Shell Script Practice

1. 建立conda虛擬環境:

   A. 建立pytorch的執行環境 (指令不需寫在一份script)。

```
(pytorch2-gpu) yucheng@yucheng-System-Product-Name:~$ python
Python 3.9.17 (main, Jul  5 2023, 20:41:20)
[GCC 11.2.0] :: Anaconda, Inc. on linux
Type "help", "copyright", "credits" or "license" for more information.
>>>
>>> import torch
>>> torch.cuda.is_available()
True
```

   B. 建立tensorflow的執行環境 (指令不需寫在一份script)。

```
(tf-gpu) yucheng@yucheng-System-Product-Name:~$ python
Python 3.9.17 (main, Jul  5 2023, 20:41:20)
[GCC 11.2.0] :: Anaconda, Inc. on linux
Type "help", "copyright", "credits" or "license" for more information.
>>> import tensorflow as tf
2023-07-10 00:45:59.983796: I tensorflow/stream_executor/platform/default/dso_loader.cc:49] Successfully opened dynamic library libcudart.so.10.1
>>> tf.test.is_gpu_available()
```

```
2023-07-10 00:46:09.106093: I tensorflow/core/common_runtime/gpu/gpu_device.cc:1406] Created TensorFlow device (/device:GPU:0 with 10209 MB memory) -> phy
sical GPU (device: 0, name: NVIDIA GeForce GTX 1080 Ti, pci bus id: 0000:01:00.0, compute capability: 6.1)
True
```

2. 寫一份能達成以下需求的Dockerfile，並以此Dockerfile使用podman建立一個container。

   需求:

   A. 能存取顯卡 (nvidia-smi should work)

   B. 安裝pytorch-gpu

   C. 安裝git、vim、curl、htop、tmux

```
root@636265f34da1:/workspace# python
Python 3.8.12 | packaged by conda-forge | (default, Oct 12 2021, 21:59:51)
[GCC 9.4.0] on linux
Type "help", "copyright", "credits" or "license" for more information.
>>> import torch
>>> torch.cuda.is_available()
True
>>>
[2]+  Stopped                 python
root@636265f34da1:/workspace# git --version
git version 2.25.1
root@636265f34da1:/workspace# htop --version
htop 2.2.0 - (C) 2004-2019 Hisham Muhammad
Released under the GNU GPL.

root@636265f34da1:/workspace# tmux -V
tmux 3.0a
root@636265f34da1:/workspace#
```

3. 寫一份script，輸出當前機器上的顯卡資訊。格式如下圖。

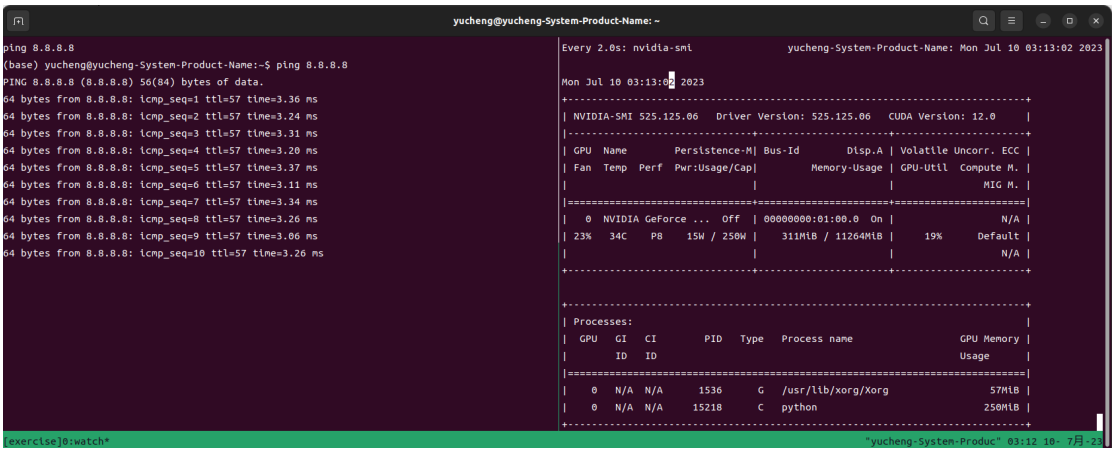
```
(base) NV04% ./gpu_info.sh
Driver Version: 510.85.02
CUDA Version: 11.6
GPUs: 4
1: NVIDIA GeForce GTX 1080 Ti
2: NVIDIA GeForce GTX 1080 Ti
3: NVIDIA GeForce GTX 1080 Ti
4: NVIDIA GeForce GTX 1080 Ti
```

```
(base) NV27% ./gpu_info.sh
Driver Version: 520.61.05
CUDA Version: 11.8
GPUs: 4
1: NVIDIA GeForce RTX 3080 Ti
2: NVIDIA GeForce RTX 3080 Ti
3: NVIDIA GeForce RTX 3080 Ti
4: NVIDIA GeForce RTX 3080 Ti
```

