Full Stack Developer - Screening Questions

Name: Blake Mason

General Questions

The following questions are designed to test your knowledge and logic skills across a wide number of areas.

Question 1

What would be the result after the following pseudo-code is executed?

```
I = 7
A = 2
WHILE I > 0
BEGIN
  A = A * 2
  I = I - 1
END
PRINT A
```

Answer: 256

Question 2

Briefly describe the difference between a HTTP GET and HTTP POST request. Why might you use one over the other?

Answer: Client app will generally use HTTP GET to request data from a server (e.g. a web page, images, files etc.) and use HTTP POST to send data to a server (e.g. client fills out and submit a form, uploaded to backend server and processed, stored etc). It is actually possible to send data with GET requests however the norm is to use POST for a client submitting data.

Question 3

Briefly describe at least two methods by which two processes on the same machine could communicate.

Answer:
1. Two nodejs programs running on separate ports could communicate by opening a websocket connection and pass continuous data between each other without interruption.
2. One process could write data to a folder location known by another. The other process can intermittently monitor that directory for changes and read data on change. (Very crude but for a simplistic database on a local server could be useful OR if the processes aren't always running simultaneously)

Question 4

What would be the result after the following pseudo-code is executed?

```
A = 1
I = 10
DO
  A = A + A
  I = I + 1
WHILE I > 0
PRINT A
```

Answer: An infinite loop with output "2, 4, 8, 16, 32 etc. etc.". Eventually lead to a system crash if not terminated.

Question 5

What is the effect of running the following command?

```
tail -f /var/log/syslog
```

Answer: Pass.

Question 6

What is the correct JavaScript syntax to change the content of the HTML element below?

```
<p id="demo">Leroy Jenkins was a young fool who changed hearts and
minds</p>
```

a) `#demo.innerHTML = "Hello World!";`

b) `document.getElementById("demo").innerHTML = "Hello World!";`

c) `document.getElement("p").innerHTML = "Hello World!";`

d) `document.getElementByName("p").innerHTML = "Hello World!";`

Answer: b

Question 7

What part of the string would match the regular expression?

Input string	`kekekekellloooooooooooooolzergrush`
Regular Expression	`^[ke]+[a-z]{4}`

Answer: Pass

Question 8

Which of the following CSS classes would apply a background to all `h3` elements?

a) `h3.all { background-color:#FFFFFF; }`

b) `h3 { background-color:#FFFFFF; }`

c) `all.h3 { background-color:#FFFFFF; }`

Answer: b

Question 9

Briefly describe the difference between TCP and UDP. Why might you use one over the other?

Answer: TCP is far more reliable than UDP for data transmission however is slower. It guarantees packets are received in the order they are sent. UDP is less reliable but much quicker and is typically used for video streaming and game development because dropped, and out of order packet receipt, is less important than data transmission speed. TCP is great for general web applications.

SQL

The following section will ask you to write several database queries. Your answers may use vendor-specific extensions to the SQL standard, however they should be avoided if possible.

Question 10

Write an SQL query to create a table named `staff` including the following information:

- `name` - string type, length up to 255 characters
- `employee_type` - string type, length exactly 1
- `tax_file_number` - string type, length exactly 9, unique, optional

Answer: Unfortunately I've had little experience with SQL to date but as a guess it may look somewhat like a JSON object below with some additional parameters.

```
{
    name: string(255)
    employee_type: string(1)
    tax_file_number: string(9)
}
```

Question 11

Write an SQL query to show the number of rows in the `product` table

Answer: Again, little experience but would guess something similar to

```
{
        product (rows length)
}
```

Question 12

Write an SQL query to show the number of rows in the `product` table where the `widget_type` has the value `dongle`

Answer: Pseudo code guesses for the win!

```
{
        product ((rows where widget_type=dongle) length)
}
```

Question 13

Write an SQL query to insert the following row into the `product` table

sku	widget_type	name	description	price	in_stock
GM6000	dongle	Gruntmaster 6000	Software upgradable to the Gruntmaster 9000	12.45	Y

Answer: Pseudo

```
{
        product append
        {
                sku: GM600
                widget_type: dongle
                name: Gruntmaster 6000
                description: Software upgradable to the Gruntmaster 9000
                price: 12.45
                in_stock: Y
        }
}
```

Question 14

Write an SQL query to set the `in_stock` column to `N` for all items in the `product` table where the `widget_type` is `sprocket`

Answer: Pass

Question 15

Given the following, write an SQL query to show how many customers with type `individual` have a corresponding attribute named `date_of_birth`?

- table **`customer`** exists with columns
  - `customer_id` (numeric type)
  - `name` (string type)
  - `type` (string type)

- table **`customer_attribute`** exists with columns
  - `customer_id` (numeric type)
  - `attribute_name` (string type)
  - `value` (string type)

Answer: Pass

Question 16

Marketing is running a promotion and would like you to find the first 10 business customers that signed up during the promotional period of July 1st and August 31st. Write an SQL query to accomplish this which uses an attribute named `signup_date`.

Answer: Pass

Short Answer

Question 17

You have been asked to look at a PHP web application that is running slowly. The application runs on a Linux server using MySQL database and Apache web server.

Outline what general steps you might take to ensure the application can handle traffic loads, including any questions you might ask.

Answer: First review the web app itself for any potential memory leaks or expensive loops (depending on complexity of course). Once happy with that setup some general logs to monitor unique client connections, any recurring connections from the same IPs (in case of (un)intended DDOS attacks) as well as general time each connection spends connected. If no fould play then assess the CPU load during normal traffic hours and an upgraded server may be required.

Question 18

A client has asked you to complete a proof of concept / prototype application. Your first estimate to the client indicated the task would take 4 weeks, however after getting started you realise the task is much simpler and will only take 2 weeks.

Choose the most appropriate course of action from the list below and briefly explain your choice:

a) Deliver the solution to the client early and stop work.

b) Spend the additional 2 weeks developing tests and documentation for the solution.

c) Ask the customer for more features to implement in the remaining time.

Answer: It could be any of the three depending on the client. Your choice should rely on communication with the client and their needs. Lean towards (a) if they just want to see a bare bones application working in as little time as possible. (b) if it is a more fleshed out prototype they intend to redistribute to others for demonstration. (c) if it is a very exploratory prototype with unclear scope/spec.

Programming Exercises

Programming exercises refer “Question 19-22.zip”