Microsec Programming Test

Please provide solutions to these questions within **24 hours**. The solutions should be provided in either .sh format, .py format or other relevant formats. Files with extension with .sh should be executable over bash shell, while files with extension .py should be executable on Python3 or Python2. Always provide a test program (client) for testing a server. If any confusion, make your own assumption. If anything else, email me within 10 minutes of receiving this email. If you need more time to solve these questions, please do let me know.

Shell Programming questions:

1. Create a script that recursively downloads a given webpage and finds all hyperlink in that webpage. It should then explore all the hyperlinks and carry doing that in a recursive way. In each of this recursive crawling, it finds all the appearance of the given search word and displays them. Create the script that takes in parameters while execution in the format: ***Format:*** ./script.sh “website_address” “search_word”. ***Example***: ./script.sh www.usec.io Security
2. Create a script that blocks a connection from a given range of IP address for a particular duration. You are allowed to use either IPTables or/and network interfaces. Create the script that takes a file with the list of IP addresses as input and another parameter as duration (in minutes). ***Example:*** ./script.sh “file” 60 Where file contains the IP addresses separated by newline as shown below and 60 minutes is the duration for which these IP addresses won’t be able to connect to any port on the given system. Example content of “file”: 10.21.11.14 202.14.56.22

Python Programming Questions:

1. Write a python socket server program that listens on port 2999. Through this socket program you are able to execute the script that you wrote in Problem 1 of Shell Programming Question above. Make this socket server program a system service which can be controlled by systemctl (like start, stop and restart this socket server). Also write a client socket program for testing it. (In other words, by using a test client program running on one computer, a user is able to connect to another computer socket and execute the script on it.) Please also provide a test program to test it.

DevOps Questions:

1. Build two Docker services. The first service consists of a cronjob which takes current time up to microseconds resolution (in format ‘%Y-%m-%dT%H:%M:%S.%f’) and writes that to **a file** every two minutes.

   The second service reads the content(time) of the **file** which is created by first service and computes the difference between the last time timestamp and the first timestamp also in ‘%Y-%m-%dT%H:%M:%S.%f’ format. This service exposes an external port so

that the service can be called outside of the docker container. Make sure that the services are deployed automatically upon bootup.

2. Write a systemd service that checks if the file has been updated since the last time it checked it and if so, sends a request to the above webservice to compute the difference. The service should ensure that docker is running before it starts and should also start on bootup (given that docker is also up).