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Report: HW4

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Description:

將一組數字由大到小排列，可整數或浮點數

quicksort 函式用來由大到小排序

split函式運作細部的排序動作

I have learn:

atoi()、更加熟悉迴圈函數

The bug I met:

取為小數後再比大小順序不太正確，後改為先比大小再乘10^(-5)

N = \*argv[1] –‘0’;只能抓取單一位元，後改為使用N = atoi(argv[1]);

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*Code:

#include <stdio.h>

#include <stdlib.h>

#include <time.h>

void quicksort(int a[], int low, int high); //排序

int split(int a[], int low, int high); //排序的詳細步驟

int main(int argc, char\* argv[])

{

int N,P,i; //N要排幾個數字，P決定數字是整數或浮點數

srand((unsigned)time(NULL));

N = atoi(argv[1]); //輸入總格數

P = \*argv[2] - '0'; //選擇整數或浮點數

int s[N]; //儲存整數

double s\_f[N]; //儲存浮點數

if(P==0) //整數的情況

{

for (i = 0; i < N; i++) s[i]=(rand()%10001); //產生N個0~10000的數字

quicksort(s, 0, N - 1); //由大到小排序

printf("In sorted order:\n"); //印出結果

for (i = 0; i < N; i++)

printf("%d\n", s[i]);

}

else if(P==1) //浮點數的情況

{

for (i = 0; i < N; i++) s[i]=(rand()%1000000001); //產生N個1~10^9的數字

quicksort(s, 0, N - 1); //由大到小排

printf("In sorted order:\n"); //將各個數字除10^5，然後顯示結果

for (i = 0; i < N; i++)

{

s\_f[i]=s[i]\*0.00001;

printf("%f\n", s\_f[i]);

}

}

else //偵錯

{

printf("You can only input 0 or 1 to select the integer or the float.");

return 0;

}

return 0;

}

void quicksort(int a[], int high, int low) //由大到小排

{

int middle;

if (high >= low) return;

middle = split(a, high, low); //將比第一格數字大的放一邊，較小的放另外一邊，記錄分界點

quicksort(a, high, middle - 1); //將剛剛分過的左半，做一樣的事

quicksort(a, middle + 1, low); //將剛剛分過的右半，做一樣的事

}

int split(int a[], int high, int low) //轉換的步驟

{

int part\_element = a[high];

for (;;)

{

while (high < low && part\_element >= a[low]) //若右邊數字較大，放到左邊

low--;

if (high >= low) break;

a[high++] = a[low];

while (high < low && a[high] >= part\_element) //若左邊數字較小，放到右邊

high++;

if (high >= low) break;

a[low--] = a[high];

}

a[low] = part\_element; //將第一格放到特定位置

return low;

}

Compilation:

gcc -o hw4 hw4.c

Execution:

./hw4 [how many numbers] [integer or float]

Output:

C14031162@c-2015-1:~/hw4> ./hw4 4 1

In sorted order:

7507.013710

5519.344440

4833.680860

329.087070