

**Character (字元):** any 1-byte ASCII symbol.

**Keyboard-characters (可以用鍵盤輸入的字元):** Things you can typed on a keyboard (eg, "x" or "\t" or "\n", but not "\r").

**Lower-case letter (小寫字母):** a single character that is one of the 26 symbols: a-z.

**Upper-case letter (大寫字母):** a single character that is one of the 26 symbols: A-Z.

**Letter (字母):** either an upper or lower case letter.

**Vowel (元音):** any letter from this set: {A, a, E, e, I, i, O, o, U, u}. (The letter 'y' does not count.)

**Consonant (輔音):** any letter that is not a vowel.

**Word (詞):** is a maximum-length sequence of one or more letters.

**Digit ( ( 0-9 之間的任一 ) 數字):** a single character that is one of the ten symbols: 0-9.

**Number (數字):** a maximum-length sequence of one or more digits. As defined here, a number is an integer. So, there are three numbers in the sample sequence "ab\$123,456.00xy" (they are 123, 456, and 00).

**Space (空格):** The character created by hitting the space bar.

**"Fill in the blank" (填空):** Write on your exam paper what text would go in the \_\_\_\_\_, to achieve the indicated output.

**"One command" or "A single command" (單一個指令 (不能使用「;」、「|」、「&&」和「||」)): Your answer cannot use piping (|) or command coordination (&&, ||, ; ).**

**"One command sequence" (不能使用「;」、「&&」和「||」): Your answer cannot use the ";", "&&", or "||" command coordination symbols.**

*Note, above: "A character" is not the same as "a letter". "A digit" is not the same as "a number". "A string of letters" is not the same as a "word". "A string of digits" is not the same as a "number".*

**1. No points will be given for answers that defy a common-sense understanding of the exam question.**

For example, suppose that you were asked to fill in the blank below with a single command:

Q: % echo "1 2 3" | \_\_\_\_\_  
123  
%

Then one possible correct answer would be: `tr -d " "`

An **incorrect** answer would be: `echo 123`

(It is incorrect because common sense tells you that you were meant to use the "1 2 3" to create the answer, not to ignore it and just print out the expected answer.)

**2. The entire exam is in tcsh.**

**3. Each question is independent. Eg: If one question creates a file, then that won't affect later questions.**

**4. Unless told otherwise, files used in this exam have no non-keyboard-characters and no spaces/tabs at the end of lines.**

**5. You will sometimes be asked to predict the output of a command, by choosing one choice from this list:**

- A) always produces an error.
  - B) might produce an error, depending upon the unknown contents of the current directory.
  - C) might produce an error, depending upon the unknown contents of some file.
  - D) might produce an error, depending upon the unknown state of what variables are defined.
  - E) hangs, waiting for the user to type more.
  - F) there is no output (not even blank lines). Note: files might change, just no output.
  - H) there is output, but it is only empty lines or spaces or tabs. (ie, you don't SEE output, except blank stuff.)
  - J) the output is a known number. **Write the Number** next to the letter J.
  - K) the output is an unknown, but non-zero, number.
  - L) the output is an unknown number.
  - M) there can be an output, but that output cannot be predicted.
  - P) there is a predictable output. **Write the output** next to the P.
- If two choices from this list are possible, choose the alphabetically earlier letter.

For example, suppose you type the following:

```
% ls -l F
-rw-r--r--  1 Me None 777 Apr  8 02:08 F
%
```

Q: echo echo                    Answer: **P echo**

Q: cat F                        Answer: **M** (Because we don't know the contents. Note: it's not 'C' because it's not an error.)

Q: cat F | wc -c                Answer: **J 777** (Note: "P" also applies, but "J" is alphabetically earlier.)

Q: cat z                        Answer: **B** (Because we do not know if it exists, as it is not shown above)

Q: echo x > z                  Answer: **F**

Q: cat z                        Answer: **B** (Because we do not know if it exists, since the questions are independent, so the "echo x > z" did not happen, as far as this question is concerned.)

- If the last character printed is **not** a \n, add a "!" (eg the output of `echo -n X`, is "X!".)

- If the output is on multiple lines, indicate that either by putting your answer on multiple lines, or using "\n"

- If an answer uses a space you can make it clear by using a \_ symbol. The only time you don't need to use a "\_" is when it is obvious (eg, you can say "echo Hello world", you don't need to say "echo\_Hello\_world").

Eg Consider the way to write the output for this question: `% echo A        B; echo -n C`

Answer:    **P A\_B**                    or    Answer: **P A\_B\nC!**  
(on 2 lines)                    **C!**                    (on one line)

6. You will also sometimes be asked to write a pattern (sometimes a wildcard pattern, sometimes a regular expression). Note that these regular expressions will only use the syntax covered in lecture. You cannot use extended regular expressions. (For those of you who have used extended regular expressions, such as in your compiler class, this means that the “+”, “?”, and “|” symbols are not allowed.) In some questions you will also be allowed to use grep flags, but only the ones we talked about in lecture.

On the exam, in the part where you need to write the patterns, the following rules must be followed:

- If a question has no solution, write IMPOSSIBLE.
- Also, if any solution requires more than 60 keystrokes, write IMPOSSIBLE.
- You can only fill in the blank to complete the single UNIX command indicated in each question.
- You **can use flags**, but you can't use any flags that we did not discuss in class (eg, you can't use the flag that makes grep act like egrep).
- You must give **proper quoting** that will work in c-shell, **or else your answer is wrong**.
- You must give **the shortest possible answer**. If an answer exists that needs **fewer keystrokes** than your answer, then your answer **will be considered wrong**. The count of keystrokes is the count of how many times the user needs to press any key (other than the shift key) on the keyboard. So keystrokes include any spaces or flags or quoting symbols that would need to be typed.

7. Although I will bring extra copies of this instructions page to class, you can bring your own copy, to save a tree. If possible, print it double-sided, so that it is just one page. You can also write Chinese translation notes on your page. (But you will need to turn this page in with your exam, so that we can verify that you didn't write anything else on this page.)