Junior Software Developer

Technical Test

Version 1.2

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ã Beauceron 2020

527 Queen Street, Suite 110

Fredericton, NB E3B 1B8 Canada

Phone 1-877-516-9245

Revision, Review and Approval History

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| **Revision Number** | **Author** | **Date** | **Changes Made** | **Approved by** | **Approval date** |
| 1.0 | Stella Metran | 2021-07-09 | Initial |  |  |
| 1.1 | Stella Metran | 2021-07-13 | Backend question reviewed | Ethan Gaudet and Nuzhat Khan | 2021-07-13 |
| 1.2 | Stella Metran | 2021-08-12 | SQL + HTML and CSS section reviewed to clarify that only one record was required to be loaded in the tables.  HTML & CSS section reviewed to clarify that only the Values session of the code has to be created. | Ethan Gaudet and Nuzhat Khan | 2021-08-12 |

Hello!

Thank you for taking the time to apply for our Junior Software Development position! We’re thrilled that you’d like to join us here at Beauceron.

As you know, as a Junior Software Developer at Beauceron, you’re expected to have the following skillset:

* You have professional development experience or education in HTML, JavaScript, and CSS.
* You’re proficient in at least one or more server-side programming languages, for example: Perl, PHP, C#, NodeJS, or Java, etc.​
* You are a quick learner and interested in working with different languages as required.
* You have a good understanding of relational databases and are proficient in SQL.​
* You work well independently and as part of a team.​
* Nice to have (but not required): Bootstrap, jQuery, REST APIs, Agile/Scrum software development practices, Code Versioning (Git/GitHub), Secure software development methodologies (OWASP Top 10), and Microservices (Docker / Kubernetes)

After the Values Alignment interview, we’d like you to move to the second step of the hiring process, which consists of answering the technical test below.

You’ll have two calendar days to send the test back to us. If we don’t hear from you after this period, we’ll assume you have withdrawn your application, so if you need more time to get this test done, let us know in advance!

Most of the exercises below will have more than one way to get to the same result and you’ll be evaluated by getting to the desirable result and by the way you chose to get to the result. Explain your code if you believe it is necessary.

We wish you all the best!­

## **SQL + HTML and CSS**

You were asked to create a new Beauceron’s employee database to load the following Excel file:



Create SQL scripts to:

* Create a new database Beauceron
* Create as many tables as needed, primary keys, foreign keys etc.
* Add the required constraints and/or indexes
* Create a statement to load the data
* You do not need to load directly from the excel sheet. Load one record for each table only.

You want the data to be normalized, knowing the company will continue to grow.

CREATE TABLE employees (

id SERIAL PRIMARY KEY,

name VARCHAR(80) NOT NULL,

email VARCHAR(80) NOT NULL,

birthday DATE,

date\_joined\_company DATE NOT NULL,

department\_id INT,

food\_restrictions\_id INT,

base\_id INT NOT NULL,

FOREIGN KEY (department\_id)

REFERENCES departments,

FOREIGN KEY (base\_id)

REFERENCES bases,

FOREIGN KEY (food\_restrictions\_id)

REFERENCES food\_restrictions

);

INSERT INTO employees(name, email, birthday, date\_joined\_company, department\_id, food\_restrictions\_id, base\_id)

VALUES

('Billie Jean', 'billie.jean@universal.com', '1970-06-30', '2019-07-18', 1,2,1),

('Florentine Pogen', 'florentine.pogen@universal.com', '1978-06-03', '2015-07-18', 1,2,1),

('Mary Banilow', 'mary.banilow@universal.com', '1978-06-03', '2015-07-18', 2,1,1),

('Arthur Russell', 'arthur.russell@universal.com', '1962-07-03', '2012-06-09', 3,1,2),

('Billie Holiday', 'billie.holiday@universal.com', '1931-07-29', '2020-07-11', 2,3,3)

;

CREATE TABLE departments (

id SERIAL PRIMARY KEY,

department VARCHAR(30) );

CREATE TABLE bases (

id SERIAL PRIMARY KEY,

base VARCHAR(30) NOT NULL);

CREATE TABLE food\_restrictions (

id SERIAL PRIMARY KEY,

restrictions VARCHAR(30)

);

INSERT INTO bases(base)

VALUES ('Fredericton'),

('Ontario'),

('Remote');

INSERT INTO departments(department)

VALUES ('Sales'),( 'IT'), ('Customer Care'),('Technical Support'), ('Accounting' );

INSERT INTO food\_restrictions(restrictions)

VALUES ('Vegan'),('Vegetarian'),('Nut Free'),('Lactose Intolerant');

CREATE UNIQUE INDEX employee\_idx ON employees (id);

-- DROP TABLE employees;

-- DROP TABLE bases;

-- DROP TABLE departments;

-- DROP TABLE food\_restrictions;

The company is having a party!!

