CYDEO - Sample JMeter Interview Questions

1. **Explain the architecture of JMeter?**
    - The **Apache JMeter** application is an open source, pure Java application designed to test and measure performance of an application under load.
    - Supports different protocols/services like HTTP, Web Service, LDAP, JDBC, Java, FTP etc.
    - Supports distributed testing (remote start option).
    - Records and plays back the user activity on the browser.
    - JMeter can be used to simulate a heavy load on a server.

2. **How did you use Jmeter in your project and why?**
   I have used JMeter for load testing to analyze the behavior of our application under high load conditions.

   I recorded test scripts based on our business scenarios, edited the scripts and configured the number of users according to requirements and system capacity.. Added listeners to check the results and used the command line to execute the tests. We analyzed the results as a team and identified bottlenecks of our infrastructure and app.

3. **What are different timers used in Jmeter?**
   In real life, users don't visit the website at the same time and they don't do the actions continuously. They need some time to wait for the page to load, take a look at the page content before going to the next action. In order to realistically simulate this behavior, a **Think Time** is added to each request in JMeter. JMeter uses **Timers** to add time between the transactions within an iteration. Timers are used to insert delay in execution. There are different timers in JMeter:
    - Constant Timer adds the same amount of time in milliseconds to each request.
    - Uniform Random Timer adds a random time in addition to the constant delay time. If the delay is 1 sec and the constant delay is 5 sec then the delay will be between 5 to 6 seconds.
    - Gaussian and Poisson Timers add think time based on a mathematical formula with a constant delay and offset.
    - There are also timers like Throughput Shaping timer that allows adjusting the overall throughput.

4. **How are requests sent to the server in JMeter?**

JMeter supports all HTTP requests, mostly GET and POST requests are required for test scripts.

5. **Explain the Process of Parameterization**
   Parameterization in JMeter is the act of creating variables that will provide many different configuration options on a load testing script. For example:
   - Variables to login with different credentials on a web service
   - Variables to use in different environments (dev, master, etc.)
   - Variables to search for a list of products in an e-commerce site

   One of the common ways to achieve Parameterization in Jmeter is using CSV Dataset Config element or User Variables. Other ways are using Database data or using Parameterized Controller.

6. **Does JMeter simulate actual browser behavior?**
   No, JMeter does not support the actual browser behavior. It does not render the HTML webpages as the normal browser does. The response can be viewed in HTML format but the actual timings are not present in the generated samples.

7. **What is Distributed testing?**
   Distributed Testing means using multiple machines for load testing in which one of the machines can be made master and others can be kept as a slave. It is very important to note that all the machines should be on the same network and should have the same version of Java and JMeter

8. **What is the use of Regular Expression in JMeter?**
   Regular Expression is used for extracting some values dynamically from the responses. These values can be used in the subsequent request or can be saved for reporting purposes. Regular Expression is used in both Pre-Processors as well as Post Processors.

9. **What are the types of processors in JMeter?**
   Pre-Processors execute before the main sampler and can change the scope of the sampler whereas Post Processors execute after the main sampler and are applicable to all samplers in the same scope of Test Plan. They can be used to extract some fields from the server response and store them in variables.

10. **What are the maximum recommended threads on a single system?**

It depends on the hardware configuration of your system which includes a processor, JVM, allocated memory -Xmx, etc.

Other factors that impact thread count are the number of components in your test plan i.e. the number of config elements or processors and it also depends on whether you are using GUI/Non-GUI Mode.

11. **Explain the difference between Gaussian and Poisson Timers.**
    Gaussian and Poisson Timers add think time based on a mathematical formula with a constant delay and offset.
    Both Gaussian and Poisson Timers work on a mathematical formula with some constant delay and additional offset. Difference between the two lies in the fact that how the lambda value is calculated in the case of Poisson timer and how deviation is calculated in the case of Gaussian Timer.

12. **What are the major differences between JMeter and LoadRunner?.**
    Load Runner is a licensed software and has a more advanced UI.

13. **What is the use of correlation in JMeter?**
    Co-relation is a process of extracting the values from the server response and storing it in a variable to be used in any other request which is to follow.

    For Example, for testing any login functionality if you have to use the session ID/cookie ID, you can extract the values from the response of GET Request of the login page and then dynamically use the same while making POST request for a login.

14. **What is the latest version of Jmeter?**
    https://jmeter.apache.org/download_jmeter.cgi
    Users are highly encouraged to use the most up to date version of JMeter.

15. **What are the different types of listeners?**
    Listeners are used for storing the execution results of load testing in different forms be it in a table, graph, tree or in any other presentable format so that it can be presented to the client. There are different types of inbuilt listeners in JMeter and many others can be imported into it by using plugins as per the requirement.

