

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

1) Analyze the following code.

1) _____

```
// Test.java: Define threads using the Thread class
import java.util.*;

public class Test {
    private Stack stack = new Stack();
    private int i = 0;

    /** Main method */
    public static void main(String[] args) {
        new Test();
    }

    public Test() {
        // Start threads
        new Producer().start();
        new Consumer().start();
    }

    class Producer extends Thread {
        public void run() {
            while (true) {
                System.out.println("Producer: put " + i);
                stack.push(new Integer(i++));
                synchronized (stack) {
                    notifyAll();
                }
            }
        }
    }

    class Consumer extends Thread {
        public void run() {
            while (true) {
                synchronized (stack) {
                    try {
                        while (stack.isEmpty())
                            stack.wait();
                        System.out.println("Consumer: get " + stack.pop());
                    }
                    catch (InterruptedException ex) {
                        ex.printStackTrace();
                    }
                }
            }
        }
    }
}
```

}

- A) The program has a logic error because the lock obtained by the synchronized block for notifyAll in the Producer class is stack and it should be this (i.e., synchronized (this) { notifyAll(); }).
- B) The program creates two threads: one to add data to the stack and the other to get data from the stack.
- C) The program will throw an exception because the notifyAll() method in the Producer class is not invoked from the stack object.
- D) The program has a compilation error on the notifyAll() method in the Producer class because it is not invoked from the stack object.

2) Which of the following statements are true?

2) _____

- A) A blocking queue causes a thread to block when you try to remove an element from an empty queue.
- B) The BlockingQueue interface provides the synchronized put and take methods for adding an element to the head of the queue and for removing an element from the tail of the queue,
- C) A blocking queue has a capacity.
- D) The BlockingQueue interface is the base interface for all concrete blocking queue classes.
- E) A blocking queue causes a thread to block when you try to add an element to a full queue.

3) Which of the following statements are true?

3) _____

- A) A timer is a source component that fires an ActionEvent at a 'fixed rate.'
- B) In general, threads are more reliable and responsive than timers.
- C) You can use a timer or a thread to control animation.
- D) The timer and event-handling run on the same event dispatcher thread. If it takes a long time to handle the event, the actual delay time between two events will be longer than the requested delay time.

4) Which method on a condition should you invoke to wake all waiting threads?

4) _____

- A) condition.signalAll();
- B) condition.signal();
- C) condition.wakeAll();
- D) condition.wake();

5) How do you create a condition on a lock?

5) _____

- A) Condition condition = Lock.getCondition();
- B) Condition condition = lock.getCondition();
- C) Condition condition = lock.newCondition();
- D) Condition condition = Lock.newCondition();

6) Which of the following method is a static in java.lang.Thread?

6) _____

- A) join()
- B) sleep(long)
- C) start()
- D) run()
- E) setPriority(int)

7) Which of the following statements are true?

7) _____

- A) When wait() is invoked, it pauses the thread and releases the lock on the object simultaneously. When the thread is restarted after being notified, the lock is automatically reacquired.
- B) An exception would occur if no thread is waiting on the object when the notify() method is invoked on the object.
- C) The notify() method can wake only one waiting thread.
- D) The wait(), notify(), and notifyAll() methods must be invoked from a synchronized method or a synchronized block.

8) You can use the _____ method to force one thread to wait for another thread to finish.

8) _____

- A) yield()
- B) suspend()
- C) sleep(long milliseconds)
- D) stop()
- E) join()

9) Analyze the following code:

9) _____

```
public class Test implements Runnable {  
    public static void main(String[] args) {  
        Test t = new Test();  
        t.start();  
    }  
  
    public void run() {  
    }  
}
```

- A) The program compiles, but it does not run because the start() method is not defined.
- B) The program compiles and runs fine.
- C) The program does not compile because the start() method is not defined in the Test class.
- D) The program compiles, but it does not run because the run() method is not implemented.

10) You can use the _____ method to temporarily release time for other threads.

10) _____

- A) suspend()
- B) stop()
- C) sleep(long milliseconds)
- D) yield()

11) You should always invoke the unlock method in the finally clause.

11) _____

- A) true
- B) false

12) Which of the following statements are true?

12) _____

- A) The javax.swing.SwingUtilities.invokeLater method runs the code in the event dispatcher thread and doesn't return until the event-dispatching thread has executed the specified code.
- B) GUI event handling is executed in the event dispatcher thread.
- C) The javax.swing.SwingUtilities.invokeAndWait method runs the code in the event dispatcher thread.
- D) The javax.swing.SwingUtilities.invokeLater method creates a thread.

13) Analyze the following code:

13) _____

```
public class Test implements Runnable {  
    public static void main(String[] args) {  
        Thread t = new Thread(this);  
        t.start();  
    }  
  
    public void run() {  
        System.out.println("test");  
    }  
}
```

- A) The program compiles fine, but it does not print anything because t does not invoke the run() method.
- B) The program compiles and runs fine and displays test on the console.
- C) The program does not compile because this cannot be referenced in a static method.
- D) None of the above.

