System Administration HW3

- Happy Shell Script programming

ymli

Overview

- ❏ 3-1 Process Inspector (20%)
  - ❏ A one-liner script to show statistics of all processes
- ❏ 3-2 Polyglot (25%)
  - ❏ How many languages can you speak?
- ❏ 3-3 The "RSS" Reader (40%)
  - ❏ Google Reader is dead, write my own one!
- ❏ Modify code (15%)
  - ❏ Add cool features during demo time

- ❏ Please write all the scripts in Bourne Shell (sh)
  - ❏ No point if you use csh, bash or other languages
- ❏ Due: 2014/11/11
- ❏ Demo after midterm

3-1: Process Inspector (20%)

```
USER     PID %CPU %MEM    VSZ   RSS TTY      STAT START   TIME COMMAND
root       1  0.0  0.0 174592  4676 ?        Ss   8月24   0:53 /usr/lib/systemd
root       2  0.0  0.0      0     0 ?        S    8月24   0:00 [kthreadd]
root       3  0.0  0.0      0     0 ?        S    8月24   3:39 [ksoftirqd/0]
root       5  0.0  0.0      0     0 ?        S<   8月24   0:00 [kworker/0:0H]
root       6  0.0  0.0      0     0 ?        S    8月24   0:00 [kworker/u48:0]
root       8  0.0  0.0      0     0 ?        S    8月24   0:00 [migration/0]
root       9  0.0  0.0      0     0 ?        S    8月24   0:00 [rcu_bh]
root      10  0.0  0.0      0     0 ?        S    8月24  67:19 [rcu_sched]
root      11  0.0  0.0      0     0 ?        S    8月24   0:16 [watchdog/0]
root      12  0.0  0.0      0     0 ?        S    8月24   0:18 [watchdog/1]
root      13  0.0  0.0      0     0 ?        S    8月24   0:00 [migration/1]
root      14  0.0  0.0      0     0 ?        S    8月24   0:02 [ksoftirqd/1]
root      16  0.0  0.0      0     0 ?        S<   8月24   0:00 [kworker/1:0H]
root      17  0.0  0.0      0     0 ?        S    8月24   0:14 [watchdog/2]
root      18  0.0  0.0      0     0 ?        S    8月24   0:00 [migration/2]
root      19  0.0  0.0      0     0 ?        S    8月24   0:04 [ksoftirqd/2]
root      21  0.0  0.0      0     0 ?        S<   8月24   0:00 [kworker/2:0H]
root      22  0.0  0.0      0     0 ?        S    8月24   0:14 [watchdog/3]
```

*

```
ymli@bsd1 [~/sa]$ wc ps1.sh
       1      35     399 ps1.sh
ymli@bsd1 [~/sa]$ sh ps1.sh
_pflogd
        S ( 885 )
ceyu
        I ( 33354 35542 35566 49315 49339 56327 56366 57036 58063 58087 60335 60360 )
        Is ( 35544 49316 56329 58064 60337 )
        Is+ ( 33356 57038 )
changchin
        I+ ( 12187 )
        Is ( 12185 )
        Is+ ( 21849 )
chchao
        I+ ( 4814 )
        Is ( 5651 )
        Is+ ( 5642 )
chchsu
        I ( 72133 72158 )
        Is ( 72135 )
chhchiang
        I ( 23228 23253 )
        Is ( 23230 )
chhhsu
        I+ ( 74377 )
        Is ( 74374 )
        Is+ ( 43523 94430 )
chsu
        Is+ ( 73434 )
        S ( 73432 )
chyhuang
        I+ ( 25170 48058 48590 83525 84093 )
        Is ( 29632 69926 70162 70239 83523 83574 )
cwshu
        I+ ( 3478 )
        Is ( 3476 )
        Is+ ( 3480 )
```

3-1: Process Inspector

- ❑ An one liner script
- ❑ Parse the output from `ps aux`, list username, stat, pid
- ❑ Well sorted by username and stat, and pid
- ❑ Test on `bsd*.cs` and `linux*.cs`
- ❑ Each field (5%), formatting (5%)

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3-1: Process Inspector

❑ One-liner, only one line!
❑ Pipes (`cmd | cmd`) are allowed
❑ No temporary files or shell variables
❑ No any of [`&& || > >> << < `` ; $ & #`]
❑ awk and sed are allowed, no perl, no python, no ruby … ^O^
❑ You can use only less than 15 pipes

❑ **Otherwise: get 0 point!**

3-1: Process Inspector

❑ Short code, please!

