Test Instructions

There are 3 parts in this test:

Algorithms and data structures
Java, OOP and whatnot
and Web

You only have 30 mins to complete. You will be asked about your answers and you will have the chance to elaborate more on them, if necessary.

*Write all your answers in **english** as if you were responding an email from a colleague. If you ran out of space, mark the question to elaborate (verbally) later in the conversation.*

Algorithms and data structures part

1- Write an algorithm to determine if a number is prime or not

2- Write an algorithm to determine the sum of consecutives numbers in an interval A and B, inclusive. A and B could be as large as 100000000.

3- Write an algorithm to sort in non-descending order an array of integers

4- What is the difference between a graph and a tree

5- What is the difference between Breadth-first-search and Depth-first search?

6- When would you use dkjistra algorithm?

7- How long, in function of N and M, would the following algorithm take?

```
for(i=0;i*i<N;i++)
  for(j=0;j<M;j++)
    s+=j%i;
```

8- How would you classify the following algorithm?:

```
int search(int A[], int key, int imin, int imax)
{
  while (imax >= imin)
    {
      int imid = midpoint(imin, imax);
      if (A[imid] < key)
        imin = imid + 1;
      else if (A[imid] > key)
        imax = imid - 1;
      else
        return imid;
    }
  return -1;
}
```

a) binary search
b) ternary search
c) breadth first search
d) mid search

Java, OOP, Backend, and such

Adding an example to your answers counts toward your favor.

1- What are Java Generics and Java Collections

2- Explain and provide an example of Polymorphism in OOP

3- Difference between an Java interface and an Java abstract class

4- What will be printed out at the end?.

```java
public class Test {
        public static void main(String[] args) {
                int a=0;
                a++;
                try {
                        a/=0;
                        a+=a;
                        throw new Exception();
                } catch (Exception e) {
                        a++;
                }finally{
                        a++;
                }
                System.err.println(a++);
        }
}
```

5- Give example of Java varargs.

6- What is Maven and how can I use it in my project.

7- Write all the git commands you remember or use the most.

8- What is MVC in your own words.

9. If you were in charge of establishing the architecture of a middleware application, how would you go about it? What technology would you use and why?
You know it's an amazon-like web application, with purchasing and checkout
You know your maximum number of request per second will be 10000.

10. What are the problems you've faced when scaling a web application.

11. What have you used spring for?

12. Explain DI and/or IoC in Spring

Web Part

1- Explain REST and its difference with RESTful.

2- How have you used javascript closures before, if so?

3- What are global variables? How are they declared? What are the problems with using globals?

4- Do you have a JavaScript framework preference? What are your thoughts on using frameworks?

5- In your opinion what's the difference between AngularJS or Backbone or CoffeScript.

6- Mention one or two JS framework you admire/love/use, and why?

5- What is your preferred CSS precompiler/extension. Show an example of it.

7 What are web workers and web sockets?

8 How do you draw shapes in web?

9 What is one way to animate objects in web?