

## Assignment Questions:

① What is the difference b/w Hashtable and HashMap?

→ Hashtable is synchronized. → HashMap is not synchronized.

→ It doesn't allow null key (or) null values. → It allows one null key and multiple null values.

→ Hashtable is slow. → HashMap is fast.

→ Hashtable is traversed by both iterator & Enumeration. → HashMap is traversed by Iterator.

→ Hashtable inherits the dictionary class. → HashMap inherits the abstract map class.

② LinkedList vs ArrayList.

### LinkedList

### ArrayList

→ LinkedList internally uses a doubly linked list to store the elements.

→ ArrayList internally uses a dynamic array to store the elements.

→ manipulation with LinkedList is faster than ArrayList.

→ manipulation with ArrayList is slow bcz it internally uses an array.

→ LinkedList class can act as list and queue both bcz it implements list & deque interfaces.

→ An ArrayList class can act as a list only bcz it implements list only.

→ LinkedList is better for manipulating data.

→ It is better for storing and accepting data.

Difference b/w <u>ArrayList</u> VS <u>Vector</u> ?	
<u>ArrayList</u>	<u>Vector</u>
→ <u>ArrayList</u> is not synchronized.	→ <u>Vector</u> is synchronized.
→ <u>ArrayList</u> is not a legacy class.	→ <u>Vector</u> is a legacy class.
→ <u>ArrayList</u> increases its size by 50% of the array size.	→ <u>Vector</u> increases its size by doubling the array size. → It is slow.
→ <u>ArrayList</u> is fast.	→ <u>ArrayList</u> , <u>Set</u> and <u>Map</u> .
<u>DS</u>	
<u>Interface</u>	<u>Duplicate</u> <u>allowed</u>
<u>List</u>	<u>Null</u> <u>value</u> <u>allowed</u>
<u>Set</u>	<u>yes</u> <u>no</u>
<u>Map</u>	<u>Not for</u> <u>keys</u> .

Insertion      Iterator

yes, can retrieve using index.

underlying map implementation

through keyset, value & entry set.

- ⑤ When to go for List?
- If you need only to add and remove items from your collection object, then you should use list. If you wish to preserve ordering, grab items in your list at a specific index (or) remove an element at a given position, then you should go with this functionality.

⑥ When to go for Map?

A) A map contains values on the basis of key, i.e., key and value pair. Each key and value pair is known as an entry. A map containing unique keys, A map is useful if you have to search, update or delete elements on the basis of a key.

⑦ When to go for Set?

A) The Set interface present in the java.util package and extends the collection interface is an unordered collection of objects in which the duplicate values can not be stored. It is an interface which implements the mathematical set. This interface contains the methods inherited from the collection interface and adds a feature which restricts the insertion form of the duplicate elements. → There are two interfaces which extend the

Set implementation

(1) Sorted Set (2) Navigable Set.

⑧ What is the difference b/w extending Thread class and implementing Runnable interface?

→ The significant differences between extending Thread class and implementing Runnable interface.

→ When we extend Thread class, we can't extend any other class even we require and when we implement Runnable, we can save a space for our class to extend any other class in future or no.

- When we extend Thread class, each of our thread creates unique object and associate with it.
- When we implement Runnable interface, it shares the same object to multiple threads.

Program:  
Java program to illustrate defining Thread class by extending Thread class.

// Here we can't extend any other class.

```
class Test extends Thread {
    public void run() {
        System.out.println("Run method executed by child Thread");
    }
}
public static void main(String[] args) {
    Test t = new Test();
    t.start();
    System.out.println("main method executed by main Thread");
}
```

Program: Java program to illustrate defining Thread by implementing Runnable interface.

```
class Greeks {
    public static void m1() {
        System.out.println("Hello Visitors");
    }
}
```

// Here we can extend any other class.

```
class Test extends Greeks implements Runnable {
```

```
    public void run() {
```

```
        System.out.println("Run method executed by child Thread");
```

```
}
```