   ❑ 5% bonus points for who can write a shorter one than TA's

   ❑ 5% bonus points for top 5 shortest ones

3-1: Process Inspector

❑ Hint
  ❑ ps (1)
  ❑ xargs (1)
  ❑ tail (1)
  ❑ sort (1)
  ❑ awk (1)
  ❑ sed (1)

3-2: Polyglot (25%)

pol·y·glot (pŏl'ē-glŏt')
adj.
Speaking, writing, written in, or composed of several languages.

n.
1. A person having a speaking, reading, or writing knowledge of several languages.
2. A book, especially a Bible, containing several versions of the same text in different languages.
3. A mixture or confusion of languages.

3-2: Polyglot

❑ Some people can write several programming languages
  ❑ Can you do that o_O?

❑ There are also too many languages / compilers / interpreters
  ❑ We need to make our lives easier
  ❑ Q_Q

```
ymli@bsd1 [~/sa]$ ls
feed.py       flag         polyglot.sh ps.sh         ps1.sh        rss.sh        rssold.sh     sa.out        test.awk      test.lua      wtf.c
ymli@bsd1 [~/sa]$ ./polyglot.sh
no src file!
ymli@bsd1 [~/sa]$ ./polyglot.sh -h
Usage: ./polyglot.sh [-h] [-s src] [-o output_name] [-l lang] [-c compiler]
ymli@bsd1 [~/sa]$ ./polyglot.sh -s wtf.c
unknown target
ymli@bsd1 [~/sa]$ ./polyglot.sh -s wtf.c -l py
SA{Hi I'am the flag, yay}
==================
ymli@bsd1 [~/sa]$ ./polyglot.sh -s wtf.c -l c
wtf.c:1: warning: data definition has no type or storage class
SA{Hi I'am the flag, yay}
==================
ymli@bsd1 [~/sa]$ ./polyglot.sh -s wtf.c -l c -c clang
wtf.c:1:1: warning: type specifier missing, defaults to 'int' [-Wimplicit-int]
x={-
^
1 warning generated.
SA{Hi I'am the flag, yay}
==================
ymli@bsd1 [~/sa]$ ./polyglot.sh -s wtf.c -l c,hs,rb,py2,py3
wtf.c:1: warning: data definition has no type or storage class
SA{Hi I'am the flag, yay}
==================
SA{Hi I'am the flag, yay}
==================
SA{Hi I'am the flag, yay}
==================
SA{Hi I'am the flag, yay}
==================
SA{Hi I'am the flag, yay}
==================
ymli@bsd1 [~/sa]$
```

3-2: Polyglot

❑ polyglot.sh [-h] [-s src] [-o output_name] [-l lang] [-c compiler]

❑ -h   print the help (2%)
❑ -s   select source code file (3%)
❑ -o   set output filename (3%)
❑ -l   select languages (10%)
❑ -c   select compilers (C/C++) (7%)

❑ Less than 300 lines of code

```
ymli@bsd1 [~/sa]$ wc polyglot.sh
    131     248    2297 polyglot.sh
```

3-2: Polyglot

❑ -l   select languages
❑ targets are separated by comma (,)
❑ valid options:

❑	C	c,C
❑	C++	cc,cpp,Cpp,c++,C++
❑	awk	awk,AWK
❑	Perl	perl,Perl
❑	Python2	python,Python,py,python2,Python2,py2
❑	Python3	python3,Python3,py3
❑	Ruby	ruby,Ruby,rb
❑	Haskell	Haskell,haskell,hs
❑	Lua	lua,Lua
❑	bash	bash,Bash

