

# Homework 2

## One liner script & System Info

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交大資工系資訊中心

Computer Center of Department of Computer Science, NCTU

# HW 2-1: One liner script (40%)

# HW 2-1: One liner script (40%)

- List top 5 processes ranked by cpu utilization rate
- List top 5 processes ranked by memory utilization
- List above users and color them by the rules given later

# HW 2-1: One liner script

List top 5 processes ranked by cpu utilization rate (must greater than 0.5%) (10%)

```
Top Five Processes of WCPU over 0.5
```

PID	command	user	WCPU
843	nrpe3	root	8.10%
879	sshd	root	2.00%
38893	ssh	chuyj	1.00%
70460	ssh	fzhong	0.70%
61006	sshd	yiyuchang	0.60%

# HW 2-1: One liner script

List top 5 processes ranked by memory utilization (20%)

```
Top Five Processes of RES
```

```
PID    command    user      RES
35037  zsh        jbliao   40M
66322  sshd       tzute    31M
66257  sshd       tzute    31M
62932  sshd       yiyuchang 31M
61006  sshd       yiyuchang 31M
```

# HW 2-1: One liner script

- List above users and color them by rules given (10%)
  - If user is root user, paint the text by Green
  - If user is shown only once, paint the text by Yellow
  - If user is shown greater than or equal to two times, paint the text by Red

Top Five Processes of WCPU over 0.5

PID	command	user	WCPU
843	nrpe3	root	8.10%
765	vmtoolsd	root	5.00%
879	sshd	root	2.00%
38893	ssh	chuyj	1.00%
70460	ssh	fzhong	0.70%

Top Five Processes of RES

PID	command	user	RES
765	vmtoolsd	root	106M
35037	zsh	jbliao	40M
66322	sshd	tzute	31M
66257	sshd	tzute	31M
62932	sshd	yyuchang	31M

*We don't care about the order of Bad Users*

Bad Users:

root  
yyuchang  
fzhong  
jbliao  
tzute  
chuyj

# HW 2-1: One liner script

- Your script is limited to one line
  - `;`, `&&`, `||` are not allowed
- Must not use shell variables
- Only two shells, `bash` and `sh`, are allowed
- Must not call interpreters or compiler (such as Python, Ruby...)
- Must not call network tools (such as `curl`, `wget`...)
- If you are not sure whether the tool is allowed, please ask TA on Google group
- *Your script must start with* `top -n max -o res |`

show all processes

order by res

# HW 2-1: One liner script

```
Top Five Processes of WCPU over 0.5
```

PID	command	user	WCPU
843	nrpe3	root	8.10%
765	vmtoolsd	root	5.00%
879	sshd	root	2.00%
38893	ssh	chuyj	1.00%
70460	ssh	fzhong	0.70%

```
Top Five Processes of RES
```

PID	command	user	RES
765	vmtoolsd	root	106M
35037	zsh	jbliao	40M
66322	sshd	tzute	31M
66257	sshd	tzute	31M
62932	sshd	yyuchang	31M

```
Bad Users:
```

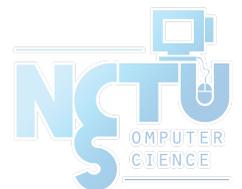
```
root  
yyuchang  
fzhong  
jbliao  
tzute  
chuyj
```

Bonus (10%):

If you can finished this homework  
without **awk**

email:

[ta@nasa.cs.nctu.edu.tw](mailto:ta@nasa.cs.nctu.edu.tw)



# HW 2-2: System Info Panel (60%)

# Freebsd: Dialog (1)

DIALOG(1)

General Commands Manual

DIALOG(1)

## NAME

dialog - display dialog boxes from shell scripts

## DESCRIPTION

Dialog is a program that will let you to present a variety of questions or display messages using dialog boxes from a shell script.