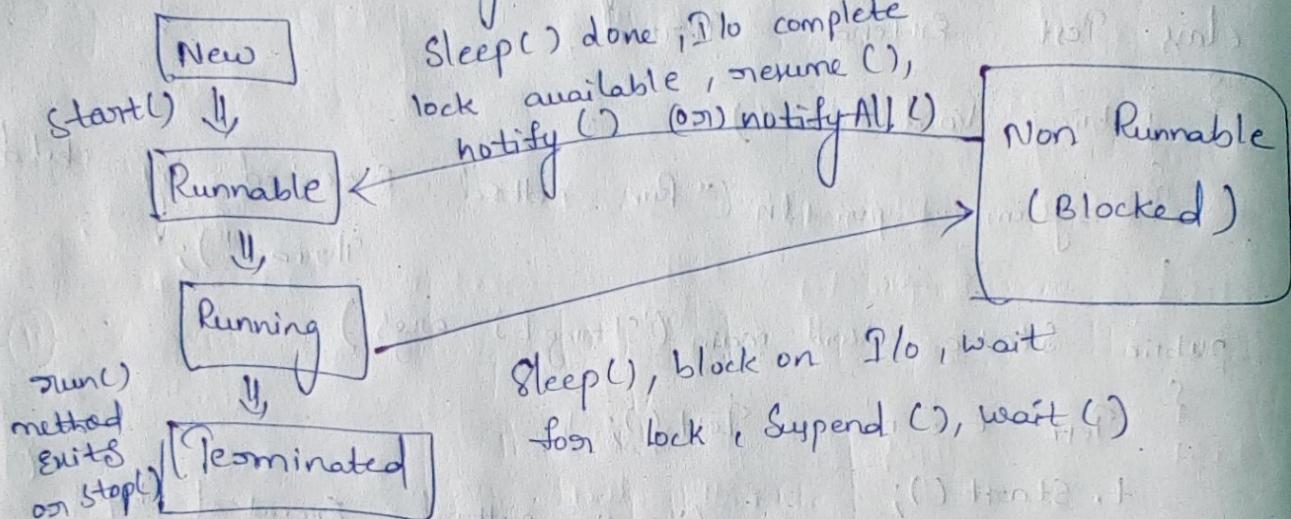
```
public static void main(String[] args) {
```

```

    Test t = new Test();
    t.m1();
    Thread t1 = new Thread(t);
    t1.start();
    System.out.println ("main method executed by
                        main thread");