❑ invoke different interpreters/compilers in order
❑ error on unknown targets

3-2: Polyglot

❑ -c   select compilers (C/C++)
  ❑ C: only support gcc and clang
  ❑ C++:   only support g++ and clang++

3-2: Polyglot

❑ The default output name should be "sa.out"
❑ The default C/C++ compiler should be gcc and g++
❑ The default Lua interpreter should be Lua52
❑ Note: bash is under /usr/local/bin on FreeBSD
❑ You should use env(1) to invoke your external commands
❑ Print help and easy-to-read error messages when missing needed arguments
❑ Bonus: write a `cat flag` polyglot test program in at least 4 languages from the language list (10%)

3-2: Polyglot

❑ Hint
   ❑ getopts (1)
   ❑ runhaskell
   ❑ HITCON CTF 2014 (?)
   ❑ https://www.youtube.com/watch?v=HeHtBYBIYIA

3-3: The "RSS" Reader (40%)

3-3: The "RSS" Reader

❑ RSS in Shell Script

    ❑ A RSS reader with fancy UI

    ❑ Well error-handling

    ❑ Modularized design

    ❑ local storage : `~/.feed/`

    ❑ Less than 400 lines

```
ymli@bsd1 [~/sa]$ wc -l rss.sh
     211 rss.sh
```

3-3: The "RSS" Reader

❑ For simplicity, TA would provide a simple RSS fetcher, try to find it!

    ❑ aHR0cHM6Ly9naXN0LmdpdGh1Yi5jb20veGF0aWVyLzZmMzkwZTZkMjA4NGVkZWRhZGNkCg==

❑ Write your own one (5% bonus)

    ❑ In any language

        ❑ `ls /usr/ports/textproc/ | grep -i feed`

❑ Test on your box

3-3: The "RSS" Reader - Grading

- ❑ Welcome message & main menu (20%)
- ❑ Each feature (5%)

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3-3: The "RSS" Reader - Main Menu


```
                        Main Menu
Choose Action

        R   Read - read subscribed feeds
        S   Subscribe - new subscription
        D   Delete - delete subscription
        U   Update - update subscription
        Q   Bye~


           <  OK  >        <Cancel>
```
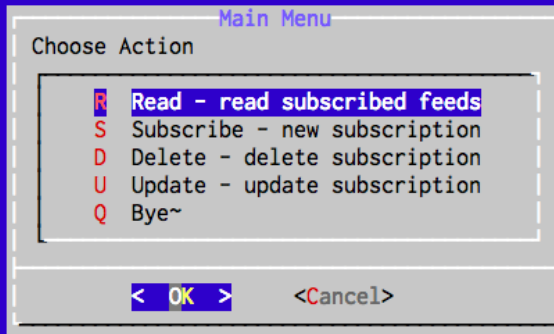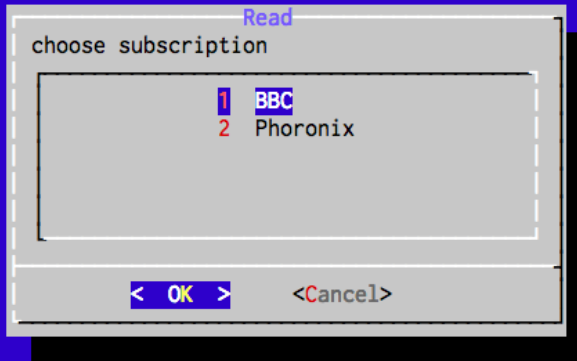
3-3: The "RSS" Reader - Read

