實驗項目- 民意調查

一、 本節目的：

- 指標以及指標運算子

二、 設計重點：

- 利用指標來以傳參考呼叫的方式傳遞引數給函式

三、 實驗題目：

寫一個簡單的民意調查程式，讓使用者針對五個社會意識議題來評分，1 代表最不重要，10 代表最重要的議題。選擇五個對你來說重要的議(例如：政治議題、全球環境議題等等)。使用一個一維陣列 topics(型別為 char *) 來儲存這五個議題。為了要整理調查結果，請你使用具有 5 列、10 行的二維陣列 responses(型別為 int)，每一列都對應到 topics 陣列的一個元素。當程式執行時，他應該要求使用者對每個議題進行評分。然後讓程式顯示整理過後的結果，包括：

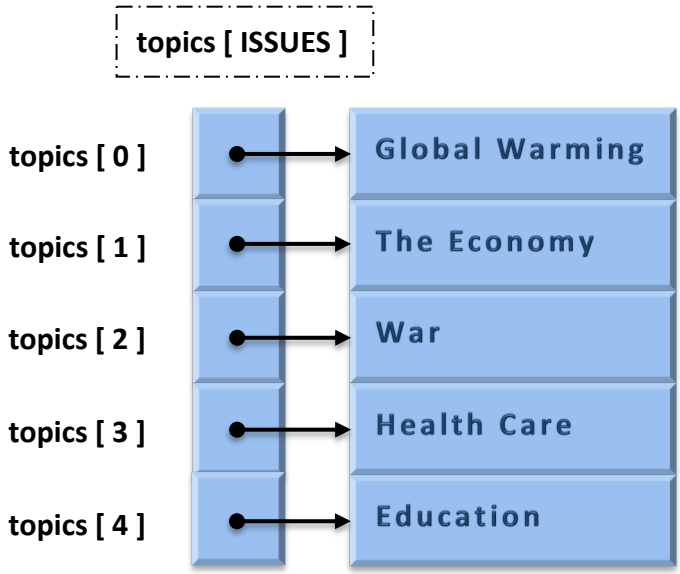
a) 以表格顯示結果，將五個議題顯示在左邊，十個等級的評分方式放在上方在每一格列出每個議題在該評分等級的計數。
b) 在每一列的最右邊，列出該議題的平均分數。
c) 哪一個議題得到最高的總點數？印出該議題以及所得點數。
d) 哪一個議題得到最低的總點數？印出該議題以及所得點數。

四、 程式解說：

- 此程式定義了一個指標陣列 topics (第 14~15 行)，topics 陣列內的 4 個字串分別為 Global Warming、The Economy、War、Health Care、Education

```
14  const char *topics[ISSUES] = { "Global Warming", "The Economy",
15                                 "War", "Health Care", "Education" };
```