Create a query to select all employees having anniversaries in July.

The data must be presented in the following format:

|  |  |  |  |
| --- | --- | --- | --- |
| Name | Department | Years in the company | Date Joined Company |
| Wendy Casey | Sales | 3 | 7/13/2018 |
| Alicia Stevens | IT | 3 | 7/16/2018 |
| Valerie Simpson | Customer Care | 2 | 7/9/2019 |
| Lenard Banks | Accounting | 1 | 7/20/2020 |
| Lynn Cannon | Accounting | 2 | 7/11/2019 |
| Stacie Richards | IT | 2 | 7/1/2020 |

SELECT employees.name,

departments.department,

date\_part('year', CURRENT\_DATE) - EXTRACT(YEAR FROM employees.date\_joined\_company) as years\_at\_company,

employees.date\_joined\_company

FROM employees, departments

WHERE employees.department\_id = departments.id

AND EXTRACT(MONTH FROM employees.date\_joined\_company) = 7;

Given the following array of employees from the list above, write a JavaScript function to create and populate a <select> HTML element. Each item should display a string containing the name of the employee along with the date they joined the company. Each item should have a value of the employee’s department. The items should be sorted by the first name of the employee.

const employees = [

{

name: "Wendy Casey",

department: "Sales",

numYears: 3,

dateJoined: "7/13/2018",

},

{

name: "Alicia Stevens",

department: "IT",

numYears: 3,

dateJoined: "7/16/2018",

},

{

name: "Valerie Simpson",

department: "Customer Care",

numYears: 2,

dateJoined: "7/9/2019",

},

{

name: "Lenard Banks",

department: "Accounting",

numYears: 1,

dateJoined: "7/20/2020",

},

{

name: "Lynn Cannon",

department: "Accounting",

numYears: 2,

dateJoined: "7/11/2019",

},

{

name: "Stacie Richards",

department: "IT",

numYears: 2,

dateJoined: "7/1/2020",

},

];

var select = document.createElement("select");

select.name = "pets";

select.id = "pets";

for (const val of employees.sort((a, b) => a.name.localeCompare(b.name))) {

var option = document.createElement("option");

option.value = val.department;

option.text = val.name + " " + val.dateJoined;

select.appendChild(option);

}

var label = document.createElement("label");

label.innerHTML = "Choose your pets: ";

label.htmlFor = "pets";

document.getElementById("container").appendChild(label).appendChild(select);

We also need to celebrate people having birthdays in July, but we don’t want to expose their age. Create a SQL script to present the list of employees as follows, ordered by Birthday date. You can choose between creating the script in SQL or JS:

|  |  |  |
| --- | --- | --- |
| Name | Department | Birthday |
| Zachary Aguirre | Sales | 4-Jul |
| Roslyn Cherry | IT | 7-Jul |
| Jan Watson | Sales | 17-Jul |
| Graciela Bauer | Technical Support | 22-Jul |
| Wendy Casey | Sales | 23-Jul |

SELECT employees.name,

departments.department,

TO\_CHAR(employees.birthday :: DATE, 'dd-Mon')

FROM employees, departments

WHERE employees.department\_id = departments.id

AND EXTRACT(MONTH FROM employees.birthday) = 7;

We’ll be going back to the office soon, and we need to plan the desks allocation and rotation.

Create a script to present how many employees of each department are currently based in Fredericton. Order your records from the departments with more employees to the ones with less employees.

