

Due Feb 15 at 7:30pm

Points 25

Questions 20

Available Feb 15 at 6:30pm - Feb 15 at 7:30pm about 1 hour

Time Limit 45 Minutes

Instructions

Quiz 1



Home



Modules



Resources

Answer all questions.

Attempt History

	Attempt	Time	Score
LATEST	Attempt 1	43 minutes	20.5 out of 25

❗ Correct answers will be available Feb 19 at 2:17am - Feb 19 at 2:59am.

Score for this quiz: **20.5** out of 25

Submitted Feb 15 at 7:17pm

This attempt took 43 minutes.

Incorrect

Question 1

0 / 1 pts

Replicating data makes a system more resilient and available. What major issues must a system with replicated data handle in order to keep the replicas consistent?

- ☒ Concurrent updates only.
- ☐ Concurrent updates, network partitions, and sharks biting through cables.
- ☐ Concurrent updates and network partitions.
- ☐ Network partitions only.

Incorrect - Concurrent updates and network partitions are the problems that turn your hair grey.

Incorrect

Question 2

0 / 1 pts

Before organizations such as banks and retail stores opened their businesses to the Internet, why was capacity planning in terms of the maximum number of users a system must support relatively

simple?

-
- ☐ Slow network connections such as modems were a bottleneck
-
- ☐ The maximum number of users for the system could be accurately predicted.
-
- ☐ Web servers were slow, which naturally limited the number of concurrent requests a system needed to handle.
-
- ☒ Systems had to handle relatively little data

Incorrect - Only internal users can access the system.Hence capacity can be accurately predicted.

Question 3

1 / 1 pts

Making a scalable system highly available requires:

-
- ☐ Scaling out the system and making sure the client application code is error free and does not crash.
-
- ☐ Using commercial cloud-based services which can make sure a system is always available at no cost.
-
- ☒ Scaling out the system's components and handling inevitable failures.
-
- ☐ Scaling up the system.

Correct - Scaling out and handling failures are key to high availability.

Question 4

1 / 1 pts

Modern businesses collect and analyze massive amounts of data. What does this data enable these businesses to do?

- ☐ Sell data about customers to foreign countries without their knowledge.
- ☐ Build bigger data centers.
- ☒ Turn data into knowledge for a better customer experience and profit.
- ☐ Store more information about customers for at least 10 years.

Correct - Analyzing data can optimize business processes.

Question 5

1 / 1 pts

Why is a consistent, fast response time for users important in scalable systems?

- ☐ Fast response times allow users to multitask more and interact with more web sites at once.

☒ Studies have shown that rapid response times are a major factor in attracting and keeping users.

☐ Fast response time systems are less expensive to build system resources and hence are cheaper to operate.

☐ Systems with fast response times are more fun to build and hence help keep smart engineers at the companies.

Correct - Fast response times make more money!

Question 6

1 / 1 pts

Concurrency is needed in many systems for the following reasons:

☐ Concurrent systems are easier to test

☐ Concurrency makes it easier to write programs

☒ Increasing application performance and exploiting multicore processors

☐ Concurrency reduces the load on the CPU and memory

Correct!

Question 7

1 / 1 pts

If a program has a race condition, which of the following are true?

- ☐ The program sometimes produces the correct results.
- ☒ All the 3 options listed here
- ☐ Running the program with identical inputs can produce different results.
- ☐ The program is hard to debug.

Correct!

Question 8

1 / 1 pts

In the following, class NamingThread simply prints out the string passed to its constructor and exits. Given the code below, what will the program output be?

```
public class ThreadStartOrderExample {
```

```
public static void main(String arg[]) {  
  
    Thread th1 = new Thread (new NamingThread("Pep the Great")) ;  
  
    Thread th2 = new Thread (new NamingThread("Mourinho the tool"));  
  
    Thread th3 = new Thread (new NamingThread("grrr")) ;  
  
    System.out.println ("Ready to roll");  
  
    th1.start();  
  
    th2.start();  
  
    th3.start();  
  
    System.out.println ("main thread exiting " + Thread.currentThread());  
  
    }  
}
```

Ready to roll

Mourinho the tool

grrr

Pep the Great

☐ main thread exiting thread0

Ready to roll

grrr

Mourinho the tool

Pep the Great

☐ main thread exiting thread0

Ready to roll

Pep the Great

Mourinho the tool

grrr

☐ main thread exiting thread0

☒ It is impossible to predict.