3-3: The "RSS" Reader - Read

Read

choose item

1	If You're Connected, Apple Collects Your Data
2	In UK, Internet Trolls Could Face Two Years In Jail
3	Gigabit Cellular Networks Could Happen, With 24GHz Spectrum
4	Soda Pop Damages Your Cells' Telomeres
5	NASA Cancels "Sunjammer" Solar Sail Demonstration Mission
6	Brain Patterns Give Clues To Why Some People Just Keep Gambling
7	Watch Comet Siding Spring's Mars Fly-By, Live
8	Ask Slashdot: Good Hosting Service For a Parody Site?
9	No More Lee-Enfield: Canada's Rangers To Get a Tech Upgrade
10	Apple Doesn't Design For Yesterday
11	Be True To Your CS School: LinkedIn Ranks US Schools For Job-Seeking Programmers
12	BBC Takes a Stand For the Public's Right To Remember Redacted Links
13	Canada Will Ship 800 Doses of Experimental Ebola Drug to WHO
14	Despite Patent Settlement, Apple Pulls Bose Merchandise From Its Stores
15	iFixit Tears Apart Apple's Shiny New Retina iMac
16	Robot SmackDowns Wants To Bring Robot Death Matches To an Arena Near You
17	JavaScript and the Netflix User Interface
18	Snapchat Will Introduce Ads, Attempt To Keep Them Other Than Creepy
19	Florida Supreme Court: Police Can't Grab Cell Tower Data Without a Warrant
20	Apple's Next Hit Could Be a Microsoft Surface Pro Clone
21	Ask Slashdot: Stop PulseAudio From Changing Sound Settings?
22	Researchers Scrambling To Build Ebola-Fighting Robots
23	Direct3D 9.0 Support On Track For Linux's Gallium3D Drivers