# Freebsd: Dialog (1) - Example 1



# Freebsd: Dialog (1) - Example 2



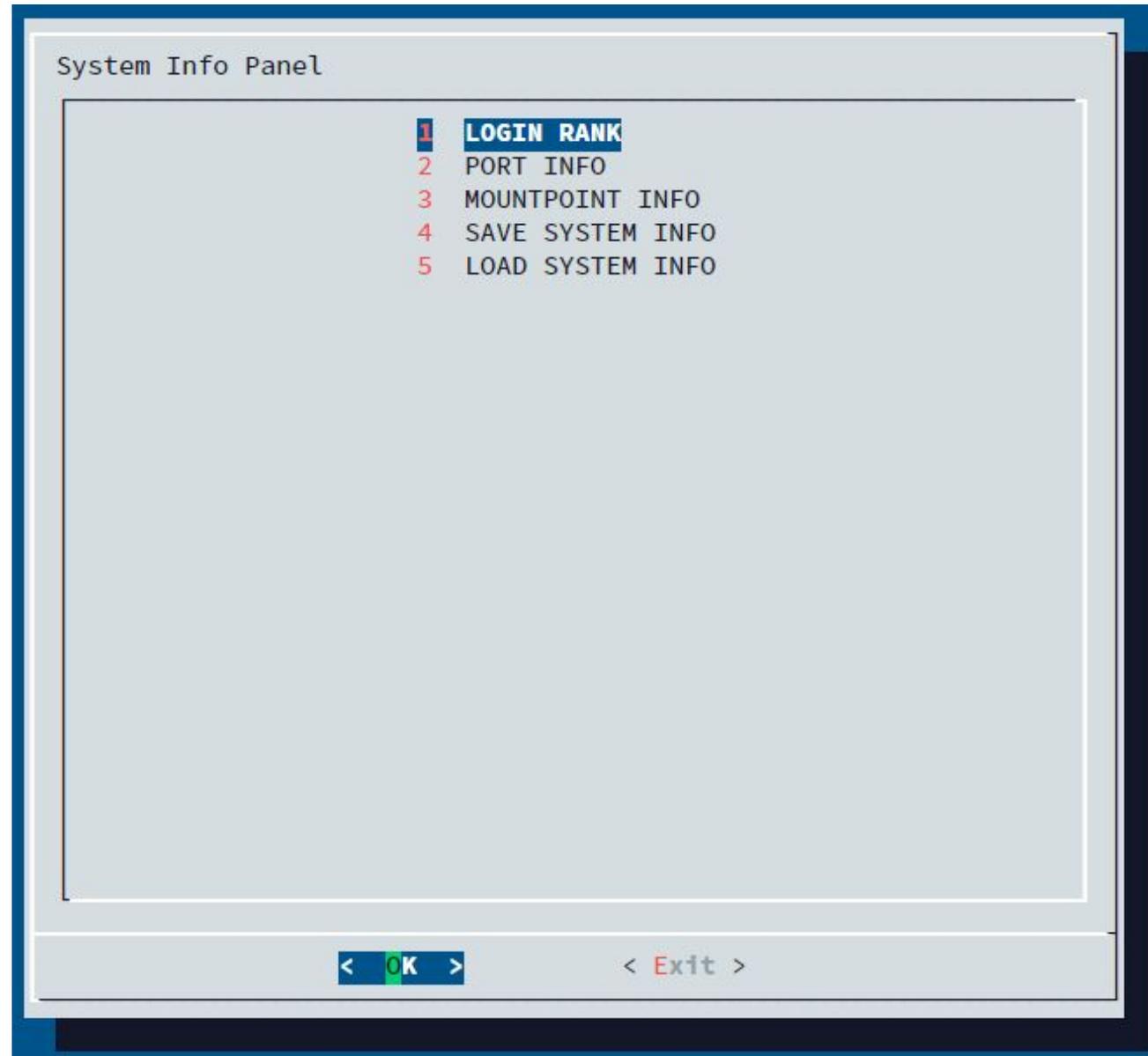
# System Info Panel

- You are a System Admin
- You decided to develop a text-based user interface (TUI) program to help you manage the system
- It comes with several functions
  - After selecting one, use [dialog\(1\)](#) to show system information
  - It has to be beautiful. It has to be formatted output but raw output

# System Info Panel - Grading

- Main Menu & Control Flow (15%)
- LOGIN RANK (5%)
- PORT INFO (10%)
- MOUNTPOINT INFO (10%)
- SAVE SYSTEM INFO (16%)
- LOAD SYSTEM INFO (4%)
- SAVE and LOAD Error Detection (**BONUS 10%**)

# Main Menu (15%)



# Main Menu & Control Flow (10%)

- The main menu shows 5 options (4%)
- There is an Exit option (1%)
- User will return to the main menu after sub-dialog exited (3%)
  - User can navigate to the any sub-dialog without the need to restart the program (2%)

# Main Menu: Return Code (5%)

- Program **Return codes** and stdout:
  - **0** for cancel (program successfully finished) (1%)
    - echo **Exit.** to stdout
  - **1** for Esc (2%)
    - echo **Esc pressed.** to **stderr**
  - **2** for Ctrl + c (2%)
    - echo **Ctrl + C pressed.** to stdout

# LOGIN RANK (5%)

LOGIN RANK		
Rank	Name	Times
1	hywu1337	24
2	tcyuan	8
3	ycchang	6
4	tzute	6
5	root	5

< OK >

# LOGIN RANK (5%)

- List and order five users with highest count of login sessions.
  - No matter the session is still logged in or not.
  - Starting from this month (See: utx.log, last)

Hint: [last \(1\)](#)

Note: No partial credits (本題無部份給分)

# PORT INFO (10%)

PORT INFO(PID and Port)

11636	udp4_*:939
11576	udp4_*:822
4228	udp4_*:756
4168	udp4_*:828
930	udp4_*:614
929	udp4_*:675
907	udp4_*:24577
907	udp4_*:36262
907	tcp4_*:113
894	tcp4_*:7745
880	udp4_*:791
877	tcp4_*:22
841	udp4_*:989
841	tcp4_*:5666
836	tcp4_*:1256
809	udp4_*:123
809	udp4_140.113.235.132:123
809	udp4_10.1.0.32:123
809	udp4_127.0.0.1:123
740	udp4_*:753
740	tcp4_*:753
696	udp4_*:686
696	tcp4_*:635

↓(+)

85%

< OK >      <Cancel>

# PORT INFO (10%)

```
Process Status: 11636
USER: tcyuan
PID: 11636
PPID: 11576
STAT: S
%CPU: 0.0
%MEM: 0.2
COMMAND: sshd
```

< OK >

# PORT INFO: 1 (5%)

- List all process listening on tcp and udp
  - List only ipv4
- Show the `pid` of the process, the protocol used (`tcp4` / `udp4`) and the `address:port` on which the process is listening
- If the list is too long, make it scrollable

Hint: [sockstat \(1\)](#)      Note: No partial credits (本題無部份給分)

# PORT INFO: 2 (5%)

- In the sub-dialog, use `Process Status: <pid>` as title
- Shows only user, pid, ppid, stat, %CPU, %MEM, COMMAND
- After user press ok, return to port info submenu

Hint: [ps \(1\)](#)      Note: No partial credits (本題無部份給分)

# MOUNTPOINT INFO (10%)

MOUNTPOINT INFO	
<b>zRoot/ROOT/default</b>	<b>/</b>
zRoot/tmp	/tmp
zRoot/usr/ports	/usr/ports
zRoot/usr/src	/usr/src
zRoot/var/audit	/var/audit
zRoot/var/crash	/var/crash
zRoot/var/log	/var/log
zRoot/var/tmp	/var/tmp
netapp3:/vol/home/cs	/net/cs
netapp3:/vol/home/faculty	/net/faculty
netapp3:/vol/home/gcs	/net/gcs
netapp4:/vol/mail	/net/mail
netapp3:/vol/csmisc/schedule	/net/schedule
netapp3:/vol/csdata	/net/data