4. 寫一份script，輸出當前機器上的cpu資訊。格式如下圖。

```
(base) NV04% ./cpu_info.sh
Architecture:                    x86_64
CPU(s):                          56
Model name:                      Intel(R) Xeon(R) CPU E5-2683 v3 @ 2.00GHz
```

5. 寫一份自動開啟tmux的script。session名稱是exercise，水平等分成兩個windows，左邊執行ping 8.8.8.8，右邊執行每兩秒刷新一次的nvidia-smi。



6. 計算files資料夾裡所有weight檔大小總和。weight檔固定以.pt結尾，輸出格式如下圖。

```
(base) yucheng@yucheng-System-Product-Name:~$ ./get_weights_size.sh
========================================
file name     size(KB)     size(MB)
========================================
task1.pt     85364930     81.41
task2.pt     85492666     81.53
task3.pt     85748138     81.78
========================================
total     256605734     244.72
```

7. (leetcode 192):

Write a bash script to calculate the frequency of each word in a text file `words.txt`.

For simplicity sake, you may assume:

- `words.txt` contains only lowercase characters and space `' '` characters.
- Each word must consist of lowercase characters only.
- Words are separated by one or more whitespace characters.

Example:

Assume that `words.txt` has the following content:

```
the day is sunny the the
the sunny is is
```

Your script should output the following, sorted by descending frequency:

```
the 4
is 3
sunny 2
day 1
```

8. (leetcode 193):

Given a text file `file.txt` that contains a list of phone numbers (one per line), write a one-liner bash script to print all valid phone numbers.

You may assume that a valid phone number must appear in one of the following two formats: (xxx) xxx-xxxx or xxx-xxx-xxxx. (x means a digit)

You may also assume each line in the text file must not contain leading or trailing white spaces.

Example:

Assume that `file.txt` has the following content:

```
987-123-4567
123 456 7890
(123) 456-7890
```

Your script should output the following valid phone numbers:

```
987-123-4567
(123) 456-7890
```

9. (leetcode 194):

Given a text file `file.txt`, transpose its content.

You may assume that each row has the same number of columns, and each field is separated by the `' '` character.

Example:

If `file.txt` has the following content:

```
name age
alice 21
ryan 30
```

Output the following:

```
name alice ryan
age 21 30
```

10. (leetcode 195):

Given a text file `file.txt`, print just the 10th line of the file.

Example:

Assume that `file.txt` has the following content:

```
Line 1
Line 2
Line 3
Line 4
Line 5
Line 6
Line 7
Line 8
Line 9
Line 10
```

Your script should output the tenth line, which is:

```
Line 10
```

11. 以下是一個顯示進度條的script。

```bash
#!/bin/bash

while :
do
  clear
  for i in {1..20}
  do
    echo -n "*"
    sleep 0.1
  done
  clear
done


```

如何將進度條的*修改成綠色*?

12. 以下是一個輸出費式數列的script。

```
#!/bin/bash

list=(0 1)
for i in `seq 2 11`
do
  list[$i] = list[-1] + list[-2]
done

echo ${list[@]}

```

要如何修改才能使其正常輸出?