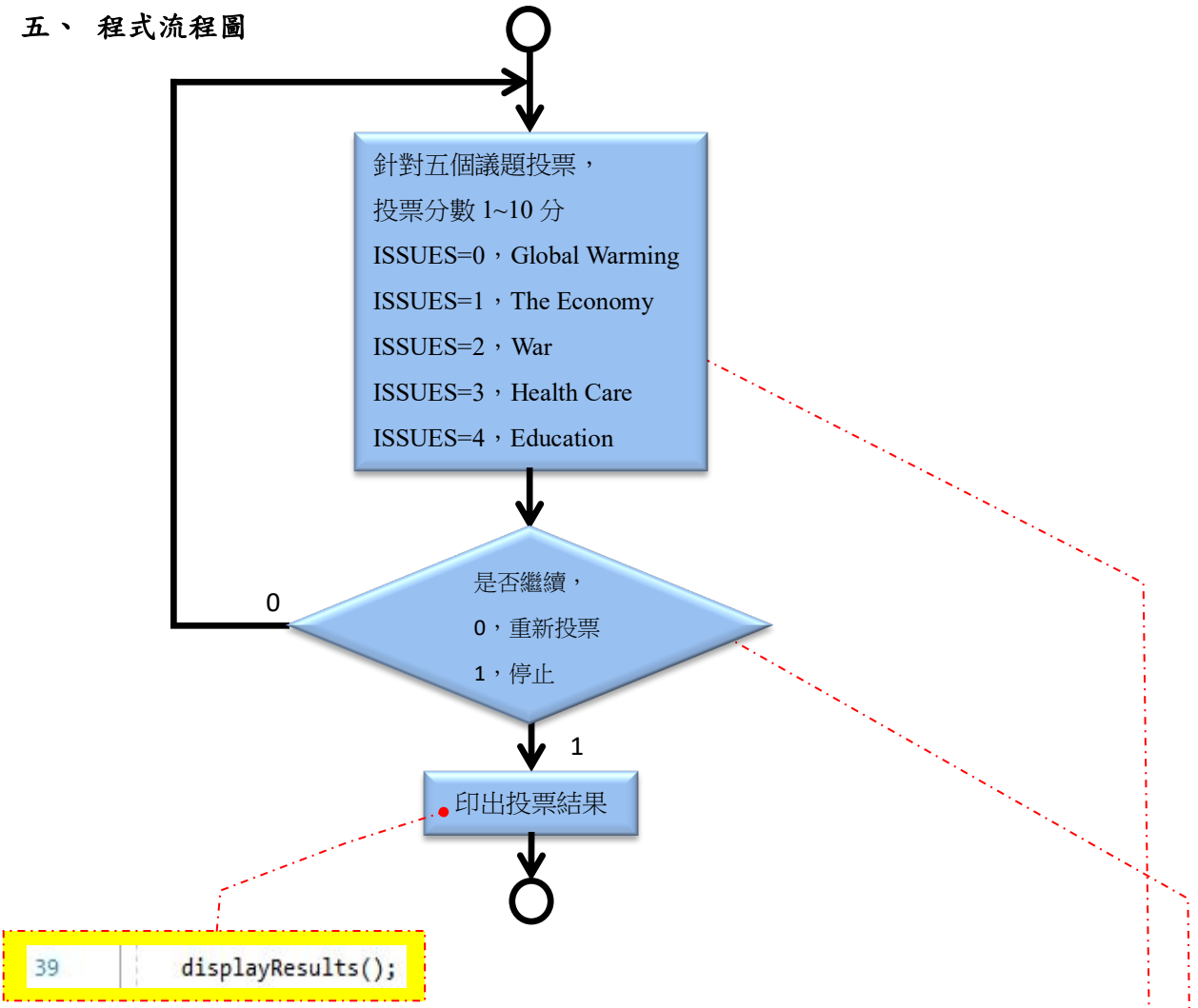
- 指標陣列 topics 裡位址 0 放置對應的字串 Global Warming
  位址 1 放置對應的函式 The Economy
  位址 2 放置對應的函式 War
  位址 3 放置對應的函式 Health Care
  位址 4 放置對應的函式 Education　　(如下圖所示)



- 程式到第 26 行，執行 for loop，到了第 27 行時，
  i=0，即 topics[0]對應到字串 Global Warming 印出
  i=1，即 topics[1]對應到字串 The Economy 印出
  i=2，即 topics[2]對應到字串 War 印出
  …以此類推

```
24      for (i = 0; i < ISSUES; i++) {
25
26          do {
27              printf("%s? ", topics[i]);
28              scanf_s("%d", &response);
29          } while (response < 1 || response>10);
30
31          recordResponse(i, response);
32      }
```

五、 程式流程圖




```
39      displayResults();
```

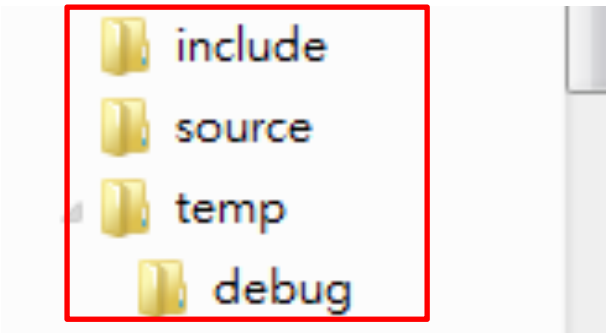
```
21          printf("Please rate the following topics on a scale from 1 - 10"
22              "\n 1 = least important, 10 = most important\n");
23
24          for (i = 0; i < ISSUES; i++) {
25
26              do {
27                  printf("%s? ", topics[i]);
28                  scanf_s("%d", &response);
29              } while (response < 1 || response>10);
30
31              recordResponse(i, response);
32          }
```

```
19      do
20      {
            ...
34          printf("Enter 1 to stop. Enter 0 to rate the issues again.");
35          scanf_s("%d", &response);
36
37      } while (response != 1);
```