< OK >      <Cancel>

# MOUNTPOINT INFO (10%)

```
zRoot/ROOT/default
Filesystem: zRoot/ROOT/default
Type: zfs
Size: 25G
Used: 11G
Avail: 15G
Capacity: 43%
Mounted_on: /
```

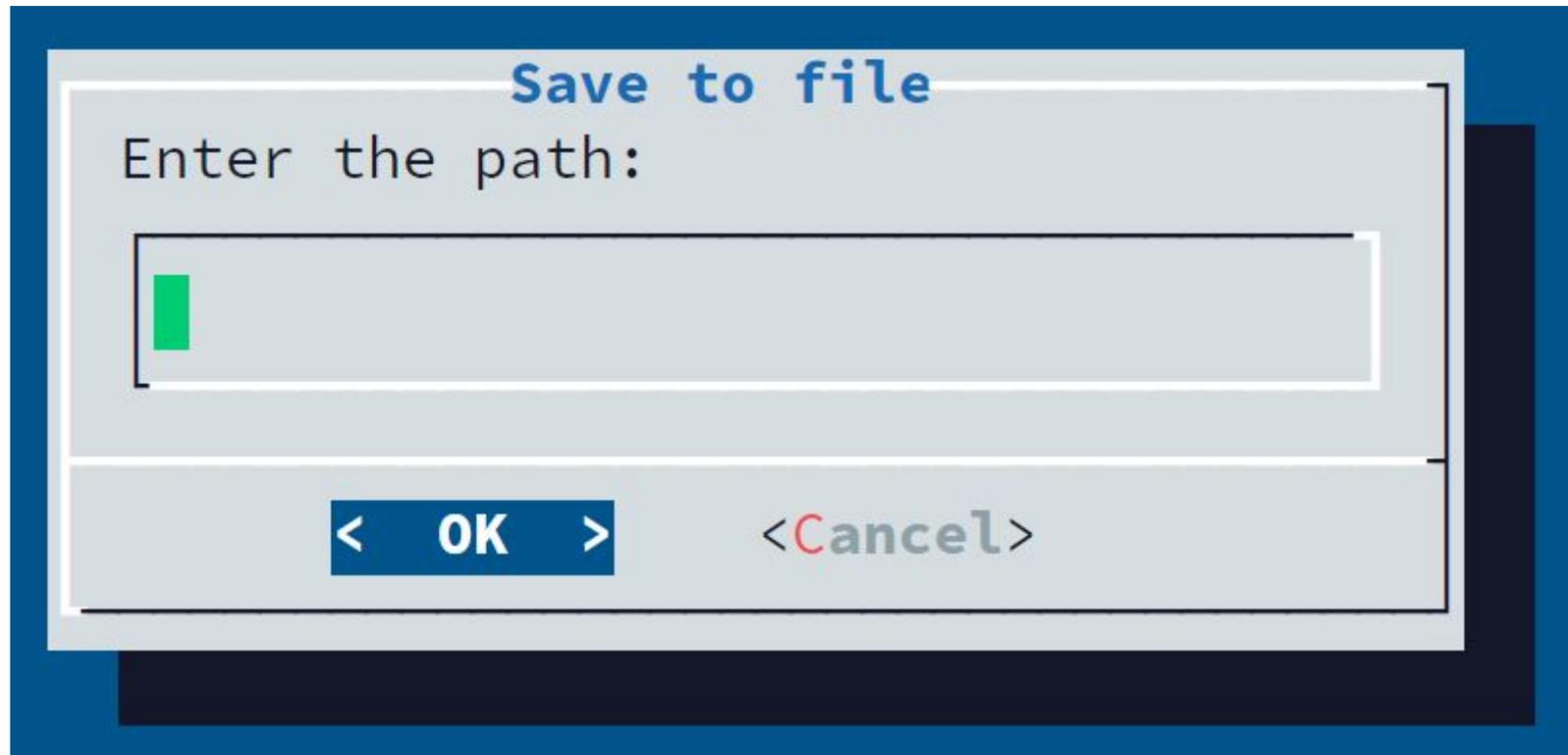
< OK >

# MOUNTPOINT INFO (10%)

- List every mounted Filesystem & Mounted on of the type **nfs and zfs** (5%)
- Sub-dialog
  - Show Filesystem, Type, Size, Used, Avail, Capacity, Mounted\_on (4%)
  - The size shown here should be in human readable form (1%)
    - Based on powers of 1024.
    - In order to reduce the number of digits to four or fewer

Hint: [df \(1\)](#)

