1. **What Is a Memory leak?**

A memory leak is a situation where unused objects occupy unnecessary space in memory.

Unused objects are typically removed by the Java Garbage Collector (GC) but in cases where objects are still being referenced, they are not eligible to be removed. As a result, these unused objects are unnecessarily maintained in memory.

2. **How to avoid Memory leak?**

i. Release the session when it is no longer needed. ...

ii. Keep the time-out time low for each session.

iii. Store only the necessary data in your Http Session.

iv. Avoid using string concatenation.

1. **Root cause for out of memory error in java.**
2. Out of Memory is a runtime error in Java which occurs when the Java Virtual Machine (JVM) is unable to allocate an object due to insufficient space in the Java heap.
3. The Java Garbage Collector (GC) cannot free up the space required for a new object, which causes out of memory
4. This error can also be thrown when the native memory is insufficient to support the loading of a Java class.
5. **Java -Xms256m-Xmx2048m.**

This means, JVM will start up with 256MB of memory and will allow the process to use up to 2048MB of memory

1. **Java memory model.**

The Java memory model specifies --

how the Java virtual machine works with the computer's memory (RAM).

how and when different threads can see values written to shared variables by other threads,

how to synchronize access to shared variables when necessary.

1. **String Pool.**

A string constant pool is a separate place in the heap memory where the values of all the strings which are defined in the program are stored.

When we declare a string, an object of type String is created in the stack, while an instance with the value of the string is created in the heap.

String pool helps in saving a lot of space for Java Runtime although it takes more time to create the String

1. **Memory utilization in java.**

New objects created and placed in the heap. Once your application have no reference anymore to an object the Java garbage collector is allowed to delete this object and remove the memory so that your application can use this memory again