SELECT department, count(department) number\_employees

FROM employees

LEFT JOIN departments

ON departments.id = employees.department\_id

LEFT JOIN bases

ON bases.id = employees.base\_id

WHERE base = 'Fredericton'

GROUP BY department

ORDER BY number\_employees DESC;

## **HTML & CSS**

Below is the current layout of the [company’s values](https://www.beauceronsecurity.com/about) on our website and we are considering changing the layout and colors. Write the HTML and CSS to achieve this.

Change the orientation of the below section from horizontal to vertical, replace the icons with images of your choice, change the background color, and change the text color.

You do not have to copy this section from the website.

Suggestion: You can use a tool like <https://codepen.io/pen/> to create and test your code.



/\* change horizontal to vertical. Not sure what has to be changed on parent id yui\_3\_17\_2\_1\_1630161355049\_771 to align text and content below. \*/

.sqs-col-4 {

height: 33.3333%;

}

/\* changing icons. I did this in the DOM directly, see YouTube video. Don't worry the video is private and only viewable through this link! \*/

/\* https://youtu.be/9W1VQAubu9Q \*/

/\* change background colour \*/

#core-values {

background-color: #d2b48c;

}

/\* changing text color \*/

#core-values .sqs-block-content > p {

color: white;

}

## **JavaScript**

Fix the code below to display the following information in an alert box.

*“My name is <your name here>, I live in <your city’s name here> and I’m completing this test on a <today’s weekday>.*

*Today is <mmm dd, yyyy>, the present time is <00:00:00>”*

Example:

“My name is John Doe, I live in Fredericton and I’m completing this test on a Thursday.

Today is July 1, 2021, the present time is 12:05:00”

const person = {

firstName: "Dean",

lastName: "Flanagan",

currentCity: "Fredericton",

};

const today = new Date();

const weekday = new Array(7);

weekday[0] = "Sunday";

weekday[1] = "Monday";

weekday[2] = "Tuesday";

weekday[3] = "Wednesday";

weekday[4] = "Thursday";

weekday[5] = "Friday";

weekday[6] = "Saturday";

var todaysWeekday = weekday[today.getDay()];

function getCurrentTime() {

return today.toTimeString().split(" ")[0];

}

var newLine = "\r\n";

var str1 =

"My name is " +

person.firstName +

" " +

person.lastName +

", I live in Fredericton and I’m completing this test on a " +

todaysWeekday;

var str2 =

"." +

newLine +

newLine +

"Today is " +

today.toLocaleDateString() +

", the present time is " +

getCurrentTime();

alert(str1 + str2);

## **Backend & Problem Solving**

The below code is written in Perl. Please read the code and explain what it’s doing and what the possible outcome would be.

sub print\_gen {

my ($rs1, $rs2);

my ($last) = shift;

$rs1 = sub {

if ($last % 2) {

$last++;

}

else {

$last += 2;

};

print "$last \n";

};

$rs2 = sub {

if ($last % 2) {

$last += 2;

}

else {

$last++

};

print "$last \n";

};

return ($rs1, $rs2);

}

($iter\_1,$iter\_2) = print\_gen(10);

This is a subroutine (method or function in other languages) in perl. It contains two subroutines within its block.

Initially private variables are declared: $rs1 and $rs2 are empty and $last is taken from the arguments passed to the main print\_gen function (by the shift function).

All three private variables are declared at the outermost block so should be accessible in the inside blocks.

It looks as though the rs variables are assigned methods to check for divisibility by 2 and they either add one or two to the number. If these methods were actually executed, they would I guess keep going on infinite loop to keep taking turns printing or adding one or two.

However this never happens as the print\_gen returns $rs1 and $rs2 without those variables’ subroutines (which are not named) to be called at any point. So nothing is printed to the console when running this as a .pl script.

## **Test Review**

Please answer the following questions related to this test:

1. What resources did you use to help you answer this test?

Google, DuckDuckGo as search engines. StackoverFlow, MDN, Postgres data types, Perl docs, examples elsewhere like GeeksForGeeks. Postgrestutorial.com a lot for the modeling, foreign keys etc.

1. How long did you take to complete the test?

Between 10 – 15 hours. Longest was to think through the SQL normalization.

1. What was your favorite exercise? And the least favorite? Why?

The SQL queries once I figured out to organize the tables and both the alert and the JavaScript question on the select.

Least favourite was the HTML & CSS.