# SAVE SYSTEM INFO (16%)



# SAVE SYSTEM INFO (16%)

```
System Info
This system report is generated on Fri Oct 9 15:42:22 CST 2020
=====
Hostname: bsd2.cs.nctu.edu.tw
OS Name: FreeBSD
OS Release Version: 12.0-RELEASE-p13
OS Architecture: amd64
Processor Model: Intel(R) Xeon(R) CPU E5-2620 0 @ 2.00GHz
Number of Processor Cores: 4
Total Physical Memory: 15.96 GB
Free Memory (%): 64
Total logged in users: 4

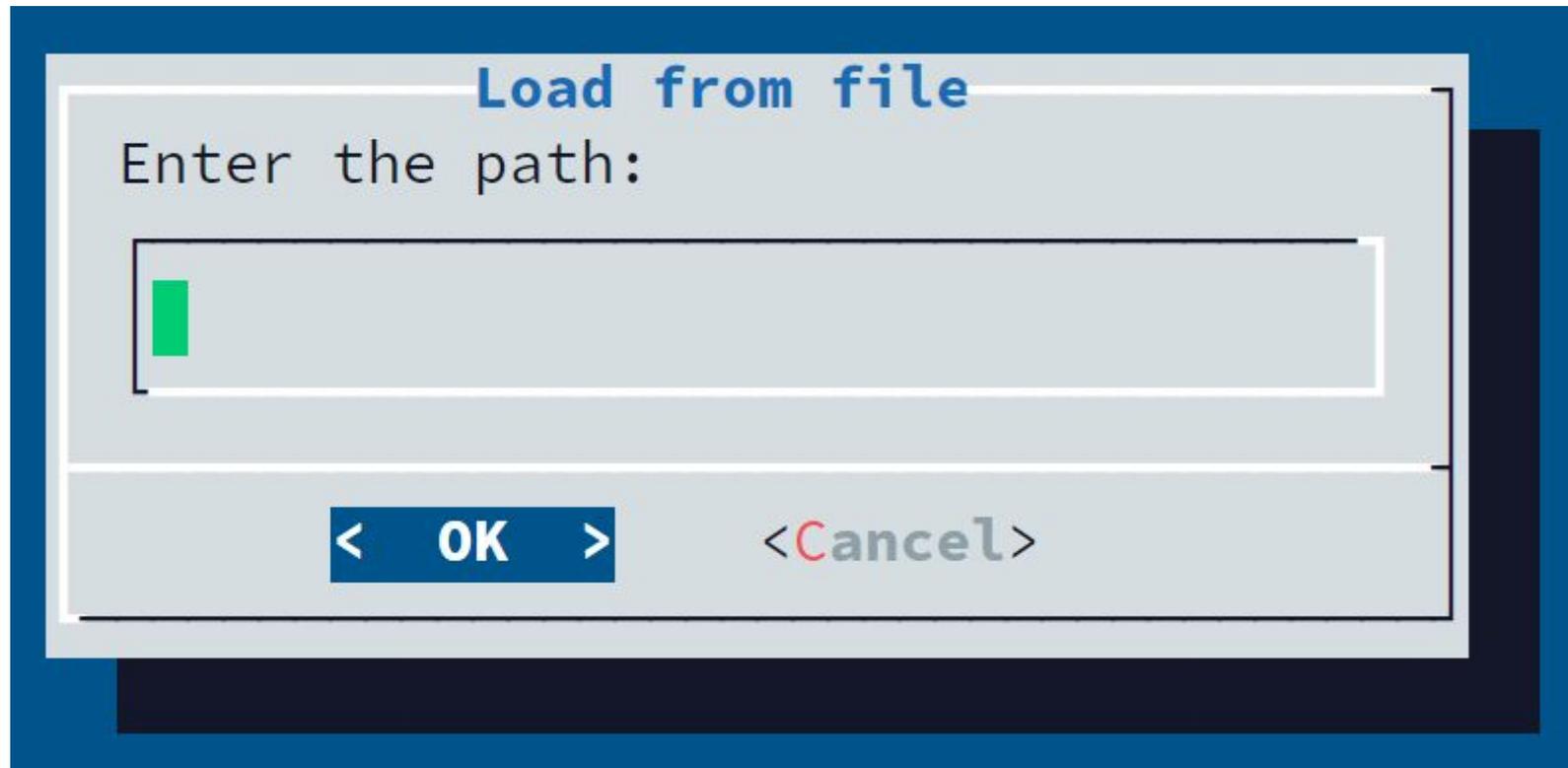
The output file is saved to /u/gcs/109/309551019/res

< OK >
```

# SAVE SYSTEM INFO (16%)

- Use dialog to ask user on where to save and save the output to file (2%)
  - User could input absolute path or relative path based on user's home directory
    - e.g. res -> /u/gcs/109/309551019/res
- Show basic system info (Refer to the previous slide ) (1% / line)
- Show saved file path (1%)
- Display memory information in **human readable format** (3%)
  - Based on powers of 1024.
  - In order to reduce the number of digits to four or fewer
- Hint: tools to get information, [sysctl\(8\)](#)

# LOAD SYSTEM INFO (4%)



# LOAD SYSTEM INFO (4%)

```
res
This system report is generated on Fri Oct 9 15:42:22 CST 2020
=====
Hostname: bsd2.cs.nctu.edu.tw
OS Name: FreeBSD
OS Release Version: 12.0-RELEASE-p13
OS Architecture: amd64
Processor Model: Intel(R) Xeon(R) CPU E5-2620 0 @ 2.00GHz
Number of Processor Cores: 4
Total Physical Memory: 15.96 GB
Free Memory (%): 64
Total logged in users: 4

< OK >
```