Correct!

Question 9

1 / 1 pts

Is this class thread safe?

```
public class Factorizer extends GenericServlet implements Servlet {  
    public void service(ServletRequest req, ServletResponse resp) {  
        BigInteger i = extractFromRequest(req);  
        BigInteger[] factors = factor(i);  
        encodeIntoResponse(resp, factors);  
    }  
}
```

☒ It sure is! Perfectly threadsafe.

☐ It is only threadsafe if run on a different server than the calling classes.

☐ No - multiple threads calling this class will cause a race condition.

☐ It is only threadsafe if it is called by one client at a time.

Correct. This class is stateless and hence threadsafe.

Question 10

2 / 2 pts

Look at the code below. Which server threading model does this code implement?

```
public class ThreadedServer {  
    public static void main(String[] args) throws IOException {  
        ServerSocket socket = new ServerSocket(80);  
        while (true) {  
            final Socket connection = socket.accept();  
            Runnable task = new Runnable() {  
                public void run() {  
                    handleRequest(connection);  
                }  
            };  
        }  
    }  
};
```

```
        new Thread(task).start();  
    }  
}  
  
private static void handleRequest(Socket connection) {  
    // request-handling logic here  
}  
}
```

- ☐ Fixed size thread pool
- ☐ thread per database connection
- ☒ thread per client request
- ☐ Varying size thread pool

Correct!

Partial

Question 11

1 / 2 pts

Which of the following are disadvantages of the thread per request model? Choose all that apply.

- ☒ It results in considerably more network traffic.

☐ It is not able to effectively exploit multicore CPUs due to thread affinity.

☒ Each thread uses additional memory, which can lead to OutOfMemory exceptions under high loads.

☒ It incurs overheads on every request for thread creation and destruction.

Partial

Question 12

1 / 2 pts

Which of the following are true about Java Executors? Choose all that apply.

☒ Executors have hooks for getting statistics, management, and monitoring information

☒ Executors tightly couple task submission and task execution.

☐ Executors support synchronous task execution.

☒ Executors support different task execution policies.

Question 13

1 / 1 pts

Which of the following statements is **NOT** true about locks in concurrent systems?

☒ Locks must always be acquired in a deterministic order.

☐ Placing a lock around a resource serializes access to that resource.

☐ A lock can only be held by one thread.

☐ All threads must first acquire a lock and then release the lock when they have completed their operations.

Correct!

Question 14

2 / 2 pts

[Select]



are more lightweight than

[Select]



because

they share the same address space and code and data segments

Answer 1:

threads

Answer 2:

processes

Correct!

Question 15

2 / 2 pts

deadlock occurs when threads acquire locks in an order such that none of the threads can make further progress.

Answer 1:

deadlock

Answer 2:

none

Correct!

Question 16

1 / 1 pts

Using queues can increase responsiveness for update operations

☒ True

☐ False

Question 17

1 / 1 pts

Load balancers will always distribute requests randomly to a group of replicated servers

☐ True

☒ False

Question 18

1 / 1 pts

The only effective way to grow a database is to scale up the system to a highly reliable, multi-CPU and disk server

☐ True

☒ False

Partial

Question 19

0.5 / 1 pts

Around 2009, decided they had to move their business systems into the cloud in order to survive.

Answer 1:

netflix

Answer 2:

Amazon Web Services (AWS)

Question 20

1 / 1 pts

According to Little's Law, if my system has 200 clients and the average response time is 0.5 seconds, what is the throughput in requests/second?

☐ 200

☒ 400

☐ 50

☐ 100

Quiz Score: **20.5** out of 25