↓(+)   92%

< OK >   <Cancel>

3-3: The "RSS" Reader - Read

```
If You're Connected, Apple Collects Your Data
=============================================================
Feed URL: http://slashdot.feedsportal.com/c/35028/f/647410/s/3f9db531/sc/4/l/0Lapple0Bslashdot0Borg0Cstory0C140C10A0
=============================================================
fyngyrz (762201) writes It would seem that no matter how you configure Yosemite, Apple is listening.
 Keeping in mind that this is only what's been discovered so far, and given what's known to be going
 on, it's not unthinkable that more is as well. Should users just sit back and accept this as the ne
w normal? It will be interesting to see if these discoveries result in an outcry, or not. Is it wors
e than the data collection recently reported in a test version of Windows? Read more of this story a
t Slashdot.
=============================================================
```
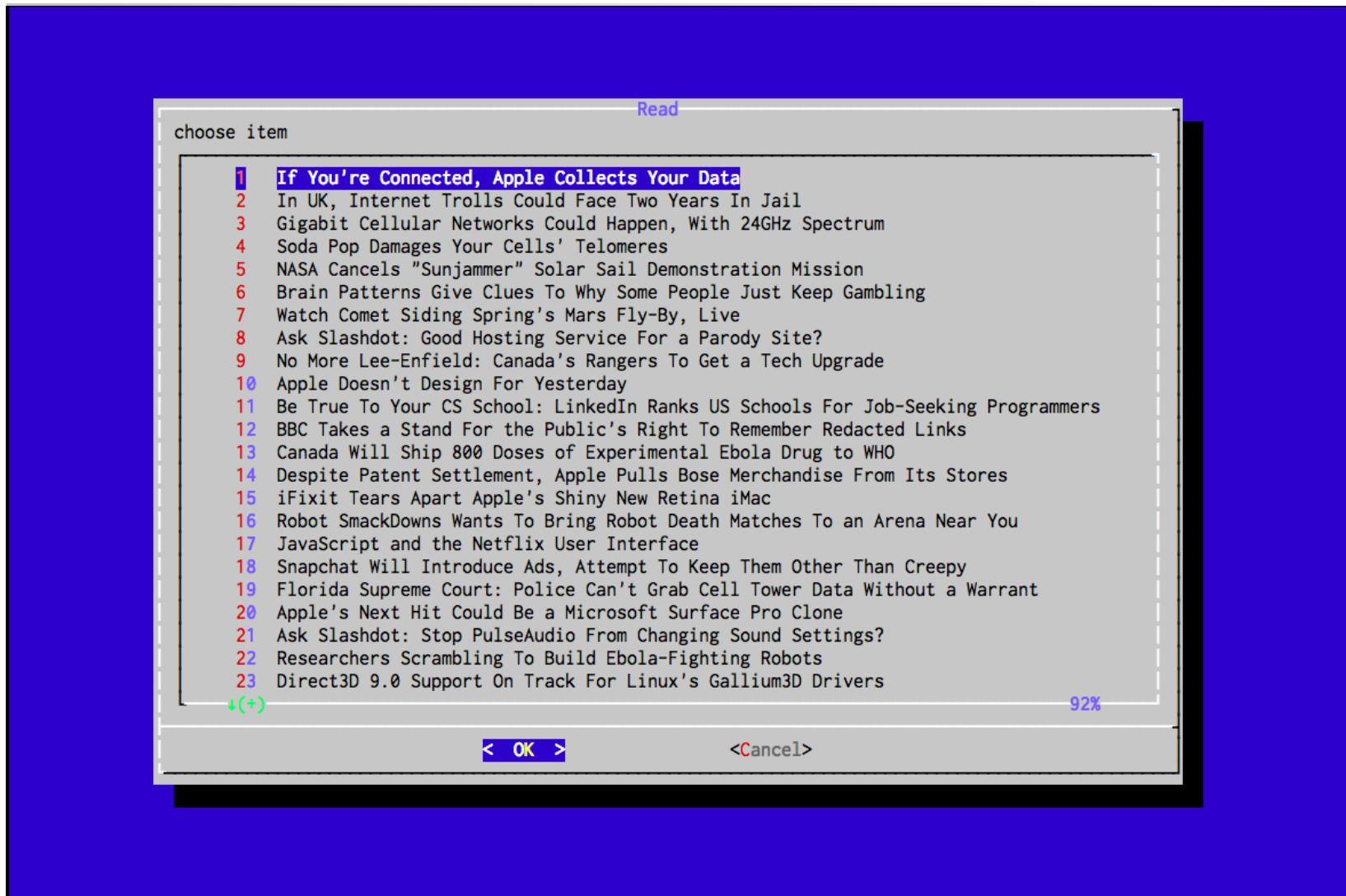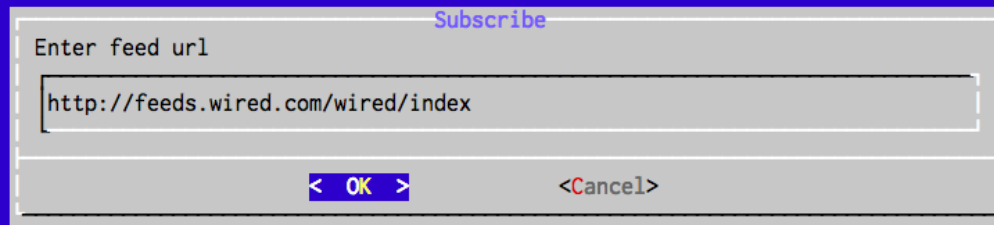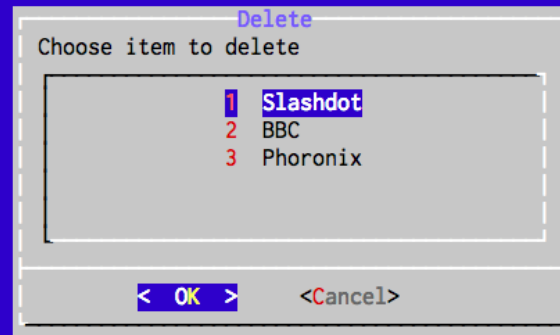
```
                                                                                                    #
                                                                                               100%
< EXIT >
```

