

Course: 113-1 Embedded System
Assignment 4: **Advanced Shell Scripting Practice**

Student No:

Student Name:

Assignment Descriptions

1. The shell script should be running on:

- 1.1. Raspberry Pi OS, or
- 1.2. Debian-based linux distributions, or
- 1.3. Virtual machine running Raspberry Pi OS or Debian-based linux distributions.

2. Submission:

- 2.1. Submit homework using the answer sheet provided.
- 2.2. For each practice, a screenshot and source code are both required.
- 2.3. For practice 2, there are 2 screenshots required: the output screenshot, and the backup verification screenshot.

3. Due: 2024/10/20 23:59

Practice 1: System Information (40%)

Create a shell program that prints system information and system resource usages onto terminal.

Example Output from TA:

```
sudo bash sysinfo.sh

SYSINFO

Kernel Information
Linux lstudlo 5.15.0-122-generic #132-Ubuntu SMP Thu Aug 29 13:45:52 UTC 2024 x86_64 x86_64 x86_64 GNU/Linux

CPU Information
Architecture: x86_64
CPU(s): 12
On-line CPU(s) list: 0-11
Model name: 12th Gen Intel(R) Core(TM) i5-12400
NUMA node0 CPU(s): 0-11

CPU Usage
CPU Usage: 0.402888%

Memory Usage (MB)
MemTotal: 31881.70 MB
MemFree: 25526.14 MB
Buffers: 548.68 MB
Cached: 4459.25 MB
SwapCached: 0.00 MB

Disk Usage (MB)
Filesystem 1M-blocks Used Avail Use%
/dev/nvme0n1p2 936738M 21039M 868044M 3%
/dev/nvme0n1p1 1873M 7M 1867M 1%
overlay 936738M 21039M 868044M 3%

Top 5 Processes by CPU Usage
  PID  PPID  CMD                                %MEM  %CPU
 30175  30155  mysqld                               1.3    0.7
170411 170410 bash --rcfile /dev/fd/63      0.0    0.3
 88386      1 /home/lightiichen/apps/payc          0.1    0.1
170410 170330 sshd: lightiichen@pts/3        0.0    0.1
      1      0 /sbin/init                          0.0    0.0

System Uptime
up 1 week, 1 day, 5 hours, 57 minutes

*COMPLETED*
```

1. Create file **sysinfo.sh**
2. Write shell script inside the file.
3. Save the script.
4. Executing the script using **bash**.
5. Take a screenshot of the result.
6. (Optional) burst into laughter.

Specs & Criteria:

1. The shell program should print:
 - 1.1. **Current Timestamp**,
 - 1.2. **Kernel Information**,
 - 1.3. **CPU Information**,
 - 1.4. **CPU Usages**,
 - 1.5. **Memory Usages**,
 - 1.6. **Disk Usages**
 - 1.7. **Top 5 processes currently running, sorted by CPU Usages.**
2. Credits are awarded based on completeness of the shell program, not the formatting or layout of the output. **The output information of each metric doesn't need to strictly match the example.**

Create a shell program that backups contents older than 365 days in system /etc directory.

```
sudo bash backup365.sh
```

BACKUP 365

Starting backup of /etc files older than 365 days...
Backup directory: /root/etc_backup_241013201919
Backup completed successfully!

COMPLETED

- [illegible]

2. Credits are awarded based on completeness of the shell program, not the formatting or layout of the output.

Practice 3: Creative shell scripting. (20%)

Create a creative shell program on your own.

Example Output from TA:

```
sudo bash creative.sh

+-----+
|s|T|u|P|i|D|i|t|y|
+-----+

Welcome to quizzes of sTuPiDiTy !!
Let's get stARtEd!

If students at NTU are all professionals, what does that make students at NTU?
1) Better professionals.
2) Hmm, let's not go there...
3) Not professionals.
4) This is too political!
Make your choice (1-4): 2
Correct! That's absurd! +1 point.

If one duck can light up 10 bulbs, what happens with 100 ducks?
1) Light up 1000 bulbs.
2) Destroy the Earth.
3) Create a black hole.
4) Ducks don't do such things!
Make your choice (1-4): 3
Correct! That's absurd! +1 point.

If you drop soap on the floor, is the floor clean or is the soap dirty?
1) The floor is clean.
2) The soap is dirty.
3) Everything descends into chaos.
4) Ask the soap.
Make your choice (1-4): 3
Correct! That's absurd! +1 point.

Your total score: 3/3
👉 You're now officially sTuPid. Yikes! 🍷

sudo bash creative.sh

+-----+
|s|T|u|P|i|D|i|t|y|
+-----+

Welcome to quizzes of sTuPiDiTy !!
Let's get stARtEd!

If students at NTU are all professionals, what does that make students at NTU?
1) Better professionals.
2) Hmm, let's not go there...
3) Not professionals.
4) This is too political!
Make your choice (1-4): 1
Too logical! No points!

If one duck can light up 10 bulbs, what happens with 100 ducks?
1) Light up 1000 bulbs.
2) Destroy the Earth.
3) Create a black hole.
4) Ducks don't do such things!
Make your choice (1-4): 1
Too logical! No points!

If you drop soap on the floor, is the floor clean or is the soap dirty?
1) The floor is clean.
2) The soap is dirty.
3) Everything descends into chaos.
4) Ask the soap.
Make your choice (1-4): 1
Too logical! No points!

Your total score: 0/3
You are not allowed to join the club.
```

1. Create a file, give it a **cREaTiVe** name.
2. Write shell script inside the file.
3. Save the file.
4. executing it using Bash.
5. Take a screenshot of the result.
6. burst into laughter **cREaTiVe**ly.

Criteria:

1. The shell program should be:
 - 1.1. **Creative**
 - 1.2. **Content-Rich**
 - 1.3. **Do what you want.**
2. Credits are awarded based on **1.richness** ,and **2.creativity** of the shell program. The Example Output is just for reference, please to create your own shell script that does whatever you want.

Guidance and Materials

1. Wondering how to create fancy ascii text?

Check out ASCII Text Art Genrator:

<https://patorjk.com/software/taag/#p=display&f=Graffiti&t=Type%20Something%20>

2. Curious about implementing system monitoring and backup functionalities?
 - 2.1. Think of **shell scripts** as tools that combine various **Linux commands**.
 - 2.2. For sysinfo.sh, try merging linux commands that displays system informations and system resource usages
 - 2.3. For backup365.sh, try merging commands that find & copy files older than 365 days.