of SSL Certificate
 3. Browser checks if it trusts the SSL certificate. If yes It send a message to the server
 4. The server sends back digitally signed agreement to start

8-How do use assertion in API testing JUnit Itself ?
 assertEquals(200, response.getStatusCode());
 assertEquals("Hi! Murodi()", response.body().asString());

HTTP STATUS CODE
 200 OK
 400 Bad request
 401 Unauthorized status code
 403 Not Authorized
 404 Not Found
 500 Internal Server Error