

1. Cletus has an extreme phobia of two periods ('..') appearing consecutively anywhere, stemming from an early childhood trauma too embarrassing to relate. He decided to write a shell script 'cd_up.sh' aimed at changing the working directory to the level up, so he didn't have to go through the distress of regularly seeing '..':

```
#!/bin/bash
cd ..
```

But when it ran his script, it didn't seem to work:

```
$ pwd
$ ./cd_up.sh
$ pwd
```

Why not, and can you fix Cletus' shell script?

2. The course code for COMP2041 has been changed to COMP2042 and the course code for COMP9041 has been changed to COMP9042. Write a shell script, `update_course_code.sh` which appropriately changes the `course_code` in all the files it is given as argument.
3. Modify `update_course_code.sh` so if given a directory as argument it updates the course codes in files found in that directory and its sub-directories.
4. Write a shell script, `is_business_hours` which exits with a status of 0 if the current time is between 9am & 5pm, and otherwise exits with a status of 1.
Hint: the `date` command prints the current time in a format like this:

```
$ date
Sun Mar 18 12:57:08 EST 2012
```

5. CSE systems have a command, `mlalias`, which prints information about a specified mail alias. For example:

```
$ mlalias COMP2041-list
    alias: COMP2041-list
description: Udb alias list
addresses:
    blix573
    mhuz728
    .....
    sngx602
    andrewt
    owners: udb, cs2041
authorised posters: @Employee, @Subject_Utility, @Wheel
Moderator: udb
    Status: system, closed, moderated, virtual, and public
```

Convert the output of the `mlalias` command into a new line separated list of CSE usernames, like this:

```
blix573
mhuz728
.....
sngx602
andrewt
```

6. CSE system have a command, `acc`, which prints information about a specified user. For example:

```

$ acc mzhou

      User Name : mzhou                Aliases : myzh046
      Uid : 25068
      Groups : cs1917
      Expires : 31 Aug 2012
      User classes : 3978_Student, COMP2041_Student[15jul2012]
                    : COMP2121_Student[15jul2012], COMP2911_Student[15jul2012]
                    : COMP1917_Tutor[16jul2012], COMP3901_Student[16jul2012]
      Misc classes : WirelessAccess[23jun2012]
      Name : Michael Yang Zhou
      Password last changed : 2011/03/02.21:23:19
      Home Directory : /import/adams/1/mzhou
      Waste Basket UID : 65619
      Printer Usage Status : Pre-census Allocation      2045 (More will be available from 31 Mar 2012)
                          : Used                        35
                          : Available                   2010
                          : set at 12:05 AM 19/Mar/2012
      Daily IP Quota : 350.0MB
      Session IP Quota : 700.0MB (more will be available from 31 Mar 2012)
      Session IP Usage : 275.3MB

```

Write a pipeline which converts the output of acc into a new line separated list of courses the person is enrolled in, like this:

```

COMP2041
COMP2121
COMP2911
COMP3901

```

7. Use the pipelines from the above 2 questions to write shell commands which print a list of courses taken by COMP2041 students with counts of how many COMP2041 students take each, like this:

```

55 COMP2911
37 COMP2121
17 COMP3311
10 COMP2111
9 COMP3331
.....

```

8. COMP2041 student Shruti has a 'friends' subdirectory in her home directory that contains images of her many friends. Shruti likes to view these images often and would like to have them appear in other directories within her CSE account so she has written a shell script to symbolically link them to the current directory:

```

for image_file in `ls ~/friends`
do
    ln -s "~/friends/$image_file" .
done

```

The links created by Shruti's script are broken. Why? How can she fix her script?

9. Implement a shell script called `iseq` for writing sequences of integers onto its standard output, with one integer per line. The script can take up to three arguments, and behaves as follows:

- `iseq n` writes all numbers from 1 up to n , inclusive
- `iseq m n` writes all numbers from m up to n inclusive
- `iseq k m n` writes the sequence $k, m, m+(m-k), m+2(m-k)$ up to p (where p is the largest integer in this sequence that is less than or equal to n)

Examples of output:

\$ iseq 5	\$ iseq 2 6	\$ iseq 3 3 16
1	2	3
2	3	6
3	4	9
4	5	12
5	6	15

10. Write a shell script named `isprime` which given an integer as argument, tests whether it is prime and prints a suitable message:

```
$ isprime 42
42 is not prime
$ isprime 113
113 is prime
```

Your script should exit with a non-zero exit status if its argument is not prime.

Write a second script named `primes` which uses the first script to print all primes less than a specified value, e.g.:

```
$ primes 100
2
3
5
7
11
13
17
...
79
83
89
97
```

11. Write a shell script, `list_include_files`, which given a list of C source files (`.c` files) as arguments, prints the names of the files they include (`.h` files), reporting each file only once, e.g.:

```
$ list_include_files count_words.c get_word.c map.c
ctype.h
get_word.h
map.h
stdio.h
stdlib.h
time.h
```

12. COMP2041 student Big Bad Barry tries to impress a girl at a party by betting her she can't work out what this shell script:

```
#!/bin/sh
IFS=abc
echo "$*"
```

prints when run like this:

```
$ ./script.sh mount inside
```

What does the script print?

Will the girl go out with Big Bad Barry?