cadence™

October 2021 - DTM Tools

Disclaimer:

This test **is eliminatory**. You are allowed to use any reference material, software or even learn from other people. Some questions do not have a right/wrong orientation, so follow your interpretation. During the interview, we are going to use some concepts discussed here.

PART 1: Web Development & Automation

1) You are responsible for developing a Linux Machines Monitor using PHP and MySQL. You will need a main table called **Machine** where every row represents a real Linux machine and contains detailed information about it.

a) How would you construct the DB model? Draft an ER model. Include all attributes you judge necessary.

b) A Web page will be necessary to handle the Machines information, using a data table and web forms. Write a detailed description of how you would insert machines on the database, query it to retrieve the needed information, instantiate the objects from the table and fill the HTML table considering a page filter form. Include **all** the code used to build the page using pure PHP for the backend and HTML, CSS, JavaScript or React for the frontend.

c) Another responsibility is the creation of a process to monitor the Linux machines periodically. You need to check if all machines are up, but only some of them need to have their usage monitored. The monitoring consists of:

i. Get the list of machines that need testing
ii. Check if each machine is up
iii. Check the logged users
iv. Check the running processes
v. Check CPU and memory usage

Explain in detail how you would retrieve the machine list, how you would execute each of those tests (commands, flows, etc.) and how you would store the results in the database (refer to the DB model asked on question 1a). Do you think there is any other relevant information to monitor?

2) You are responsible for a critical system and needs to update a software package with minimum downtime and impact. How would you proceed with the upgrade? Explain the migration plan, covering any possible challenges.

PART 2: Python

3) A certain system needs a password validator module, which upon receiving a string with a password and a list with the requirements of this password, returns whether the password is valid or not. The list of the password requirements is composed of tuples containing the following:

- First value:
  - `LEN` – password length
  - `LETTERS` – # of letters
  - `NUMBERS` – # of numbers
  - `SPECIALS` – # of special characters
- Second value: <, > or =
- Third value: an integer number

Ex.:

```
req = [('LEN', '=', 8), ('SPECIALS', '>', 1)]
```

`req` specify a password with eight characters and at least two special characters.

Write a Python 3 script to solve this problem and the unit test to validate it, without installing external packages.

PART 3: Quality Assurance

4) Imagine that you are responsible for guaranteeing the quality of a software that is constantly updated. How would you guarantee that those updates will not affect parts of the software that were working correctly before?