**Assignment 4**

1. **What’s the difference between final, finally? What is finalize()?  
   Final** is a reserved keyword in Java. Final is used on Class, Method, and variable. Under this keyword, a final class cannot be inherited, a final method cannot be overridden, a final variable value cannot be re-referenced.  
   **Finally** is used in Java exception handling, normally placed after the catch block. It will always be executed no matter if the exception is handled or not.  
   **Finalize()** is a method to perform cleanup before objects are being destroyed by the garbage collection (before System.gc()).
2. **What’s the difference between throw and throws?**The throw keyword is used inside a function. It is used when it is required to throw an Exception logically. It is used to throw an exception explicitly. It can throw only one exception at a time. Throw keyword can be only used to propagate the unchecked Exceptions.  
   The throws keyword is used in the function signature. It is used when the function has some statements that can lead to exceptions. It can be used to declare multiple exceptions, separated by a comma. Whichever exception occurs, if matched with the declared ones, is thrown automatically.
3. **What are the two types of exceptions?  
   Checked Exception:** Classes that extend Throwable class except Runtime and Error are called checked exception. Checked exceptions are checked at compile-time and have to be handled.  
   **Unchecked Exception:** Classes that extend RuntimeException are known as unchecked exceptions. Unchecked exceptions happen during runtime and are not required to be handled.
4. **What is error in java?**An error is a subclass of Throwable that tells that something serious problem is existing and a reasonable Java application should not try to catch that error.
5. **Exception is object, true or false?**True. When we throw an exception, we throw an object which is extended from Throwable class in java.lang package.
6. **Can a finally block exist with a try block but without a catch?**Yes, we can. The finally block will always be executed even if there is a return in the try block.
7. **From java 1.7, give an example of the try-resource feature.**try (PrintWriter writer = new PrintWriter(new File(“input.txt”))){  
    writer.println(“Hello Word!”);  
   }
8. **What will happen to the Exception object after exception handling?**The Exception object will be garbage collected in the next garbage collection.
9. **Can we use String as a condition in switch(str){} clause?**Yes, we can use String in switch case in Java.
10. **What’s the difference between ArrayList, LinkedList and vector?  
    ArrayList**: ArrayList uses a dynamic resizable array to store the duplicate element of different data types. The ArrayList class maintains the order according the insertion orders. ArrayList is non-synchronized. ArrayList can be randomly accessed which allow O(1) accessing time.  
    **LinkedList**: LinkedList use the doubly linked list structure to store the elements. It can store the duplicate elements which remains the insertion order and is not synchronized. The manipulation in LinkedList are fast which takes O(1) time.  
    **Vector**: Vector uses a dynamic array to store the data elements which is similar to ArrayList. However, it is synchronized and contains methods that are not the part of Collection framework.
11. **What’s the difference between hashTable and hashMap?  
    HashMap** is non-synchronized. It is not thread-safe and can’t be shared between many threads without proper synchronization code. **Hashtable** is synchronized. It is thread-safe and can be shared with many threads. **HashMap** is a implementation of Map interface whereas **HashTable** is inherited from the Dictionary class.
12. **What is static import?**Static import is a feature in Java that allows members (fields and methods) which have been scoped within their container class as public static, to be used in Java code without specifying the class in which the field has been defined.
13. **What is static block?**A static block is a set of instructions that run only once when a class is loaded into memory which also called a static initialization block. This is because it is an option for initializing or setting up the class at run-time.
14. **Explain the keywords:  
    default(java 1.8), break, continue, synchronized, strictfp, transient, volatile, instanceOf  
    default**: default is an access-modifier. If a user does not assign any access-modifier to a class or its variable, Java, by default, assigns them the default access-modifier.  
    **continue**: The continue statement skips the specific part of the loop and jumps to the next iteration of the loop immediately.  
    **break**: The break statement is used to break the current flow of the program and transfer the control to the next statement outside a loop or switch statement. However, it breaks only the inner loop in the case of the nested loop.  
    **synchronized**: This keyword helps achieve communication between threads such that only one thread accesses the synchronized resource and other threads wait for the resource to become free.  
    **strictfp**: strictfp is used in java for restricting floating-point calculations and ensuring the same result on every platform while performing operations in the floating-point variable.  
    **transient**: transient is a variables modifier used in [**serialization**](https://www.geeksforgeeks.org/serialization-in-java/) . At the time of serialization, if we don’t want to save value of a particular variable in a file, then we use transient keyword.  
    **volatile**: Volatile is a keyword used to ensure thread safe(all writes and reads will be directly on the main memory instead of CPU cache)  
    **instanceof**: The instanceof keyword checks whether an object is an instance of a specific class or an interface.
15. **Create a program including two threads – thread read and thread write.**

**Input file ->Thread read -> Calculate -> buffered area**

**Buffered area -> Thread write -> output file**

**Detailed description is in assignment4.txt file.**

**Sample input.txt file.**

**Attached files are input.txt and a more detailed description file.**<https://github.com/buyichen/antra_java_batch_5_6/tree/main/src/main/java/day4/Assignment4/Question15>