六、 設計步驟：

1. 建立新的空專案

   Step1-在 C:\c_code 資料夾內新增名為“Ch5_Lab2”的資料夾，再於 Ch5_Lab2 資料夾內分別建立 include、source、temp 等資料夾，建立後需要在 temp 資料夾內新增名為“debug”的資料夾，建立完成後如下圖

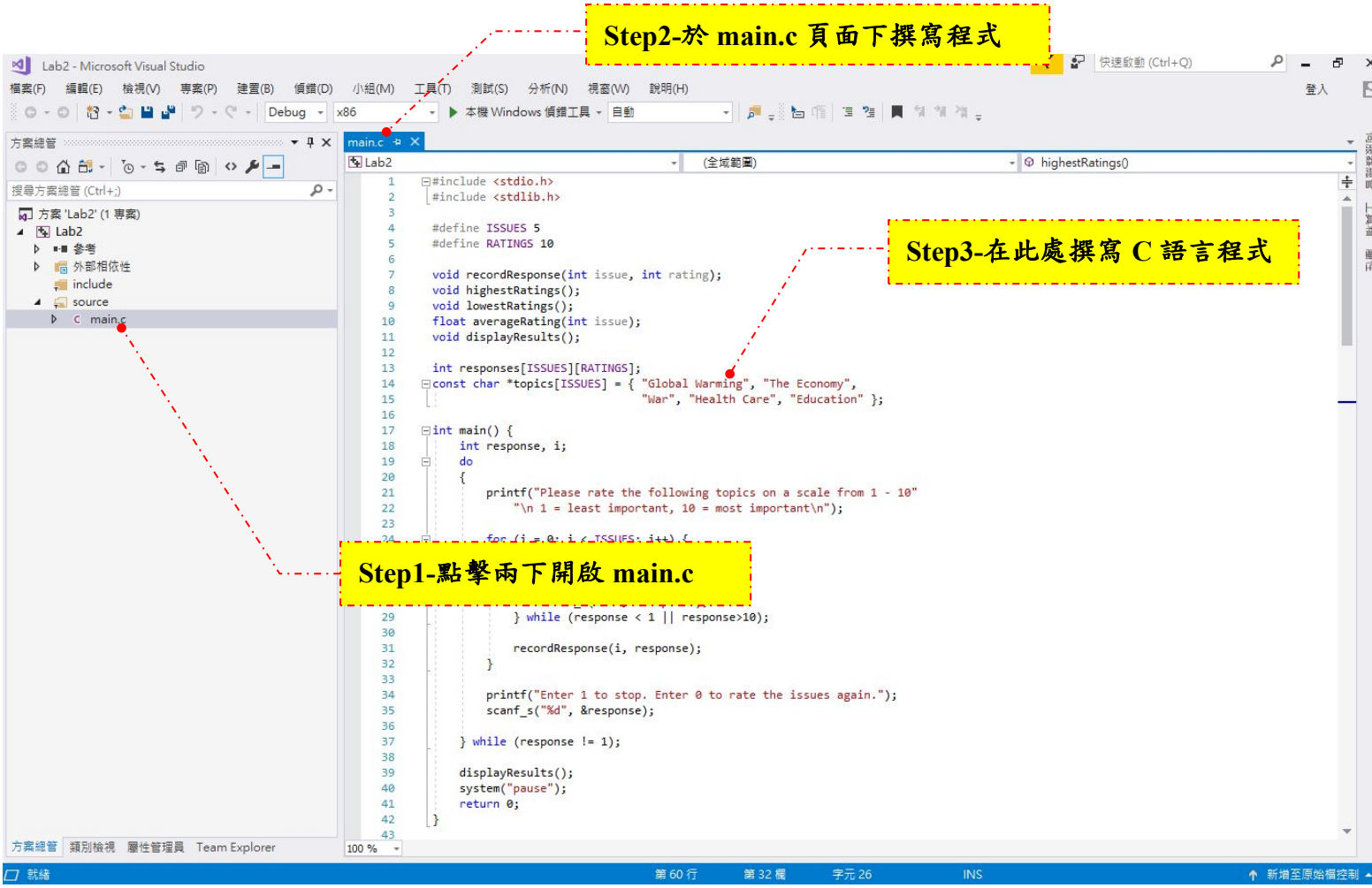


   Step2-參照 Ch1_Lab3 中“1.建立新的空專案”Step2~Step4，設定相關路徑位置為 C:\c_code\ Ch5_Lab2

2. 路徑設定、新增 .c 檔

   Step1-參照 Ch1_Lab3 中“2. 路徑設定、新增 .c 檔”Step1~Step8，新增 main.c 檔與設定相關屬性設定。

3. 撰寫 C 語言程式


Step2-於 main.c 頁面下撰寫程式
Step3-在此處撰寫 C 語言程式
Step1-點擊兩下開啟 main.c
Lab2 - Microsoft Visual Studio
main.c
Lab2
(全域範圍)
highestRatings()
方案 'Lab2' (1 專案)
參考
外部相依性
include
source
main.c
#include <stdio.h>
#include <stdlib.h>
#define ISSUES 5
#define RATINGS 10
void recordResponse(int issue, int rating);
void highestRatings();
void lowestRatings();
float averageRating(int issue);
void displayResults();
int responses[ISSUES][RATINGS];
