國立暨南國際大學九十三學年度轉學生入學考試試題

第三節

科目：程式設計　適用：資工系二

編號：312

考生注意：
1. 依次序作答，只要標明題號，不必抄題。
2. 答案必須寫在答案卷上，否則不予計分。
3. 試題隨卷繳回。

本試題共2頁
第1頁

The following program handles the binary tree. The arguments are the possible paths of the tree starting from the root. We denote '0' for left and '1' for right. The program creates the tree for each arguments sequentially. Then it will tranverse the tree in in-order and pre-order.

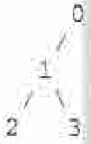
1. 80%

   Please complete the following functions:
   `create(), preOrder(), inOrder().`

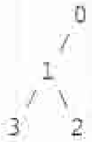
2. 20%

   If we want to know how many nodes in the tree, we may write the function: `int treesize(NodePtr root);`
   Please implement this function.

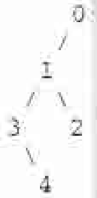
```
$ ./a.out "00" "01"
------ in-order -----
value = 2
value = 1
value = 3
value = 0
------ pre-order -----
value = 0
value = 1
value = 2
value = 3
$
```



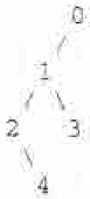
```
$ ./a.out "01" "00"
------ in-order -----
value = 3
value = 1
value = 2
value = 0
------ pre-order ----
value = 0
value = 1
value = 3
value = 2
$
```



```
$ ./a.out "01" "001"
------ in-order -----
value = 3
value = 4
value = 1
value = 2
value = 0
------ pre-order -----
value = 0
value = 1
value = 3
value = 4
value = 2
$
```



```
$ ./a.out "00" "01" "001"
------ in-order -----
value = 2
value = 4
value = 1
value = 3
value = 0
------ pre-order -----
value = 0
value = 1
value = 2
value = 4
value = 3
$
```



```
#include <stdio.h>
#include <stdlib.h>

typedef struct _node {
  int value;
  struct _node *left, *right;
} Node, *NodePtr;

Node Z={-1,&Z,&Z}, *Zptr=&Z;

NodePtr newNode()
{
  static int count = 0;
  NodePtr n;

  if((n=malloc(sizeof(Node)))==NULL)
     return Zptr;
  n->value = count++;
  n->left = n->right = Zptr;
  return n;
}

void create(NodePtr *root, char *path) { ......  }

void inOrder(NodePtr root) { ......  }

void preOrder(NodePtr root) { ......  }

int main(int argc, char *argv[])
{
  int i;
  NodePtr r = Zptr;

  for(i=1; i<argc; i++)
    create(&r, argv[i]);

  printf("------  in-order -----\n");  inOrder(r);
  printf("------  pre-order -----\n"); preOrder(r);
}
```