3-3: The "RSS" Reader - Read

Read

choose item

```
1   If You're Connected, Apple Collects Your Data
2   In UK, Internet Trolls Could Face Two Years In Jail
3   Gigabit Cellular Networks Could Happen, With 24GHz Spectrum
4   Soda Pop Damages Your Cells' Telomeres
5   NASA Cancels "Sunjammer" Solar Sail Demonstration Mission
6   Brain Patterns Give Clues To Why Some People Just Keep Gambling
7   Watch Comet Siding Spring's Mars Fly-By, Live
8   Ask Slashdot: Good Hosting Service For a Parody Site?
9   No More Lee-Enfield: Canada's Rangers To Get a Tech Upgrade
10  Apple Doesn't Design For Yesterday
11  Be True To Your CS School: LinkedIn Ranks US Schools For Job-Seeking Programmers
12  BBC Takes a Stand For the Public's Right To Remember Redacted Links
13  Canada Will Ship 800 Doses of Experimental Ebola Drug to WHO
14  Despite Patent Settlement, Apple Pulls Bose Merchandise From Its Stores
15  iFixit Tears Apart Apple's Shiny New Retina iMac
16  Robot SmackDowns Wants To Bring Robot Death Matches To an Arena Near You
17  JavaScript and the Netflix User Interface
18  Snapchat Will Introduce Ads, Attempt To Keep Them Other Than Creepy
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22  Researchers Scrambling To Build Ebola-Fighting Robots
23  Direct3D 9.0 Support On Track For Linux's Gallium3D Drivers
```

↓(+)   92%

```
< OK >                        <Cancel>
```

3-3: The "RSS" Reader - Subscribe

3-3: The "RSS" Reader - Delete

3-3: The "RSS" Reader - Delete

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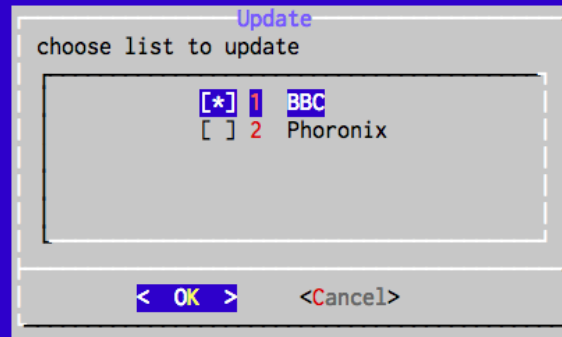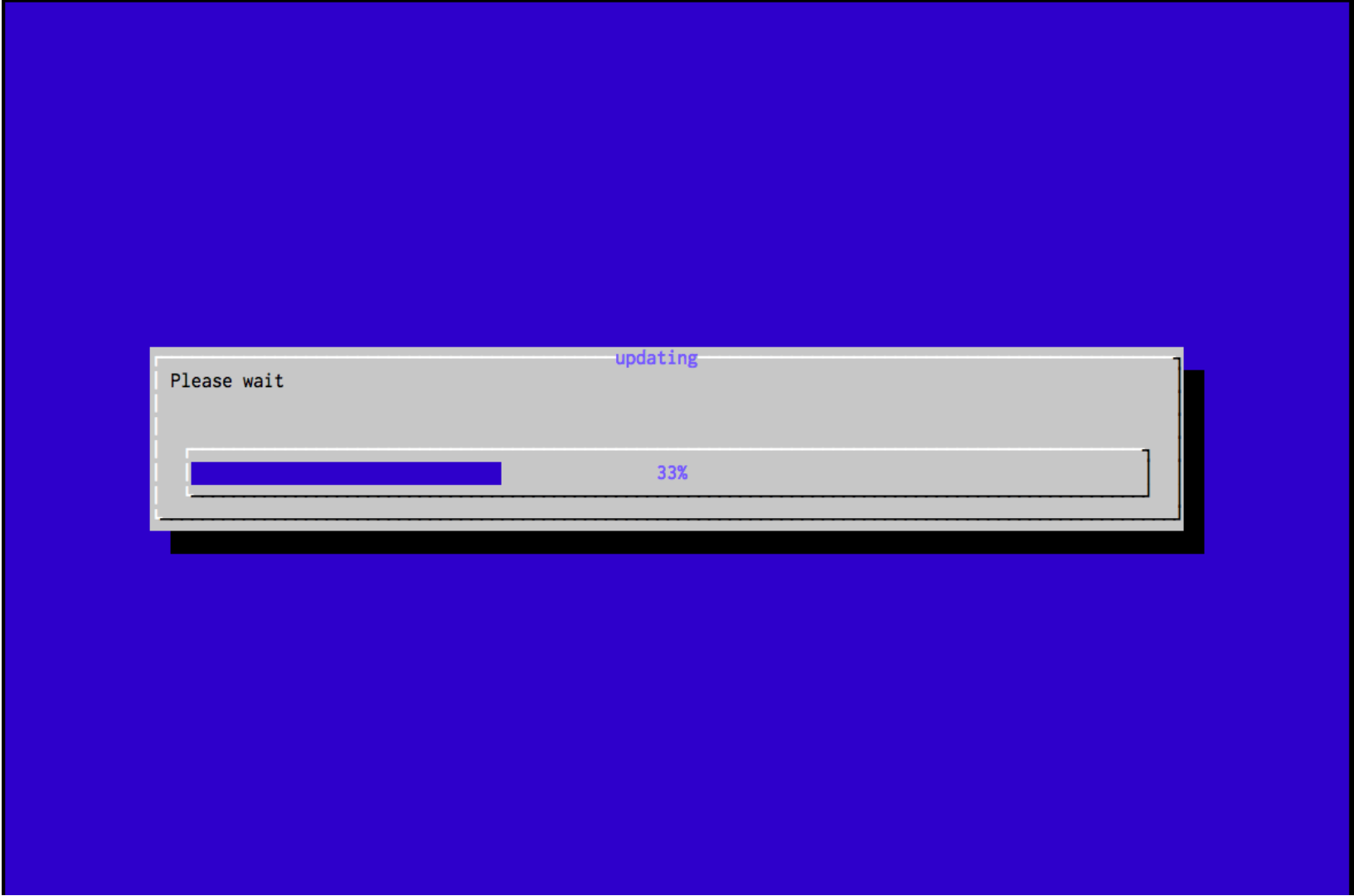
3-3: The "RSS" Reader

