**Test Taker Full Name:**

**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

9 - Write the solution in paper.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Dado un numero x, podemos definir p(x) como el producto de los dígitos de x. Podemos entonces formar una secuencia x, p(x), p(p(x))… La profundidad de x es entonces definida como el índice del primer numero de un digito en la secuencia. Por ejemplo, usando 99, tenemos la secuencia 99, 81, 8. De esta manera la profundidad de 99 es 2. Tu recibirás **x,** y tu debes retornar su profundidad.  **Input**  La primera línea del INPUT comienza con un número M indicando el número de casos (1<=M<=100), M líneas le siguen.  - Cada línea tendrá un entero x (0<=x<=2,000,000,000).  **Output**  profundidad en un entero. **Example Cases**  |  |  | | --- | --- | | Input | Output | | 99 | 2 | | 268 | 4 | | 6 | 0 | |

**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?.

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.

12. Have you implemented sharding successfully in a previous project?

**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 Have you run build tasks on frontend code. What tool did you use?