Assignment 4

1. What's the difference between final, finally? What is finalize()?
   final is the keyword used for classes, attributes, and methods. It will make them un-changeable (impossible to inherit or override).
   finally is the keyword used along with try. It defines a block of code that is always run after the try and any catch block, before the method is completed.
   finalize() is a method that the Garbage Collection always calls just before the deletion/destroying the object which is eligible for Garbage Collection to perform clean-up activity. Clean-up activity means closing the resources associated with that object like Database Connection, Network Connection, or we can say resource de-allocation. Once finalize() is completed, Garbage Collection destroy that object.

2. What's the difference between throw and throws?
   throw is a keyword which is used to throw an exception explicitly in the program inside a function or inside a block of code.
   throws is a keyword used in the method signature used to declare an exception which might get thrown by the function while executing the code.

3. What are the two types of exceptions?
   Checked exception and unchecked exception.
   Checked exception (compile-time exception) are checked by the compiler during the compilation process. For example, SQLException, IOException, InvocationTargetException, and ClassNotFoundException.
   Unchecked exception (runtime exception) are those exceptions that occur during the execution of the program.

4. What is error in java?
   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. Generally, it has been noticed that most of the occurring errors are abnormal conditions and cannot be resolved by normal conditions.

5. Exception is object, true or false?

6. Can a finally block exist with a try block but without a catch?
   Yes.

7. From java 1.7, give an example of the try-resource feature.
   Before JDK 7, we need to use a try-catch-finally statement to manage resources. We need a finally block, to ensure that the resources are properly closed regardless of whether the try completes normally or abruptly.

JDK 7 introduces a try-with-resources statement, which ensures that each of the resources in try(resources) is properly closed at the end of the statement. Therefore, we don't need a finally to explicitly close the resources.

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. However, the expression in the switch cases mush not be null, otherwise, NPE.

10. What's the difference between ArrayList, LinkedList and vector?
    ArrayList is stored in consecutive space, while LinkedList is not.
    Vector is synchronized and doubles its array size each time as more elements are added. But ArrayList grow 50% of its size each time.

11. What's the difference between hashTable and hashMap?
    Hashtable is synchronized, HashMap is not.
    Hashtable does not allow null key or value, but HashMap allows one null key and any number of null values.

12. What is static import?
    With the help of static import, we can access the static members of a class directly without class name or any object.
    Ex: we need to use Math.sqrt(4), but with
    ```
    Import static java.lang.math.*;
    ```
    We can just use sqrt(4)

13. What is static block?
    A static block is a set of instructions that is run only once when a class is loaded into memory. A static block is 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 (java 1.8) – Java 8 introduces a new concept of default method implementation in interfaces. An interface can have default implementation of its methods, and the class implementing these interfaces need not implement the same.
    Break – jumps out of a loop or a switch statement.
    Continue – breaks one iteration (in the loop) and continues with next iteration in the loop.
    Synchronized – can be used for methods and statements. ex: synchronized{ CODE_HERE }. For a synchronized method, when one thread is executing it, all other threads that invoke it for the same object block until the first

thread is done with the object. Sometimes we don't need to synchronize the whole method. Then we can only synchronize a block of codes. It guarantees both mutual exclusion and visibility.
Strictfp – by default, the floating-point computations in Java are platform-dependent. It can be used for classes, non-abstract methods or interfaces. It is used for restricting floating-point calculations and ensuring the same result on every platform while performing operations in the floating-point variable.
Transient - is used to avoid serialization. Serialization is the process of converting an object into a byte stream.This way, we can protect some sensitive data such as ssn.
Volatile - ensures the visibility aspect of the data change without providing mutual exclusion.
InstanceOf - checks whether an object is an instance of a specific class or an interface. Ex: Student myObj = new Student();
System.out.println(myObj instanceof Student); -> return true

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.