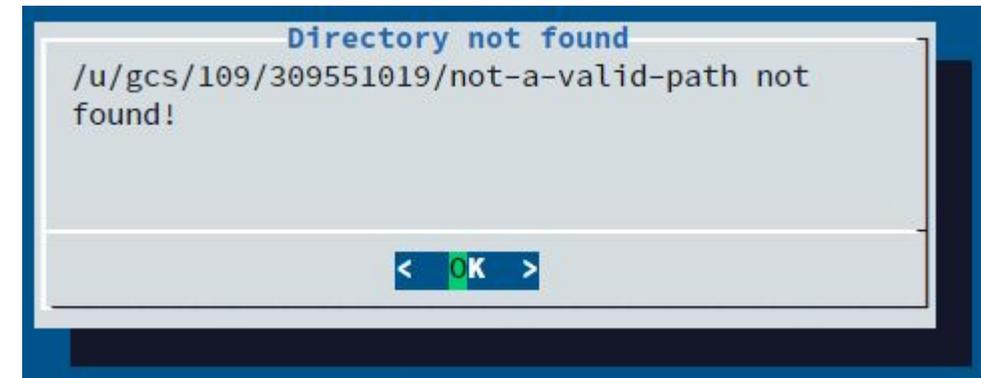
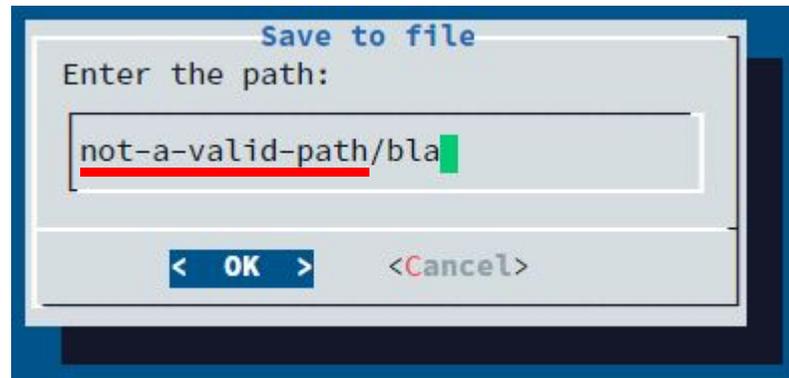
# LOAD SYSTEM INFO (4%)

- You have to load the exact output from earlier exported file (3%)
  - That is, you have to preserve all the newlines in your file
  - User could input absolute path or relative path based on user's home directory
    - e.g. res -> /u/gcs/109/309551019/res
- The title should be the **filename** instead of the full path of the file (1%)

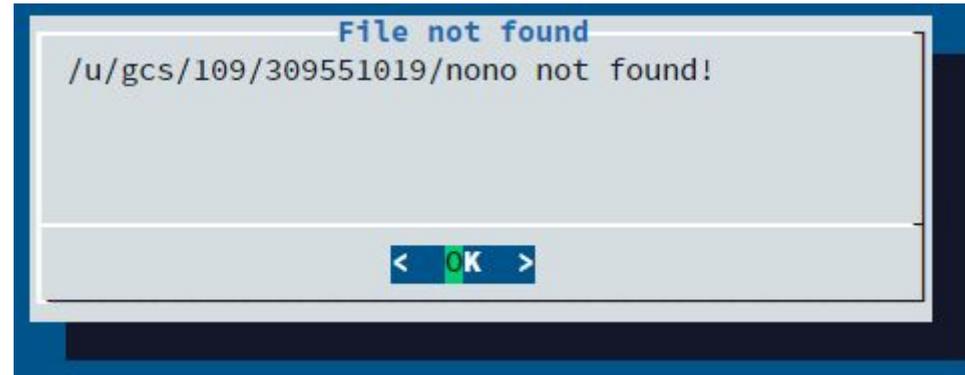
# Error Detection (BONUS 10%)

- On the last two part, we have to detect error.
- Show error dialog when
  - Directory not found on Save, File not found on Load (BONUS 2%)
  - No write permission on Save, No read permission on Load (BONUS 4%)
- File not valid (Not from your program) (BONUS 2%)
- Return to input dialog after error message dialog (BONUS 2%)

# Save System Info: Directory not found (1%)



# Load System Info: File not found (1%)



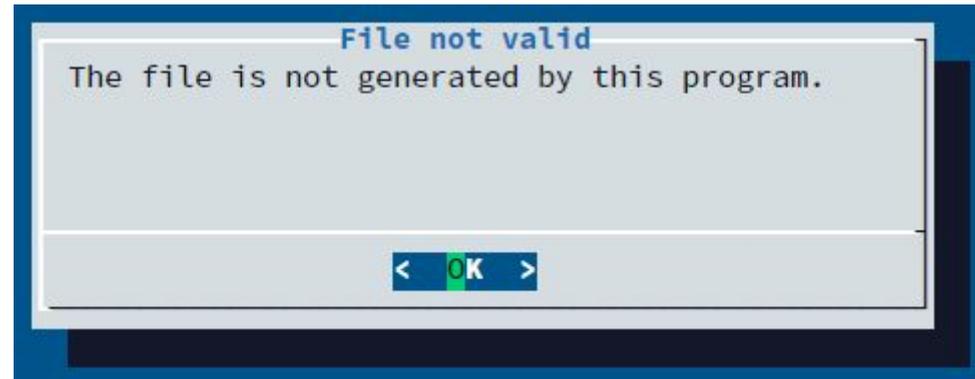
# Save System Info: No write permission (2%)