13. 以下是一個統計process執行狀態的script。完成以下case中的TODO部分。

```
#!/bin/bash

ALL_PROCESS=$(ls /proc/ | egrep '[0-9]+')

running=0
stopped=0
sleeping=0
zombie=0

for pid in ${ALL_PROCESS[*]}
do
  test -f /proc/$pid/status && state=$(egrep "State" /proc/$pid/status | awk '{print $2}')
  case $state in
    # TODO
    # if $state == "R": running++
    # elif $state == "T": stopped++
    # elif $state == "S": sleeping++
    # elif $state == "Z": zombie++
  esac
done

echo -e "running: $running\nstopped: $stopped\nsleeping: $sleeping\nzombie: $zombie\n"

```

14. 以下是一個檢查機器port狀態的script。

```
#!/bin/bash

HOST=$1
PORT="22 25 80 8080"
for PORT in $PORT;
do
  if echo &>/dev/null > /dev/tcp/$HOST/$PORT; then
    echo "$PORT open"
  else
    echo "$PORT close"
  fi
done

```

上述script中，port是寫死的。如何將其修改成ip和port皆用parse input的形式? 如下圖:

```
(base) NV04% ./port_status_ans.sh 127.0.0.1 80 8080
80 close
8080 open
```

15. 以下是一個檢查ip格式是否正確的script。若格式正確即退出執行，否則繼續輸入。請說明錯誤之處及如何修改。

```
#!/bin/bash

function check_ip(){
  local IP=$1
  VALID_CHECK=$(echo $IP | awk -F. '$1<=255 && $2<=255 && $3<=255 && $4<=255 {print "yes"}')
  if echo $IP|grep -E "^[0-9]{1,3}\.[0-9]{1,3}\.[0-9]{1,3}\.[0-9]{1,3}$" >/dev/null; then
    if [ $VALID_CHECK == "yes" ]; then
      return 0
    else
      echo "$IP not available!"
      return 1
    fi
  else
    echo "Format error! Please input again."
    return 1
  fi
}

while true;
do
    read -p "Please enter IP: " IP
    check_ip($IP)
    [ $? -eq 0 ] && break || continue
done

```

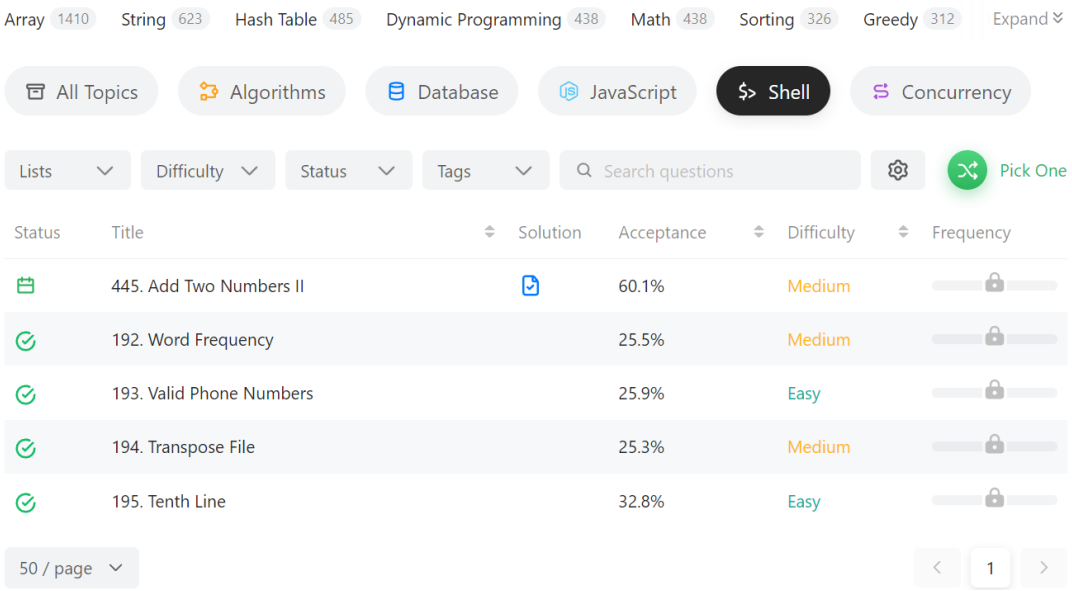
Submission:

檔名: [your_name].pdf

(交一份pdf檔就好)

Q1~Q6: 記錄指令或截圖script檔，並附上在機器上的執行結果，格式如題目附圖。在自己的機器或實驗室機器上都行。

Q7~Q10: leetcode的AC截圖。如下圖:



Q11~Q15: 記錄需要修改的地方及如何修改即可。