❑ Hint
  ❑ sh (1)
  ❑ dialog(1)
  ❑ tail (1)
  ❑ head (1)
  ❑ tr (1)
  ❑ awk (1)

Bonus: Conway's Game of life (30%)

- ❏ An one-liner (same as 3-1)
- ❏ map size = 30
- ❏ initialize with random seed

check and run

```
$ wc -l gol.sh
    1 gol.sh
$ sh gol.sh
```

- ❏ https://en.wikipedia.org/wiki/Conway's_Game_of_Life

Bonus: Conway's Game of life (30%)
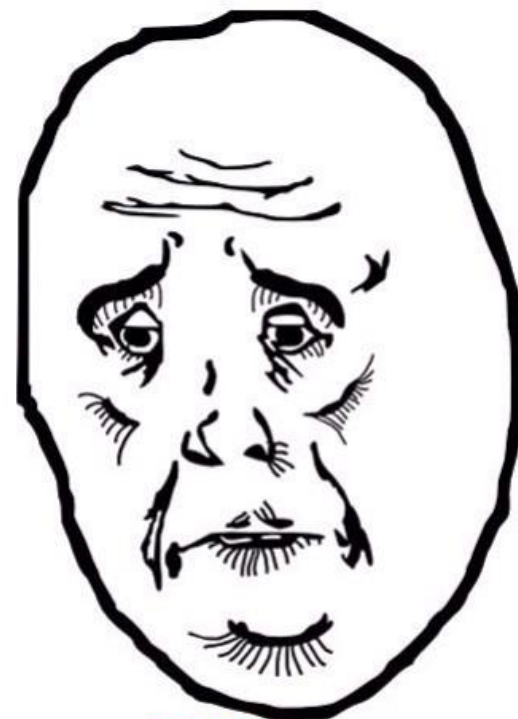
Bonus: Conway's Game of life (30%)

❑ Hint

 ❑ Do some math (?)

 ❑ http://rosettacode.org/wiki/Conway's_Game_of_Life

Deadline

- ❑ Demo sheet will be available next week
- ❑ Demo before 11/21 (Fri.)

- ❑ http://goo.gl/mfMTWH

Need Help?

- ❑ IRC channel #nctuNASA on freenode
- ❑ BBS bs2.to board CS-SysAdmin
- ❑ Email ta@nasa.cs.nctu.edu.tw
- ❑ Goto CSCC to ask professional 3F!