CSC3320 System Level Programming
Homework 1

Part I: Answer the following questions

1. Tell the differences between Unix and Linux. Then please list some operating systems (at least three) which belong to Unix but not Linux.

2. What is the pipe mechanism in UNIX? And show one command using pipe and explain how the pipe works in it?

3. In a Linux system, you can issue the command **ls /** to check the sub-directories under root. Please describe the meanings of directory /bin, /dev, /boot, /usr, /etc, /mnt, /sbin, /var separately. For example, you can say that /bin contains binary executable files.

4. What is the meaning of Multitask and Multi-user in a Unix system?

5. What does GNU stand for? What is the GNU project? Which organization funded the development of GNU project?

6. In class, you have learned the meaning of read, write and execute permission for regular file. However, these permissions are also applied to directories. So please describe the meaning of read, write, and execute permission for directory.

Part II: Regular Expression

1. Chose match(es) for each given basic/extended regular expression (maybe multiple correct matches) and describe the pattern of matched string for 3), 4), 5), 6), 11).

e.g. 'ab+a' （extended regex）
a) ababa   b) aba   c)abba   d)aabbaa   e)aa

Answer: b,c ; Pattern : The matched string should begin and end with 'a' and 'b' occurs at least once between leading and ending 'a')

Note: 1) to 5) are basic regexes;

1) 'a[ab]*a'
   (a)ababa   (b) aaba   (c) aabab   (d) aabbaa (e)aa

2) 'a(bc)?'
   (a) abc   (b) a(bc)?   (c) a(bc   (d) a   (e) abcbc

3) '.[ind]*'
   (a) wind   (b) window (c) end   (d) good   (e)will

4) '[a-z]+[a-z]'
   (a) a+b+c   (b) +b   (c) x   (d) x+1   (e) x+a

Note: 5) to 12) are extended regexes.

5) '[a-z] (\+[a-z])+'
   (a) a+b+c   (b) +b   (c) x   (d) x+1   (e) x+a

6) 'a.[bc]+'
   (a)azbc   (b) az   (c) azbcbc (d) acc   (e)acz

7) 'a.[0-9]'
   (a)azz   (b) a0z   (c) a01   (d) a0a   (e)aza

8) '[a-z]+[\.\?!]'
   (a)good!   (b) Book.   (c) hard?   (d) cool?hot   (e)nothing

9) '[a-z]+[\.\?!]\s*[A-Z]' (hint: \s matches any whitespace characters)

(a)Grade. A   (b) book. Z (c) E. G   (d) Level. a   (e)index?a

10)   '(very)+(cool)?(good|bad) weather'

(a)good weather   (b) very good weather   (c) cool weather

(d) very cool bad weather   (e)cool good weather

11)   '-?[0-9]+'

(a)3312   (b) -2231   (c) +32   (d) 0.5   (e)2/3

12)   '-?[0-9]*\.?[0-9]*'

(a)3312   (b) -2231   (c) +32   (d) 0.5   (e)2/3

2. Write down the extended regular expression for following questions.

E.g. Social security number in the format of 999-99-9999.

Answer: [0-9]{3}-[0-9]{2}-[0-9]{4}

1) Valid URL beginning with "http://" and ending with ".edu" (e.g. http://cs.gsu.edu, http://gsu.edu)

2) Non-negative integers. (e.g. 0, +1, 3320)

3) A valid absolute pathname in Unix (e.g. /home/ylong4, /test/try.c)

4) Identifiers which can be between 1 and 10 character long, must starting with a letter or an underscore. The following characters can be letters or underscores or digits. (e.g. number, _name1, isOK).

5) Phone number in any of the following format: 9999999999,999-999-9999, (999)-999-9999. (Note: all of these formats should be matched by a single regular expression)

Submssion:

- Upload an electronic copy (MS word or pdf) of your answer sheet to the folder named "**HW1**" of the dropbox in the iCollege system.

- **Please add the homework number and your name at the top of your answer sheet.**

- **Please write down your answers with the question number only in the answer sheet.**

- Name your file in the format of HW1_FisrtnameLastname (eg. HW1_YuanLong.docx, HW1_YuanLong.pdf)