

C Language Programming: Homework #5
Assigned on 11/29/2011(Wednesday), Due on 12/06/2011(Tuesday)

1. Write a program that read data from a file containing a datum called prefix in each line of the file. Each prefix contains an IP number and a prefix length. The following lines show some examples.

0.0.0.0/8
0.2.64.0/15
0.3.0.0/23
0.3.8.0/22
1.3.33.0/24
1.3.38.0/23
1.3.41.0/24

2. The first part a.b.c.d is a 32-bit IP address. So, you have to store the IP address into an unsigned variable. For the prefix length, you can use an unsigned character. So, for all the prefixes, you can use two array to store all the prefixes, e.g., IP[N] and Len[N], where N is the number of prefixes.

3. please do the the following:

- (a) write a function *input(..)* to read all the prefixes from the input file
- (b) print out the total number of prefixes in the input file,
- (c) write a function *length_distribution(..)* to compute the number of prefixes with prefix length i , for $i = 0$ to 32,
- (d) write a function *segment(int d)* to divide the prefixes into 2^d groups such that the prefixes in the same group have the same first d bits and printout the number of prefixes in group i for $i = 0$ to $2^d - 1$.

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1. 禁止使用 goto
 2. 第三題提到的 function 請務必要寫出來，input file 的檔名是讓使用者自行輸入
 3. 第三題的(d)選項，int d 的值是使用者自行輸入的，之後丟入 function 產生 group
Ex: int in; scanf("%d",&in); segment(in);
 4. 同學們寫的程式，最大要能夠允許 d=16, 也就是 2^{16} 個 group
 5. 至少要能讀取一萬筆資料