    Some of the inbuilt listeners are:

- View results in Table
- View results in Tree
- Graph results
- Aggregate graph
- Aggregate report
- Assertion results
- Response time graph
- Summary Report

16. Explain the flow of the Test Script Recorder.

JMeter Test Script Recorder is one of the ways to create a test script.

• Recorded test script can be used as a starting point to develop test script. Then this test script can be edited to create the final test script.

• In order to record a test script using Test Script Recorder:

- Add HTTPS Test Script Recorder element to the Test Plan
- Set the port number in recorder or keep the default (Port: 8888)
- Configure the browser proxy with the same port number
- Import the JMeter certificate to the browser
- Set the target controller and grouping options of the Test Script Recorder.
- Exclude files like images. You can exclude images by entering "**.*\.gif**"
- Start the recorder and follow the steps you want to test. Check the steps recorded and edit as required.

Other ways to record a test script are using Blazemeter Chrome extension or using Chrome dev tools/Network tab.

17. Can JMeter record actions from mobile? If yes, how?

Yes, JMeter can record mobile application requests on HTTP(S) Script Recorder. All we have to do is to configure JMeter and mobile devices. In JMeter, we can test both iOS and Android native applications. In order to record actions

- Install the JMeter root certificate to your mobile device and turn on trust certificate settings.
- Mobile devices and the system should use the same Wi-Fi network and be set to the same port number.
- On the mobile device, go to Settings > Wi-Fi and click the arrow next to your Wi-Fi connection. Under “HTTP Proxy”, select the Manual button and enter your desktop’s IP address in the Server field. Then enter the same port number.

18. How to do master-slave configuration in JMeter?

Master-slave configuration is a part of distributed testing in which more than one machine is used to perform load testing of the server under test.

It is very important that all machines are on the same network and all have the same version of JMeter. In distributed testing, one machine is considered the master, and the others are kept as slaves by doing some configurations.

The process is specified below:

- On the master machine, edit the JMeter.properties file and add the IP addresses of slave machines against the remote_host field in the file.
- Save the file and open the JMeter again.
- Now, from the RUN menu in JMeter, select Remote Start and choose the IP of the machine to be invoked.
- Choose the RUN menu and select Remote Start all to start all the slave machines for your testing.

19. What are the JMeter supported protocols?

- Web - HTTP, HTTPS (Java, NodeJS, PHP, ASP.NET, ...)
- SOAP / REST Webservices
- FTP
- Database via JDBC
- LDAP
- Message-oriented middleware (MOM) via JMS
- Mail - SMTP(S), POP3(S) and IMAP(S)
- Native commands or shell scripts
- TCP
- Java Objects

JMeter **does not execute JavaScript present in HTML web pages**.

20. Why is it recommended to run JMeter in GUI mode?

The GUI mode should be used for recording, building, and running preliminary tests, but it is not recommended to use for large scale testing since **GUI mode consumes some resource**s. For large scale testing, the Command Line Interface (CLI) should be used.

Also all listeners should be disabled for running tests from CLI in order to use the resources effectively.

21. Is it possible to run selenium scripts in JMeter? If yes, how?

Jmeter can be integrated with Selenium via WebDriver Plugin support. Download the plugin and copy the jars in your “lib” folder and “ext” folder. The WebDriver sampler comes with config elements plugins for IE, Chrome, Mozilla and other browsers so that they can be invoked via selenium code written in your sampler. Set the driver path in the config element so that it picks the browser driver correctly and establishes connection between your code and browser.
Use a webdriver sampler in your test plan and add the Selenium script to the sampler.

22. How do you manage sessions and cookies in JMeter?

Sessions and cookies can be managed in JMeter by using config elements such as HTTP Cookie Manager which provides an option to clear the cookies in every iteration and also allows to add user-defined cookies.

HTTP Cache manager helps you in clearing cache after each iteration as per your requirement in the load tests and also limits the number of elements that can be stored in the cache. Both of these config elements can be attached to the HTTP sampler.

23. What are the important steps for testing JDBC requests?

JDBC Requests are used to establish a connection with the databases and then measure the response time of the queries.

Important steps for testing JDBC requests are:

- Setting up Config Element: JDBC Connection Configuration in which Database URL and JDBC Driver Class needs to be added as per the database which is being used. Also, add the variable name for this connection configuration so as to use it in the sampler.
- Add JDBC Request, add the same variable name added above and write your queries to test.

24. What is BeanShell scripting?

BeanShell is one of the most advanced JMeter built-in components. It supports Java syntax and extends it with scripting features like loose types, commands, and method closures.
https://www.blazemeter.com/blog/beanshell-jmeter#what

25. **Can JMeter measure the performance of a complete application? For Example, you have multiple screens in your mobile app. Can JMeter measure the time taken to flip the screens?**
    No, JMeter does not measure the transition time between the screens. It can only measure the server actions, not the UI interactions.