# Load System Info: No read permission (2%)



# Load System Info: File not valid (2%)

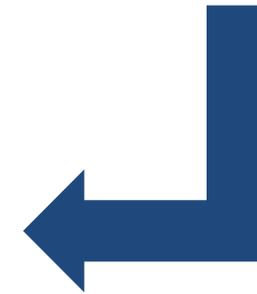
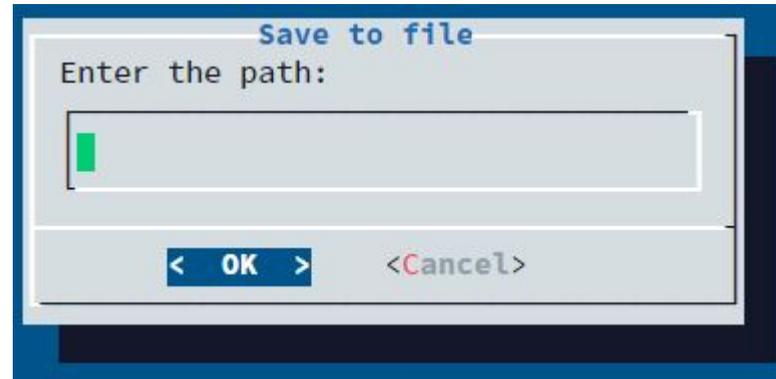
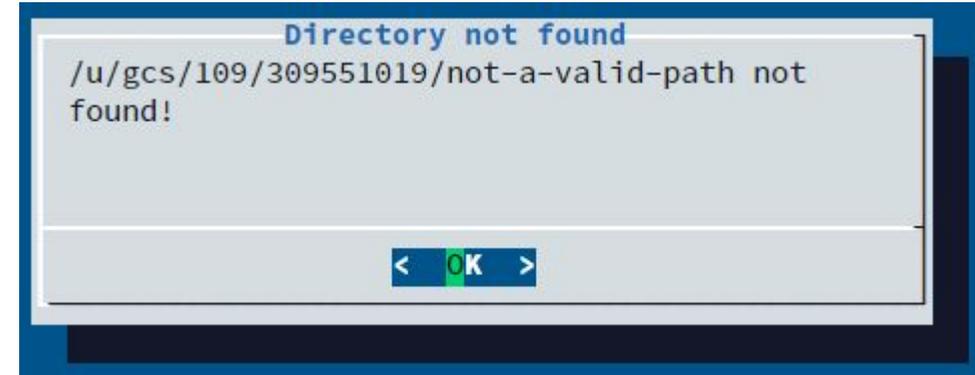
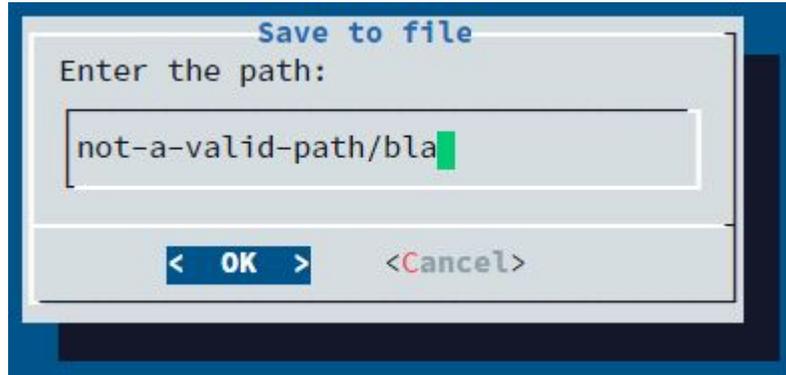


Hint:

We don't care what's in the file.

What we care about is **your output in dialog.**

# Return to input dialog after error message dialog (2%)



# Attention!

- You are restricted to use only **bash** and **sh** to complete your work
  - That is, no other shell and no other programming language.
  - If you're not sure what's allowed, contact TAs.
  - TAs reserve the right of final explanations. Specs are subject to change without notice.
- Your output does not have to be exactly the same as mine.
  - You could design your own ways the information is presented in as you please.

# How to use git.cs

# git.cs

You should have an account by now.

If not, please apply now.

# git.cs: application

ⓘ Please accept the Terms of Service before continuing.



## 國立交通大學資訊工程學系 GitLab 服務條款

為推廣Git之使用，國立交通大學資訊工程學系資訊中心(以下簡稱「本中心」)建置一Git管理平台GitLab (<https://git.cs.nctu.edu.tw>，以下簡稱「本平台」)，並提供每位教職員生1GB的空間，以支援資訊學院之教職員生教學或研究使用。

只要您使用本平台，即表示您已閱讀並同意本使用規範，故請詳閱本使用規範內容。一、個人資料保護本中心在中華民國「個人資料保護法」與相關法令之規範下，蒐集、處理及利用您的個人資料。

