Department of Computer Science and Engineering

Object Oriented Programming Through Java (25CS303)

Worksheet

UNIT-4: MULTITHREADING, COLLECTIONS

A. Multiple Choice Questions

1. Which class or interface must be extended or implemented to create a thread in Java?

   A) Thread class or Runnable interface

   B) Process class

   C) Task interface

   D) Applet class

   Answer: A

2. Which method is used to start the execution of a thread in Java?

   A) run()

   B) start()

   C) execute()

   D) init()

   Answer: B

3. Which method contains the entry-point code for a thread's execution?

   A) start()

   B) main()

   C) run()

   D) init()

   Answer: C

4. Which method is used to check whether a thread is still running?

A) isAlive()

B) isRunning()

C) active()

D) checkAlive()

Answer: A

5. Which method causes the current thread to wait until another thread finishes its execution?

   A) wait()

   B) join()

   C) sleep()

   D) yield()

   Answer: B

6. Synchronized methods in Java are used to prevent:

   A) Memory overflow

   B) Thread deadlock

   C) Race conditions / Concurrent data corruption

   D) Compilation errors

   Answer: C

7. Which collection class allows dynamic resizing and maintains insertion order?

   A) Array

   B) ArrayList

   C) HashSet

   D) TreeSet

   Answer: B

8. Which collection implementation does NOT allow duplicate elements?

   A) ArrayList

   B) Vector

C) TreeSet

D) LinkedList

Answer: C

9. Which interface represents key-value pairs in the Java Collections Framework?

A) Collection

B) Set

C) Map / HashMap

D) List

Answer: C

10. Which interface is used to traverse through a collection element by element?

A) Iterator

B) Comparator

C) Enumeration

D) Collector

Answer: A

11. Which interface is used to define custom sorting logic for objects?

A) Runnable

B) Comparator

C) Iterator

D) Comparable

Answer: B

12. Which collection class maintains elements in a sorted ascending order?

A) Vector

B) ArrayList

C) TreeSet

D) HashMap

Answer: C

13. What is the legacy synchronized counterpart of ArrayList in Java?

    A) LinkedList

    B) Vector

    C) HashSet

    D) Hashtable

    Answer: B

14. Which method of the Object class is used to notify a waiting thread to wake up?

    A) resume()

    B) notify()

    C) wake()

    D) start()

    Answer: B

15. What is the minimum and maximum priority value a thread can have in Java?

    A) 0 and 10

    B) 1 and 10

    C) 1 and 5

    D) 0 and 100

    Answer: B

B. Fill in the Blanks

1. Every Java application has at least one thread called the **main** thread.
2. A thread can be created either by extending the **Thread** class or implementing the **Runnable** interface.
3. The **start()** method allocates resources and calls the thread's run() method.
4. The **isAlive()** method returns true if a thread has been started and has not yet terminated.
5. The **join()** method allows one thread to wait for the completion of another.
6. Multi-threaded access to shared resources is controlled using the **synchronized** keyword.
7. Inter-thread communication relies on the wait(), notify(), and **notifyAll()** methods defined in the Object class.

8. The **ArrayList** class provides a dynamically resizing array implementation of the List interface.
9. A collection that contains unique elements and maintains no specific order is **HashSet**.
10. The **TreeSet** class stores unique elements in a sorted, ascending order.
11. Data stored in a **HashMap** consists of key-value pairs.
12. An object of the **Iterator** interface is used to step through elements of a collection one by one.
13. Custom ordering of objects can be implemented using the **Comparator** interface.
14. The **Vector** class is a synchronized legacy list implementation in java.util.
15. Suspending and resuming thread execution can be controlled programmatically using thread state management methods.