

Course No : SWE 4412                      College of Engineering                      Student No: \_\_\_\_\_

Course Title: Concurrent and real-time programming                      Midterm Exam First Term 2014/2015                      Student Name: \_\_\_\_\_

Exam Time: 1 Hour                      Eng. Ibrahim Al-Sharif                      Date: 20-11-2014

No of Questions: 4                      Total Grade: 20                      Try to Answer: All

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**1- State if the following statements True Or False: (5 marks )**

- i. Concurrent programs work normally on multi-core (    )
- ii. In soft real-time systems there is no explicit deadline response time(    )
- iii. A concurrent process is a parallel activity that can be performed at the same time as other concurrent processes (    ).
- iv. Notify method guarantee executing thread directly (    )
- v. Resume method instructs the JVM to add the interrupted thread to the set of runnable threads(    )

**2- Choose The Correct Answer(s): ( 5 marks )**

**i. Concurrency is:**

- a) Programming as the simultaneous execution of (possibly related) computations.
- b) a way to structure a program by breaking it into pieces that can be executed independently.
- c) techniques for dealing with communication and synchronization between parallel entities.
- d) many calculations are carried out simultaneously.

**ii. The IllegalThreadStateException is thrown when:**

- a. an attempt is made to get the exit value of a non-terminated Process.
- b. a null pointer is passed to the stop method.
- c. the wait, notify, or notifyAll methods are called by a thread that has not locked the associated object.
- d. an attempt is made to place a thread into a thread group (via the Thread constructor) and the thread group has already been destroyed

**iii. Thread-compatible.**

- a) Instances of the class provide no synchronization.
- b) Instances of the class should not be used in a concurrent environment even if the caller provides external synchronization.
- c) Instances of the class either have methods that are thread-safe or have methods that are called in sequence with the lock held by the caller.
- d) Instances of the class are constant and cannot be changed.

**iv. Is concurrent programs problem:**

- a) Synchronization.
- b) Interference.
- c) Starvation.
- d) Parallelism.

**v. Safety in concurrent programming means that:**

- (a) Concurrent activities are able to make progress and do not suffer from deadlocks or starvation.
- (b) Concurrent activities do not interfere with each other and cause data corruption.
- (c) Resources acquired by a concurrent activity cannot be forcibly taken away from it by another activity.
- (d) None, of the above.

**3- Solve the following: (5 marks )**

- a. Why do we need concurrent programming?
- b. How deadlocks happens?list.
- c. What is advantages of ExecutorService?list and explain.
- d. Talk about Strengths and Limitations of the Java Concurrency Model.
- e. Why do we need synchronization?

**4- What does this program do? (5 marks )**

<pre>public class Main {     public static void main(String[] args) {         Worker w1 = new Worker("Worker1");         Thread th1 = new Thread(w1);         Thread th2 = new Thread(w1);         th1.start();         th2.start();     } }</pre>	<pre>public class Worker implements Runnable {     int Counter;     String name;     public Worker(String name) {         this.name = name;     }     @Override     public void run() {         for (Counter = 0; Counter &lt; 10; Counter++) {             System.out.println(name + " " + Counter);         }     } }</pre>
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