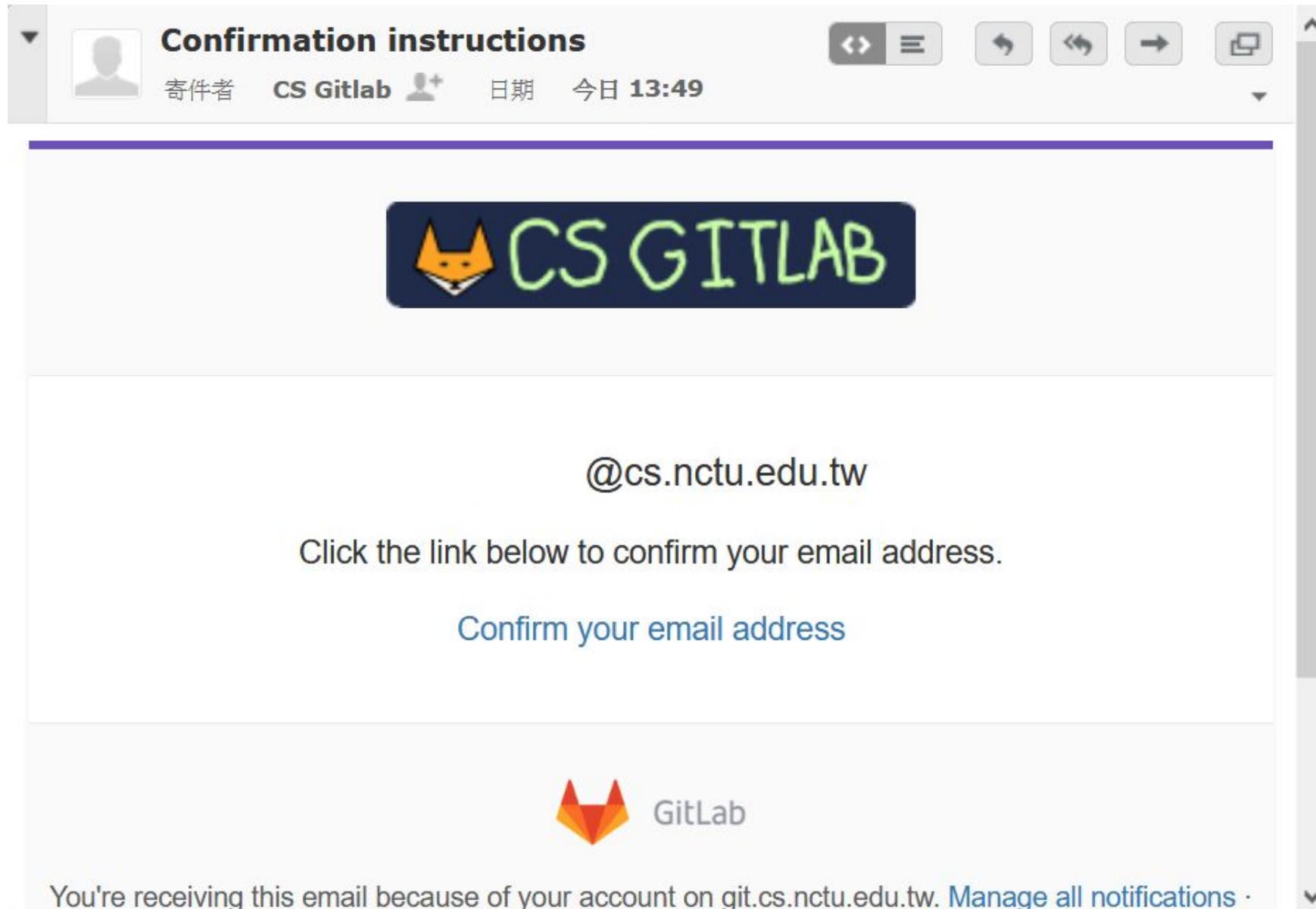
1. 請於申請時提供您本人正確、最新及完整的個人資料。
2. 本中心因執行業務所蒐集您的個人資料包括帳號名稱、中英文姓名、學號、學籍、E-mail 信箱等，您可依中華民國「個人資料保護法」，就您的個人資料行使以下權利：(1) 請求查詢或閱覽。(2) 製給複製本。(3) 請求補充或更正。(4) 請求停止蒐集、處理及利用。(5) 請求刪除。若因本中心執行職務或業務所必須者，本中心得拒絕之。若因您行使上述權利，而導致權益受損時，本中心將不負相關賠償責任。
3. 當您的個人資料使用方式與當初本中心蒐集的目的不同時，我們會在使用前先徵求您的書面同意，您可以拒絕向本中心提供個人資料，但可能因此喪失您的權益。
4. 您的個人資料受到「個人資料保護法」之保護及規範。本中心如有違反「個人資料保護法」規定或因天災、事變或其他不可抗力所致者，致您的個人資料被竊取、洩漏、竄改、遭其他侵害者，本中心將於查明後以電話、信函、電子郵件或網站公告等方法，擇適當方式通知您。二、尊重智慧財產權
5. 使用者得自行決定其資料之著作權歸屬與授權規則。任何使用此資料之使用者，應遵守之，並了解本平台對此資料不負任何法律責任。
6. 使用者應尊重智慧財產權，不得為下列行為：(1) 違法複製受著作權法保護之著作。(2) 未經著作權人之同意，將受保護之著作上傳於公開之網



