Software Developer Hiring Questionnaire

## About The Company

[Videology](http://www.videologygroup.com/) is an online advertising company based in Baltimore, MD. We run advertising campaigns for our customers effectively and efficiently. Effective campaign execution means that our customers are guaranteed brand safety when they run their campaigns on our platform, as well as higher return on investment. Efficient campaign execution comes about because of the support built into the platform to eliminate not just routine tasks, but also sophisticated data analysis that often cannot be done quickly enough by humans.

Our company relies on our software platform not just for campaign execution, but also for other company-wide functions. This platform is a high-performance, always-available, low-latency, high-throughput platform built on top of open-source technologies. We are looking to hire smart, creative software engineers who have hands-on high performance experience, and who have programmed in a cutting-edge Java environment for several years.

## About This Questionnaire

You received this questionnaire because you inquired about software development careers with Videology. To be considered for a position, please answer the questions on the pages that follow. You may type your answers directly into the document. Use as many pages as necessary.

The questions are not intended to be “gotcha” questions. If you need to make reasonable assumptions to provide an answer, let us know what those assumptions are. You are welcome to consult whatever resource you like – books, web, friends – as long as you can claim to yourself honestly that you solved the problem.

## Your Contact Details

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## Your Links

If you would like to share links to your website or to your previous projects and accomplishments, please mention them below. Include a sentence or two explaining the significance of each.

## Telephone Directory

Suppose I have a very long list of alphabetically-sorted unique names, along with exactly one phone number next to each name. The list is very long, containing ~10M names and numbers. Given a name, how would you find the associated number without hitting disk every time? (Okay to hit disk for one-time pre-processing.)

For the pre-processing, get all data from the disk and cache (the alphabetically sorted unique names and phone numbers) in a Map preferably LinkedHashMap as it’s faster to iterate (search).

Using Map Collection cause of key value pair, key being the unique names and value being the numbers.

Say LinkedHashMap<String, int>

Given a unique name, first will search through the LinkedHashMap and return the number.

## Java Signature

Write down the signature of a Java method that will take in a word and return a bunch of words that are synonyms of the input word. The implementation of the method is irrelevant.

public Set<String> method(String word){

}

Elaborate on the choices you made when selecting the type for the return value. Specifically, what benefits does choosing this type over another give you?

Set<String> return type can have unique (non-repetitive) synonyms.

“Set” Collection doesn’t allow any duplicate objects.

## Power Of 2

Implement a method / function that takes an int n as input and returns a boolean, whose value is true, if and only if n is a power of 2. Pseudocode is sufficient.

public boolean method(int n){

}

Implement a second algorithm for the same problem.

## Storing Trees

Suppose you had a tree structure, where each node contains a geographic name (e.g., continent, country, state, etc.), and each node can have many children but exactly one parent. What database schema would you use to store such a structure? Given a particular node, how would you enumerate all of that node’s siblings?

## Faulty Program

What’s wrong with the program below?

public static scrollDown (integer a)

{

(a = 0) ? scrollDown(100) : scrollDown(a-1);

}

main(int arg1, arg2)

{

if (arg2 <= 0)

if (arg2 < 0)

print("Too small.")

else

print("Just right.")

scrollDown(arg1, "start");

}

## Adding Two Numbers

Write a Java program to add two numbers.

Anticipate edge-case problems and future requirements for this program, and explain how you will adapt.

## Joint Membership

Given two long lists of integers, A and B, use whatever tool/program you like to list out:

* All elements present in both lists (elements must be present in list A and list B)
* All elements present in exactly one list, but not the other (“in A but not in B” as well as “in B but not in A”)
* All elements present in any list, but discarding duplicates

## Mean Time

Write an algorithm to find the mean (average) of an extremely large list of numbers. The list could contain trillions or quadrillions of numbers, but each number is (relatively) manageable, e.g., in the hundreds, thousands or millions.

## Anagrams

How would you determine if one string is an anagram of another (ignoring whitespace, case and punctuation)? For example, “A man’s rag” and “anagrams” are anagrams.

## Persistence

Given a class like the one below, suggest some ways to store thousands of instances of it on disk. Augment the class with whatever you need.

public class Superhero

{

private String name;

private Date debut;

private int numVillainsFought;

private short numAlterEgos;

private boolean masked;

private boolean female;

private boolean retired;

}

## Technologies

For each of the technologies below, place an X in the column that best describes your level of experience with it.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Technologies | Just Googled it / Have not used | Used 2+ years ago | Used it actively recently | Patched it |
| Hibernate / JPA |  |  |  |  |
| JSON |  |  |  |  |
| MySQL |  |  |  |  |
| InfoBright |  |  |  |  |
| Spring |  |  |  |  |
| Spring MVC |  |  |  |  |
| jQuery / Ext JS / Flot |  |  |  |  |
| Eclipse / IntelliJ |  |  |  |  |
| JMS / ActiveMQ / RabbitMQ |  |  |  |  |
| Unix / Linux command-line |  |  |  |  |
| Perl / awk / shell scripts |  |  |  |  |
| Ant / Maven / make |  |  |  |  |
| CVS / SVN / Perforce / … |  |  |  |  |
| Jenkins / Hudson / CruiseControl / … |  |  |  |  |
| Cassandra / Redis / MongoDB / memCached |  |  |  |  |
| Tomcat |  |  |  |  |
| JUnit |  |  |  |  |
| JaxB |  |  |  |  |
| AWS / Cloud Computing |  |  |  |  |
| Graphite |  |  |  |  |
| Nagios |  |  |  |  |