```

## ⑨ Thread life cycle with all the methods.



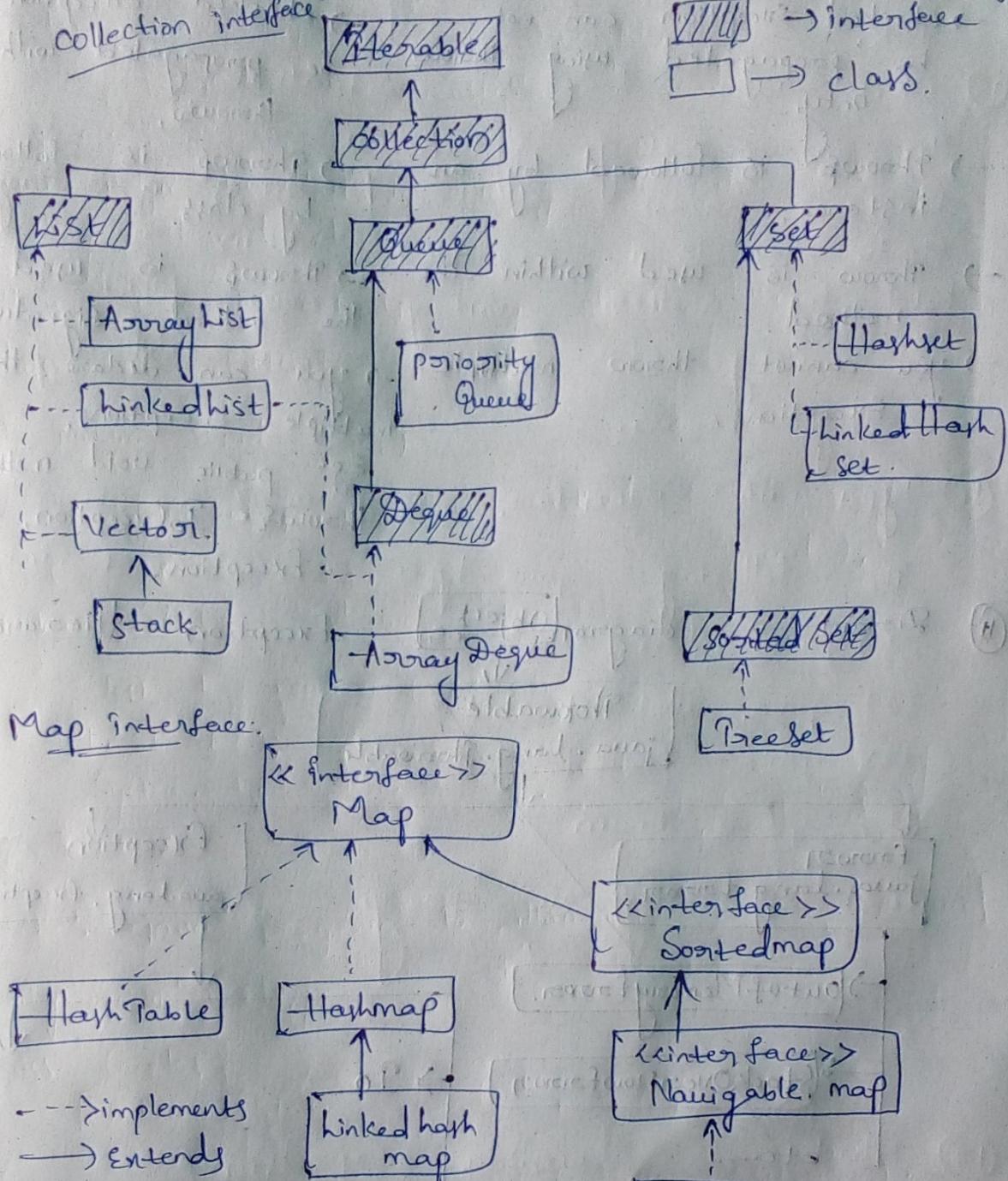
⇒ life cycle of a Thread:

A thread can be in one of the five states. According to Sun, there is only 4 states in thread life cycle in java. New, Runnable, non Runnable and terminated. There is no running state.

→ The life cycle of a thread in java is controlled by jvm. The java thread life cycle is as follows:

- (1) New
- (2) Runnable
- (3) Running
- (4) Non Runnable (Blocked).
- (5) Terminated.