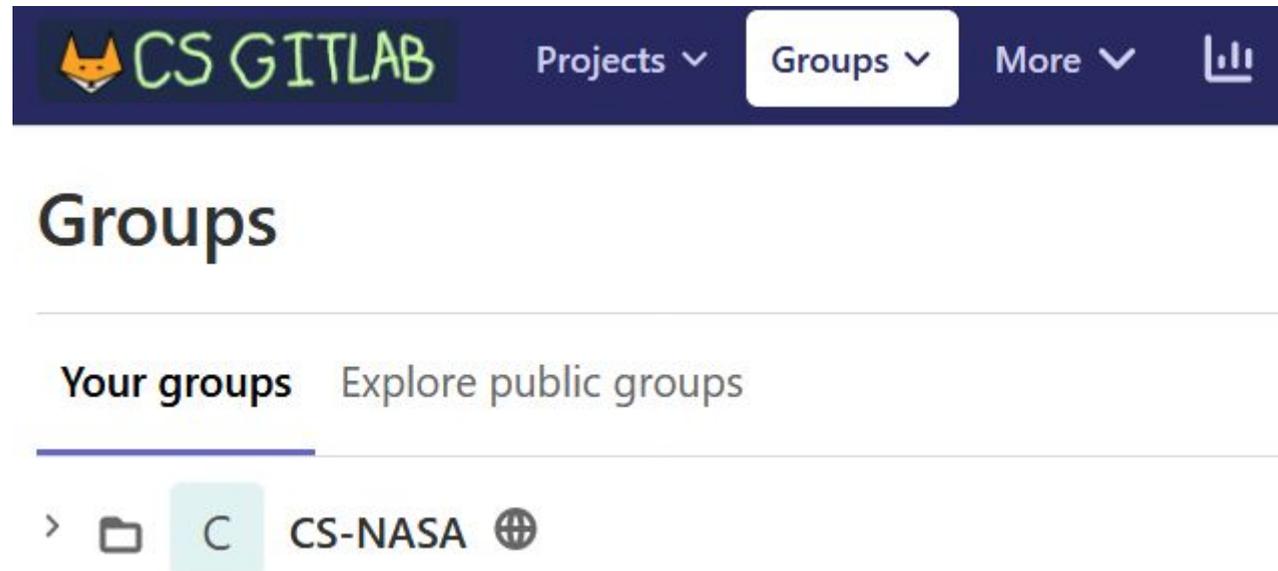
# git.cs: application

The screenshot shows the GitLab user settings interface. At the top, the navigation bar includes the 'CS GITLAB' logo, dropdown menus for 'Projects', 'Groups', and 'More', a search bar with the text 'Search or jump to...', and several utility icons. The left sidebar contains a 'User Settings' menu with options: Profile (selected), Account, Applications, Chat, Access Tokens, Emails, Notifications, SSH Keys, and GPG Keys. The main content area is titled 'User Settings > Edit Profile'. A blue notification banner at the top of the main area reads 'Please complete your profile with email address'. Below this is the 'Public Avatar' section, which includes a circular placeholder for an avatar, a text prompt 'You can upload your avatar here or change it at [gravatar.com](https://gravatar.com)', and an 'Upload new avatar' section with a 'Choose file...' button and the text 'No file chosen' and 'The maximum file size allowed is 200KB.'. At the bottom, the 'Current status' section contains the text 'This emoji and message will appear on your profile and throughout the interface.' and the 'Your status' section shows a status input field with a smiley face emoji and the text 'What's your status?' and a close button.

# git.cs: application



# CS-NASA Group



The screenshot shows the top navigation bar of the CS GitLab interface. It includes the GitLab logo (a fox head) and the text "CS GITLAB" in green. To the right are navigation links: "Projects" with a dropdown arrow, "Groups" with a dropdown arrow and a white background, and "More" with a dropdown arrow. A bar chart icon is also present. Below the navigation bar, the word "Groups" is displayed in a large, bold font. Underneath, there are two tabs: "Your groups" (which is active and underlined) and "Explore public groups". Below the tabs, a breadcrumb trail is shown: a right-pointing chevron, a folder icon, a light blue square containing the letter "C", the text "CS-NASA", and a globe icon.

# Check your project

CS-NASA > Details

git.cs



**CS-NASA** 

Group ID: 123



**Subgroups and projects** Shared projects Archived projects

Search by name

Last created 

 **1** **144**  Maintainer

  0  0  2

## Your Online Judge Page

Key

Value

Description

ID

144



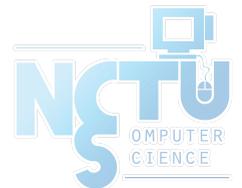
Your VPN's IP: 10.113.0.ID

# New Project

1

144 

Group ID: 621 | [Leave group](#)



# Project name

Project name

sahw2

It has to be exactly the same

Project URL

https://git.cs.nctu.edu.tw/ cs-nasa/144

Project slug

sahw2

Project description (optional)

Check your URL again

Description format

Visibility Level [?](#)

Private

Project access must be granted explicitly to each user. If this project is part of a group, access will be granted to members of the group.

Initialize repository with a README

Allows you to immediately clone this project's repository. Skip this if you plan to push up an existing repository.

Create project

Cancel

# ans.sh

```
tcyuan@ :~/sa/sahw2/sahw2 (master ?D) $ tree .  
.  
├── hw2-1  
│   └── ans.sh  
└── hw2-2  
    └── ans.sh  
  
2 directories, 2 files
```

```
tcyuan@ :~/sa/sahw2 [!1] $ ll hw2-1/ans.sh  
-rwxr-xr-x. 1 tcyuan gcs 0 Oct 14 14:08 hw2-1/ans.sh*
```

Check your permission

# Debug HW2-1: Student answer not found.

```
Please make sure you have the correct access rights  
and the repository exists.
```

```
Command: /bin/sh -c GIT_SSH_COMMAND="ssh -o UserKnownHostsFile=/dev/null -o StrictHostKeyChecking=no" git clone
```

```
==== Start Judging ====
```

```
Making answer...
```

```
./judge-2.sh: line 22: stu_repo/hw2-1/ans.sh: No such file or directory
```

```
Student answer not found.
```

```
0;0;0;
```

# Debug HW2-1: 0;0;0; Wrong Answer

```
-----  
Your ID: 144  
Your IP: 10.113.0.144  
[debug] ID: 144  
[debug] CMD1: GIT_SSH_COMMAND="ssh -o UserKnownHostsFile=/dev/null -o StrictHostKeyChecking=no" git clone --quiet git@git.cs.nctu.edu.tw:~/hw2  
[debug] CMD2: cd sa-judge-hw2 && ./judge-2.sh  
==== Preparing Judge Environment ====  
Warning: Permanently added 'git.cs.nctu.edu.tw' (ECDSA) to the list of known hosts.  
Cloning student repo...  
Warning: Permanently added 'git.cs.nctu.edu.tw' (ECDSA) to the list of known hosts.  
[OK].  
Cloning answer repo...  
Warning: Permanently added 'git.cs.nctu.edu.tw' (ECDSA) to the list of known hosts.  
[OK].  
==== Start Judging ====  
Making answer...  
[OK].  
Judging...  
Section 1 error. (In case 1)  
Finished Section 1.  
Section 2 error. (In case 1)  
Finished Section 2.  
Section 3 error. (In case 1)  
Finished Section 3.  
0;0;0;
```

0 = Wrong answer, 1 = accepted

# Attention!

- You will get **zero** points if you just copy code from other students
- You will get **zero** points **if you tamper with TA's system / file**
- You can use our workstations to complete your homework
- Make good use of Google Group and TA time
- HW 2-1 => Online Judge
- HW 2-2 => Demo
  - Demo time will be announced later on e3
  - Failed to complete Demo + Q&A will results in a **loss of 20% credit**
- Due date: **23:59 November 4th (Wed. )**

# Help me! TA!

- TA time & Early Demo: 3 GH at EC 324 (PC Lab)
  - You can bring your laptop to us
  - You can also use PC lab
  - If there're too many people, we will announce another time slot.
- Questions about this homework
  - Ask them on <https://groups.google.com/g/nctunasa>
  - We MIGHT give out hints on google group
    - Be sure to join the group :D
  - Do not email us
  - Do not use e3 to email us

# Good Luck!