14) Which of the following methods in the Thread class are deprecated?

14) _____

- A) resume();
- B) suspend();
- C) stop();
- D) yield()

15) Suppose there are three Runnable tasks, task1, task2, task3. How do you run them in a thread pool with 2 fixed threads?

15) _____

- A) ExecutorService executor = Executors.newFixedThreadPool(3); executor.execute(task1); executor.execute(task2); executor.execute(task3);
- B) new Thread(task1).start(); new Thread(task2).start(); new Thread(task3).start();
- C) ExecutorService executor = Executors.newFixedThreadPool(2); executor.execute(task1); executor.execute(task2); executor.execute(task3);
- D) ExecutorService executor = Executors.newFixedThreadPool(1); executor.execute(task1); executor.execute(task2); executor.execute(task3);

16) You can obtain the server's hostname by invoking _____ on an applet.

16) _____

- A) getCodeBase().hostName()
- B) getCodeBase().getHostName()
- C) getCodeBase().host()
- D) getCodeBase().getHost()

17) When a client requests connection to a server that has not yet started, _____.

17) _____

- A) the client encounters a fatal error and must be terminated
- B) the client is blocked until the server is started
- C) java.net.BindException occurs
- D) java.net.ConnectionException occurs

18) To create an InputStream on a socket s, you use _____.

18) _____

- A) InputStream in = s.getInputStream();
- B) InputStream in = new InputStream(s);
- C) InputStream in = s.obtainInputStream();
- D) InputStream in = s.getStream();

19) When creating a client on a server port that is already in use, _____.

19) _____

- A) java.net.BindException occurs
- B) the client can connect to the server regardless of whether the port is in use
- C) the client is blocked until the port is available
- D) the client encounters a fatal error and must be terminated

- 20) To obtain an `ObjectInputStream` from a socket, use _____. 20) _____
A) `socket.getObjectInputStream()`
B) `socket.getInputStream()`
C) `socket.getObjectStream()`
D) `socket.objectInputStream()`
E) `new ObjectInputStream(socket.getInputStream());`
- 21) You can invoke _____ on a `Socket` object, say `socket`, to obtain an `InetAddress` object. 21) _____
A) `socket.InetAddress();` B) `socket.retrieveInetAddress();`
C) `socket.getInetAddress();` D) `socket.obtainInetAddress();`
- 22) To obtain an `ObjectOutputStream` from a socket, use _____. 22) _____
A) `socket.getObjectStream()`
B) `socket.getObjectOutputStream()`
C) `socket.objectOutputStream()`
D) `new ObjectOutputStream(socket.getOutputStream())`
E) `socket.getOutputStream()`
- 23) Which of the following expressions must be true if you create a thread using `Thread = new Thread(object)?` 23) _____
A) `object instanceof Runnable` B) `object instanceof Thread`
C) `object instanceof Applet` D) `object instanceof Frame`
- 24) Which method on a condition should you invoke to causes the current thread to wait until the condition is signaled? 24) _____
A) `condition.wait();` B) `condition.waited();`
C) `condition.await();` D) `condition.waiting();`
- 25) Which of the following statements are true? 25) _____
A) A synchronized statement can be used to acquire a lock on any object, not just this object, when executing a block of the code in a method.
B) A synchronized instance method acquires a lock on the object for which the method was invoked.
C) A synchronized instance method acquires a lock on the class of the object for which the method was invoked.
D) A synchronized statement is placed inside a synchronized block.
- 26) Which of the following methods can be used to return a permit to a Semaphore s? 26) _____
A) `return()` B) `release()` C) `add()` D) `send()`
- 27) When creating a server on a port that is already in use, _____. 27) _____
A) the server is created with no problems
B) the server encounters a fatal error and must be terminated
C) the server is blocked until the port is available
D) `java.net.BindException` occurs
- 28) The client requests a connection to a server by using which of the following statements? 28) _____
A) `Socket s = serverSocket.accept();` B) `Socket s = new Socket(ServerName);`
C) `Socket s = new Socket(ServerName, port);` D) `Socket s = serverSocket.getSocket();`

29) Analyze the following code:

29) _____

```
public class Test implements Runnable {  
    public static void main(String[] args) {  
        Test t = new Test();  
    }  
  
    public Test() {  
        Thread t = new Thread(this);  
        t.start();  
    }  
  
    public void run() {  
        System.out.println("test");  
    }  
}
```

- A) The program compiles fine, but it does not run because you cannot use the keyword this in the constructor.
- B) The program has a compilation error because t is defined in both the main() method and the constructor Test().
- C) The program compiles and runs and displays test.
- D) The program compiles and runs and displays nothing.

30) The _____ method in the InetAddress class returns the IP address.

30) _____

- | | |
|---------------------|-------------------|
| A) getIP() | B) getAddress() |
| C) getHostAddress() | D) getIPAddress() |