計算機概論 作業六之一

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HW 6-1

（一）程式碼

```
#include <stdio.h>
#define n 20
int judge_numbers(int a[]);
int main (){
    int arr[n], i, j, k, size=20;
    while(1){
        printf("Enter %d numbers between 10 and 100:", size);
        for(i=0; i<size; i++){  //input the number of 1d array
            scanf("%d", &arr[i]);
        }
        if(judge_numbers(arr) == 1){  //if the numbers between 10 and 100,
while loop will stop
            break;
        }
    }
    //judge the duplicted numbers in array and delete them
    for(i=0; i<size; i++){
        for(j=i+1; j<size; j++){
            if(arr[i] == arr[j]){
                // remove the position of the duplicated numbers
                for(k=j; k<size-1; k++){
                    arr[k] = arr[k+1];  //let the next number assign to the
previous number(duplicated), which means that removing the duplicated number
                }
                size--;  //decrease the array size after removing the
duplicated number in array
                j--;  // if the position of the elements is changes, don't
increase the index j
            }
        }
    }
    printf("The non-duplicated numbers are:");
```

```
    for(i=0; i<size; i++){  //output the 1d array numbers after removing the
duplicated elements
        printf ("%3d", arr[i]);
    }
    return 0;
}

int judge_numbers(int a[]){
    for(int i=0; i<n; i++){
        if(a[i] < 10 || a[i] > 100){ //judge the array number whether between
10 and 100 or not
            printf("Your numbers are out of range. Please enter again.\n");
            return 0;  //if the numbers are larger than 100 or smaller than
10, it will return 0
        }
    }
    return 1;  //if the numbers between 10 and 100, it will return 1
}
```

（二）輸出結果

```
Enter 20 numbers between 10 and 100:1 2 3 4 5 6 7 8 9 10 11 1 2 3 4 5 6 7 8 9
Your numbers are out of range. Please enter again.
Enter 20 numbers between 10 and 100:10 11 12 13 14 15 16 17 18 19 20 11 12 13 14 15 16 17 18 19
The non-duplicated numbers are: 10 11 12 13 14 15 16 17 18 19 20
```

（三）延伸

1. 印出未重複的數字(刪除陣列中重複的數字)

（1）version 1 使用布林值

```
#include<stdio.h>
#include<stdbool.h>
#define ArraySize 20
int judge_numbers(int a[]);
int main(){
    int array[ArraySize], i, j;
    while(1){
        printf("Enter %d numbers between 10 and 100:", ArraySize);
        for(i=0; i<ArraySize; i++){ //輸入陣列數字
            scanf("%d", &array[i]);
        }
```

```
        if(judge_numbers(array) == 1){
            break;
        }
    }

    printf("The non-duplicated numbers are:");
    for(i=0; i<ArraySize; i++){
        bool isRepeat = false;
        for(j=0; j<ArraySize; j++){
            if(i == j){ //當 i == j，跳過
                continue;
            }
            else if(array[i] == array[j]){ //當陣列中索引值 i 的數等於陣列中索引值為 J 的數，則代表有數字重複
                isRepeat = true;
                break;
            }
        }
        if(!isRepeat){  //isRepeat = false
            printf("%d", array[i]);
            putchar(' ');
        }
    }
    return 0;
}
int judge_numbers(int a[]){
    for(int i=0; i<ArraySize; i++){
        if(a[i] < 10 || a[i] > 100){ //判斷陣列數字是否介於 10~100
            printf("Your numbers are out of range. Please enter again.\n");
            return 0;
        }
    }
    return 1;
}
```

```
Enter 20 numbers between 10 and 100:1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 16 15 14
Your numbers are out of range. Please enter again.
Enter 20 numbers between 10 and 100:10 11 12 13 14 15 16 17 18 19 20 21 10 11 12 13 14 15 16 17
The non-duplicated numbers are:18 19 20 21
```

(2) version 2

```c
#include<stdio.h>
#include<stdlib.h>
#define n 20

int judge_numbers(int a[]);

int main(){
    int arr[n], i, j;
    while(1){
        printf("Enter %d numbers between 10 and 100:", n);
        for(i=0; i<n; i++){ //輸入陣列數字
            scanf("%d", &arr[i]);
        }
        if(judge_numbers(arr) == 1){
            break;
        }
    }
    printf("The non-duplicated elements are:");
    for(i=0; i<n; i++){
        for(j=0; j<n; j++){
            if(arr[i]==arr[j] && i!=j){
                break;
            }
        }
        if(j == n){
            printf("%2d", arr[i]);
            putchar(' ');
        }
    }
    printf("\n");
    return 0;
}

int judge_numbers(int a[]){
    for(int i=0; i<n; i++){
        if(a[i]<10 || a[i]>100){ //判斷陣列數字是否介於 10~100
            printf("Your numbers are out of range. Please enter again.\n");
```

```
            return 0;
        }
    }
    return 1;
}
```

```
Enter 20 numbers between 10 and 100:1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20
Your numbers are out of range. Please enter again.
Enter 20 numbers between 10 and 100:10 11 12 13 14 15 16 17 18 19 20 10 11 12 13 14 15 16 17 18
The non-duplicated elements are:19 20
```

2. 印出重複的數字

```c
#include<stdio.h>
#define n 20
//判斷出重複數字的程式碼
int judge_numbers(int a[]);
int main(){
    int arr[n], arr2[n], k=0, r, flag, i, j;

    while(1){
        printf("Enter %d numbers between 10 and 100:", n);
        for(i=0; i<n; i++){ //輸入陣列數字
            scanf("%d", &arr[i]);
        }
        if(judge_numbers(arr) == 1){
            break;
        }
    }

    for(i=0; i<n; i++){
        for(j=0; j<n; j++){
            flag = 0;
            if(i != j && arr[i] == arr[j]){
                for(r=0; r<k; r++){
                    if(arr2[r] == arr[j]){
                        flag = 1;
                    }
                }
                if(flag != 1){
                    arr2[k++] = arr[j];
                }
            }
        }
    }
    printf("The duplicated numbers are:");
    for(i=0; i<k; i++){
        printf("%d", arr2[i]);
        putchar(' ');
    }
```

```
    return 0;
}

int judge_numbers(int a[]){
    for(int i=0; i<n; i++){
        if(a[i]<10 || a[i]>100){ //判斷陣列數字是否介於 10~100
            printf("Your numbers are out of range. Please enter again.\n");
            return 0;
        }
    }
    return 1;
}
```

```
Enter 20 numbers between 10 and 100:1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20
Your numbers are out of range. Please enter again.
Enter 20 numbers between 10 and 100:10 11 12 13 14 13 12 11 24 25 26 27 28 36 35 36 27 28 18 76
The duplicated numbers are:11 12 13 27 28 36
```