計算機概論 作業九

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HW 9

（一）程式碼

```c
#include<stdio.h>
void sort(int*, int*, int*);
int main(){
    //將預設好的數字由大到小排序後印出
    int a = 9, b = 10, c = 8;
    sort(&a, &b, &c);
    printf("Descending order of a, b, c: %d, %d, %d\n", a, b, c);
    //將使用者輸入的數字由大到小排序後印出
    printf("Enter your own three values:\n");
    scanf("%d%d%d", &a, &b, &c);
    sort(&a, &b, &c);
    printf("Descending order of entered three values: %d, %d, %d\n", a, b,
c);
    return 0;
}
void sort(int *a, int*b, int*c){
    int temp;
    if(*a < *b){
        temp = *a; *a = *b; *b = temp;
    }
    if(*a < *c){
        temp = *a; *a = *c; *c = temp;
    }
    if(*b < *c){
        temp = *b; *b = *c; *c = temp;
    }
}
```

（二）輸出結果

預設數字(10,9,8)及自訂數字(100,1,43)的降排序輸出結果

```
Descending order of a, b, c: 10, 9, 8
Enter your own three values:
100 1 43
Descending order of entered three values: 100, 43, 1
```

（三）延伸(加分題)

輸入一維陣列大小後，隨機生成陣列數字後進行氣泡排序法降排序

1. Version 1

(1) 程式碼

```c
#include<stdio.h>
#include<time.h>
#include<stdlib.h>
void bubble_sort(int *, int *);
int main(){
    int size;
    printf("please enter the matrix of the array:\n");
    scanf("%d", &size);
    int arr[size];
    srand(time(NULL));
    for(int i=0; i<size; i++){
        arr[i] = rand() % 100 + 1; //產生一個元素介於 1~100 的陣列
    }
    printf("Before descending order: ");
    for(int i=0; i<size; i++){
        printf("%d ", arr[i]);
    }

    bubble_sort(arr, &size);
    printf("\nAfter descending order: ");
    for(int i=0; i<size; i++){
        printf("%d ", arr[i]);
    }
    return 0;
}
void bubble_sort(int *ptr, int *size){
    int temp;
```

```
    for(int i=0; i<*size-1; i++){
        for(int j=0; j<*size-1-i; j++){
            if(*(ptr+j) < *(ptr+j+1)){
                temp = *(ptr+j+1);
                *(ptr+j+1) = *(ptr+j);
                *(ptr+j) = temp;
            }
        }
    }
}
```

(2) 輸出結果

使用者輸入陣列大小 10

```
please enter the matrix of the array:
10
Before descending order: 54 68 76 96 60 48 10 61 44 40
After descending order: 96 76 68 61 60 54 48 44 40 10
```

2. Version 2

(1) 程式碼

```
#include<stdio.h>
#include<time.h>
#include<stdlib.h>
void bubble_sort(int *arr, int *);
int main(){
    int size;
    printf("Please enter the matrix of the array:\n");
    scanf("%d", &size);
    int arr[size];
    srand(time(NULL));
    for(int i=0; i<size; i++){
        arr[i] = rand() % 100 + 1; //產生一個元素介於 1~100 的陣列
    }
    printf("Before descending order: ");
    for(int i=0; i<size; i++){
        printf("%d ", arr[i]);
    }
    //將陣列數字由大到小排序後印出(bubble sort)
    bubble_sort(arr, &size);
```

```
    printf("\nAfter descending order: ");
    for(int i=0; i<size; i++){
        printf("%d ", arr[i]);
    }
    return 0;
}
void bubble_sort(int *arr, int *size){
    int temp;
    for(int i=0; i<*size-1; i++){
        for(int j=0; j<*size-1-i; j++){
            if(arr[j]<arr[j+1]){
                temp = arr[j+1];
                arr[j+1] = arr[j];
                arr[j] = temp;
            }
        }
    }
}
```

（2）輸出結果

使用者輸入陣列大小 7

```
Please enter the matrix of the array:
7
Before descending order: 62 31 73 54 30 69 51
After descending order: 73 69 62 54 51 31 30
```