**Irman Wafi Bin Rosli**

**Case 1 until Case 4 code at my github:**

**Vectolabs is a Smart city and Enterprise IoT solutions company. (http**[**s://ww**](http://www.vectolabs.com/))**w.v**[**ectolabs.com/)**](http://www.vectolabs.com/)) **This position will require you to work in a team and individually to develop custom IoT solutions. Our successful software developer candidates have strong fundamentals and understanding of IoT ecosystems and data structure & algorithm.**

1. **We are in CoPlace 2, Cyberjaya, Selangor. Although software development work can be done remotely, this job may require to be present at the office from time to time. Please confirm that you can come to the office during normal work hours when required.**

Yes, I am able to commute to the CoPlace 2 office in Cyberjaya during standard work hours whenever required. I understand the value of in person collaboration and am happy to accommodate on site needs.

1. **Optional: Please attach your academic transcripts if you already have it handy (non-official printed from University’s site is acceptable).**

My academic transcripts are attached to the application email.

1. **Please answer the following questions based on the use cases provided below:** **Case 1**

You have an IoT application that runs on Cloud, it manages sensors at farm fields and collects information of land moisture and temperature of the environment. The owner has a new idea and created a formula that calculates the farm’s nutrition. To do that, you have to be able to pull weather data and generate daily trends of weather in one month and create relation with average moisture & average temperature daily. The relation factor will be on day of week.

Formula = (wheater\_today \* average\_temperature\_today) / average\_moisture\_today.

Whether score :

Rainy = 1, Sunny = 2, Cloudy = 3, Windy = 4, Snowy = 5.

Questions :

1. Design an ERD (Entity Relation Diagram) with proper normalization technique applied that is suitable for the application mentioned above.

I split the data into 4 normalized tables, I could say 3NF:

Location, Device, Reading, WeatherLog, and optionally NutrientIndex actually.

A screenshot of a computer

AI-generated content may be incorrect.

One Location can have many Devices.

One Device can generate many Readings.

One Location has one WeatherLog per day.

Groups readings by date and location

Average temperature from temp\_sensor

Average moisture from moisture\_sensor

Joins with WeatherLog using the same date and location, then formula.

A screenshot of a computer

AI-generated content may be incorrect.

1. Explain the calculation with pseudo SQL.

FOR each day:

SELECT AVG(temperature) FROM readings WHERE date = day

SELECT AVG(moisture) FROM readings WHERE date = day

SELECT weather\_score FROM weather\_log WHERE date = day

nutrient\_index = (weather\_score \* avg\_temperature) / avg\_moisture

STORE nutrient\_index WITH the date

END

**Case 2**

John Aviation runs a company that focuses on drone technology. Now , the company decided to develop a device that is able to send data from the ground to the drone. Due to data needing to be sent over long distances

, the data need to be as small as possible. Required data :

Voltage : 254

Energy: 1450

Current : 1580

Please write a function in any programming language that returns data provided in <= 3 bytes (no 3rd-party library allowed) and a function that reads the converted data back in JSON format.

**Case 3**

Power Motor Industries Sdn Bhd has been acquired by Tesla Motor Inc. Due to acquisition, current practice for calculating hourly employees needs to streamline with Tesla Motor accounting practice. These new rules affect the calculation of overtime for hourly employees.

These new rules require a different rate for each employee based on the year of service and number of overtime hours for the day.

|  |  |
| --- | --- |
| Seniority (year) | multiplier |
| 0 - 1 | 1 |
| 2 - 3 | 1.1 |
| 4 - 5 | 1.2 |
| > 6 | 1.7 |

|  |  |
| --- | --- |
| Overtime (hour) | multiplier |
| 0 - 1 | 2 |
| 2 - 3 | 2.1 |
| > 4 | 3 |

For example, Tajuddin has been an employee for Power Motor since 2019 and he has 2.5 hour of overtime and his hourly rate is RM 20 /per hour.

Number of years = 2 First Hour

(1 \* 1.1) \* 2 \* 20 = 44

Second Hour

(1.5 \* 1.1) \* 2.1 \* 20 = 69.3

Total overtime wages for the day is RM 113.30

Please write a function in any programming language or pseudo-code to determine overtime wages given the number of years of service and overtime hours.

**Case 4 (Optional)**

Create a simple VueJS application that displays the list of the data below and deploy it in any free hosting platform ( preferably free tier AWS or 000webhost) and be able to download the data in CSV format. Please share a url where the page was deployed.

Required data:

|  |  |
| --- | --- |
| Asset name | Department |
| Printer | HR |
| Monitor | IT |
| Barcode Scanner | ACCOUNT |