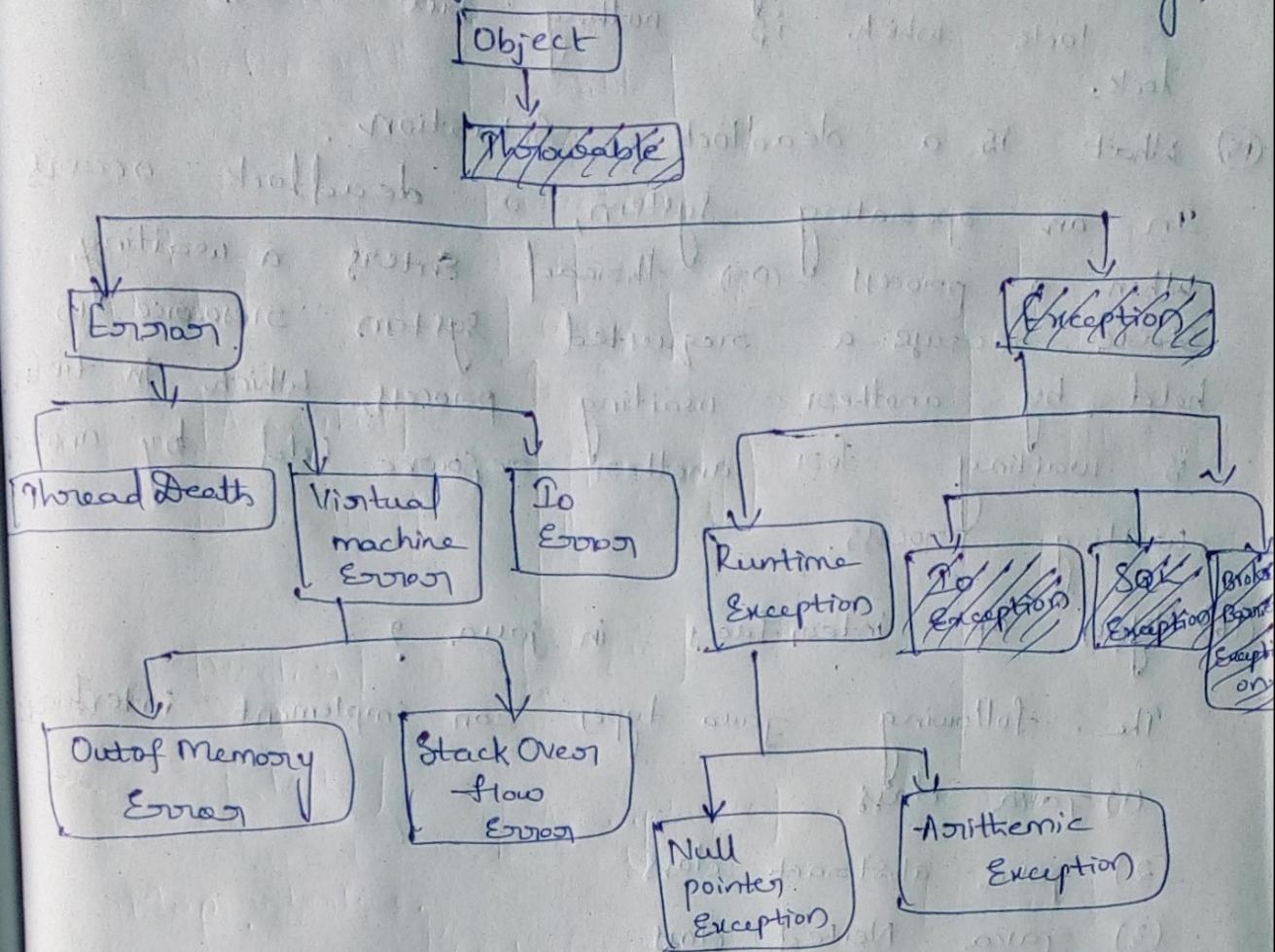
⑩ Draw a diagram for collection hierarchy (including map on the side).



⑪ What is the difference between throw and throws keyword?

- 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.

⑫ Draw a diagram for exception hierarchy?



checked exception \ compile time exception.

unchecked exception \ runtime exception.

⑬ How to make ArrayList synchronized?

→ In order to get a synchronized list from an ArrayList, we use the synchronized list method in Java. The collections synchronized list (List<T>) method accepts the ArrayList as an argument and returns a thread safe list.

⑭ Types of locks in Java threads.

In synchronization, there are 2 types of locks on threads:

→ Object level lock: Every object in java has a unique lock. whenever we are using synchronized keyword, then only lock concept will come in the picture.

→ class level lock: Every class in java has a unique lock which is nothing but class level lock.

(15) What is a deadlock situation.

In an operating system, a deadlock occurs when a process (or) thread enters a waiting state because a requested system resource is held by another waiting process, which in turn is waiting for another resource held by another waiting process.

(16) Types of interfaces in java?

The following java types can implement interface

(1) Java class.

(2) Java abstract class.

(3) Java Nested class

(4) Java Enum

(5) Java Dynamic proxy.

(17) What is Lambda Expression?

→ Lambda Expressions were added in java 8.

A Lambda Expression is a short block of code

which takes in parameters and returns a value

Lambda Expressions are similar to methods, but they do not need a name and they can be implemented right in the bodies of a method.

Q18) How to handle null pointer exception without using  
~~try~~<sup>bad</sup>. try-catch block (or) throw and throws  
keyword.

- A) If your object's reference equals to null, a null pointer exception will be thrown. Instead, consider using the static storing value of method which doesn't throw any exception and points "null" in case the function's argument equals to null.