### Multiple Choice Questions

#### Python

1. Which of the following is used to output text in Python?

a) echo   
b) print   
c) console.log  
d) printf

1. What is the result of the following Python code?

numbers = [1, 2, 3, 4, 5]

result = [n\*2 for n in numbers if n/2 in [1,2,3,4,5]]

print(result)

a) [2, 4, 6, 8, 10]   
b) [2, 4, 6, 8]  
c) [4, 8]  
d) [2, 4]

1. Consider the following Flask application:

from flask import Flask, request, jsonify

app = Flask(\_\_name\_\_)

@app.route('/sum', methods=['POST'])

def sum\_numbers():

data = request.get\_json()

numbers = data.get('numbers', [])

result = sum(numbers)

return jsonify({'sum': result})

if \_\_name\_\_ == '\_\_main\_\_':

app.run()

If a POST request is made to /sum with the following JSON payload:

{"numbers": [1, 2, 3, 4, 5]}

What will be the JSON response?

a) {"result": [1,2,3,4,5]}   
b) {"sum": 15}   
c) {"numbers": 15}   
d) {"sum": "sum[1,2,3,4,5]"}

#### Bash

1. Which command is used to display the current working directory?

a) pwd   
b) cwd   
c) dir   
d) ls

1. What does the following Bash script do?

for file in \*.txt

do

echo "Processing $file"

done

a) Deletes all .txt files   
b) Processes each .txt file and prints the filename  
c) Renames all .txt files  
d) Counts all .txt files

1. Given the following Bash script, what will be the output if the script is executed?

#!/bin/bash

sum=0

for i in {1..5}

do

sum=$((sum + i))

done

echo "Sum is $sum"

if [ $sum -gt 10 ]; then

echo "Sum is greater than 10"

else

echo "Sum is 10 or less"

fi

a) Sum is 15; Sum is greater than 10   
b) Sum is 10; Sum is 10 or less  
c) Sum is 15; Sum is 10 or less   
d) Sum is 5; Sum is greater than 10

#### Git

1. Which command initializes a new Git repository?

a) git init   
b) git start  
c) git create  
d) git new

1. What is the difference between git pull and git rebase?

a) git pull fetches and merges changes from a remote repository, while git rebase changes the base of your commits.   
b) git pull only fetches changes from a remote repository, while git rebase merges changes.   
c) git pull is used to update your local branch with changes from a remote branch, while git rebase is used to combine multiple commits into one.   
d) git pull updates your local branch by fetching and integrating remote changes, while git rebase applies your local commits on top of another branch's history.

1. How do you merge a branch named feature into the main branch?

a) git branch merge feature   
b) git checkout feature && git merge main   
c) git checkout main && git merge feature   
d) git merge main feature

#### Docker

1. How do you start a **NEW** Docker container?

a) docker run   
b) docker start   
c) docker up   
d) docker go

1. What is the purpose of the EXPOSE instruction in a Dockerfile?

a) To expose ports to host machine  
b) To expose network ports in the container  
c) To expose network ports in the image  
d) To expose environment variables in the image

1. Given the following Dockerfile:

FROM python:3.8-slim-buster

WORKDIR /app

COPY requirements.txt requirements.txt

RUN pip install -r requirements.txt

COPY . .

CMD ["python app.py"]

What will be the result if you build and run this Dockerfile assuming requirements.txt lists the necessary dependencies and app.py exists and is correctly configured?

a) The Docker container will start and run app.py.   
b) The Docker container will fail to build because requirements.txt is missing.  
c) The Docker container will fail to start because CMD is incorrectly specified.   
d) The Docker container will build but fail to run because the working directory is not specified.

#### Docker-Compose

1. How do you scale a service named web to 3 instances using Docker Compose?

a) docker-compose scale web=3   
b) docker-compose up --scale web=3  
c) docker-compose scale --web=3   
d) docker-compose up -d web=3

1. What role does the build directive serve within a service definition in a Docker Compose configuration (docker-compose.yml) file?

a) It specifies the base image for the Docker container.   
b) It configures the runtime environment variables for the service.  
c) It orchestrates the deployment of multiple containers across a distributed cluster.   
d) It instructs Docker Compose to build a Docker image using the Dockerfile located at the specified path.

1. Consider the following docker-compose.yml file:

version: '3.8'

services:

web:

image: nginx

ports:

- "8080:80"

environment:

- NGINX\_HOST=example.com

- NGINX\_PORT=80

app:

build:

context: .

dockerfile: Dockerfile

volumes:

- .:/code

ports:

- "5000:5000"

depends\_on:

- db

db:

image: postgres

environment:

POSTGRES\_PASSWORD: example

volumes:

- db\_data:/var/lib/postgresql/data

volumes:

db\_data:

Which of the following statements is true?

a) The web service will automatically restart if it fails.   
b) The app service will wait for the db service to be ready before starting.   
c) The db service exposes its data directory to the host file system.   
d) The volumes key under the app service defines a named volume.

*Prometheus*

1. What is a time series in Prometheus?

a) A type of graph   
b) A sequence of data points indexed in time order  
c) A configuration file   
d) An alert rule

1. What does Prometheus use to collect metrics from a target?

a) Agents  
b) Exporters   
c) Probes  
d) Collectors

1. What does the following PromQL query mean?

rate(http\_requests\_total{job="webserver"}[5m])

A) It calculates the average rate of HTTP requests received by the "webserver" job over the last 5 minutes.   
B) It calculates the total number of HTTP requests received by the "webserver" job in the last 5 minutes.  
C) It computes the percentage change in HTTP request rate for the "webserver" job over the last 5 minutes.  
D) It retrieves the instantaneous rate of HTTP requests received by the "webserver" job at the current moment.

#### Grafana

1. Which of the following best describes a panel in Grafana?

a) A user interface component for building dashboards   
b) A script for collecting metrics   
c) A data storage backend  
d) A logging tool

1. What type of code is used to define a Grafana dashboard, and how is it typically stored?

a) YAML, in a separate configuration file  
b) JSON, in the Grafana database  
c) JSON, in the Prometheus database  
d) YAML, in the Alertmanager database

1. What is the role of the Data Source in Grafana?

a) To provide the user interface  
b) To store metrics data  
c) To define the connection to the backend where the data is stored  
d) To manage user permissions

### Coding Tasks

#### Task 1: Python Flask and Bash Script

1. Write a simple Python Flask application that will retrive a Chuck Norris joke from an API (https://api.chucknorris.io/jokes/random) and will return the joke when accessed at the root URL (/).
2. Write a Bash script (curl\_flask.sh) that curls the root URL of the Flask application and prints the number of words in the joke.
3. Create a Git repository, commit the Python Flask application (app.py), the Bash script (curl\_flask.sh), and push the repository to GitHub.

#### Task 2: Docker and Docker-Compose

1. Write a Dockerfile for this python script (The script - joke.py fetchs a random joke from an API (e.g., Official Joke API) and print it).

import requests

response = requests.get("https://official-joke-api.appspot.com/random\_joke")

if response.status\_code == 200:

joke = response.json()

print(joke['setup'])

print(joke['punchline'])

else:

print("Failed to fetch joke")

1. Write a docker-compose.yml file to include the Python Flask application, Prometheus, and Grafana services (No need to create a custom configuration file).
2. Configure Grafana to use Prometheus as a data source through the Grafana UI. (add a screen shot of the data sources)
3. Upload the code to GitHub