26. **What is a Root CA certificate?**
    HTTPS connection requires a certificate to authenticate the connections which get established when the browser hits the web server. JMeter generates it temporarily to intercept the SSL traffic in order to record the actions. Root certificate is added to the browser to record http scripts.

27. **What are the important plugins that are supported in JMeter?**
    The most used JMeter plugins are:

    - 3 Basic Graphs.
    - JSON Plugins.
    - Inter-Thread Communication.
    - Flexible File Writer.
    - Custom JMeter Functions.
    - Throughput Shaping Timer.
    - Dummy Sampler.
    - Custom Thread Groups.

28. **What are the types of the controller in JMeter?**

    JMeter has two types of Controllers: Samplers and Logical Controllers. These drive the processing of a test.

    Samplers tell JMeter to send requests to a server. For example, add an HTTP Request Sampler if you want JMeter to send an HTTP request.

    Logical Controllers let you customize the logic that JMeter uses to decide when to send requests. For example, you can add an Interleave Logic Controller to alternate between two HTTP Request Samplers.

29. **Explain Ramp up period?**
    Ramp up period is part of the workload pattern and it is a stage where the number of users increase, The other stages are steady state and ramp down.

30. Name a few timers in JMeter. For what purpose are they considered?

Timers are used to simulate Think Time which is the pause of a real user. There are different timers like Constant Timer, Uniform Random Timer, Constant Throughput Timer and Synchronizing Timer.

31. What do you mean by Rendezvous point?

Rendezvous point in load testing is a point where an expected number of users wait till all of them are emulated, and then all virtual users send requests at one time. This point is created to check the behavior of an application where it might get a huge number of requests at a particular time.

32. What do you know about assertions?

Assertion in JMeter is used to validate the response of the request that you have sent to the server. Assertion is a process where you verify expected results with the actual result of the request at run time. If you need to apply assertion on a particular Sampler, then add it as a child of that Sampler.

33. What are the main parts of a Thread Group?

- İts name.
- Number of threads (the number of users you are testing).
- Ramp-up time (how much time you want to allow the Thread Group to go from 0 to 3 users).
- Loop count (How many times the test should be looped).
- Scheduler checkbox (The checkbox at the bottom of the Thread Group panel is used to enable/disable extra fields in which you can enter the duration of test, the startup delay, the start and end times of the run).

34. What do you know about the Concurrent user hit in JMeter?

Concurrent users tell the number of users for a given test duration, while simultaneous users define the number of users performing the same transaction at any given point of time.

35. List some of the test plan elements in JMeter.

Threads
Configuration elements

Pre-processors
Timers
Sampler
Post-processors
Assertions
Listeners
Test Fragment
Non-test elements

36. What is the execution order of Test Elements

Configuration elements
Pre-processors
Timers
Sampler
Post-processors
Assertions
Listeners

37. What is the 90% line in JMeter?

90% of the samples took no more than this time. It means Aggregate Report computes 90 percentile for each "sampler name" however TOTAL row contains 90 percentile computing for all requests.

38. What is median in jmeter listener

Median is a number which divides the samples into two equal halves. Half of the samples are smaller than the median, and half are larger.

39. What is heap size in jmeter?

The JMeter process runs in the Java Virtual Machine (JVM) under various settings and arguments. The Java Heap Space (as referred to in the error message) is the memory the JVM takes from the underlying operating system to allocate space for the creation of necessary objects.

JMeter's default configuration (see jmeter.bat for Windows or jmeter for non-Windows systems scripts) assumes a heap space of 1024 megabytes only. This is actually pretty low considering many modern smartphones have up to four times

more! If your test is running massive objects which go over 1024Mb, you'll get an OOM error and your test will fail.

Fortunately, there's a simple solution. Just increase the maximum heap size to ~80% of your total available physical RAM. To do this, find the following line in your JMeter startup script:

HEAP=-Xms1g -Xmx1g

Now change the -Xmx value accordingly. For example: if you want to set the maximum heap size to 4 gigabytes, you'll need to change the line to:
HEAP="-Xms1g -Xmx4gm"

To apply the change, you'll need to restart JMeter.

Before increasing the heap size make sure your app needs it.

40. What is BlazeMeter?

BlazeMeter is 'JMeter in the cloud'. This means it's not only 100% compatible with JMeter - but it also addresses its limitations like scalability, stability and reporting. With BlazeMeter, you can get: 'On-the-fly' script recording with the BlazeMeter Chrome Extension.

41. How do you ensure re-usability in your JMeter scripts?

- By using variables and Parameterized values
- Changing number of threads
- Adding a random think time
- Naming samplers and reusing for different tests