const char *topics[ISSUES] = { "Global Warming", "The Economy",
"War", "Health Care", "Education" };
int main() {
int response, i;
do
{
printf("Please rate the following topics on a scale from 1 - 10"
"\n 1 = least important, 10 = most important\n");
} while (response < 1 || response>10);
recordResponse(i, response);
}
printf("Enter 1 to stop. Enter 0 to rate the issues again.");
scanf_s("%d", &response);
} while (response != 1);
displayResults();
system("pause");
return 0;
}

main.c 程式碼：

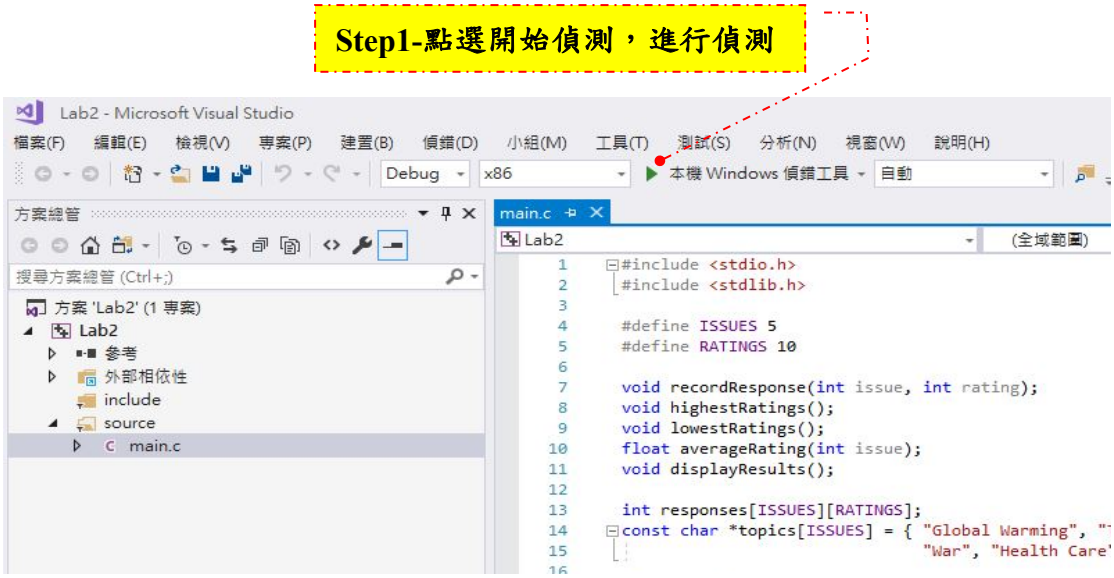
```c
#include <stdio.h>
#include <stdlib.h>

#define ISSUES 5
#define RATINGS 10

void recordResponse(int issue, int rating);
void highestRatings();
void lowestRatings();
float averageRating(int issue);
void displayResults();

int responses[ISSUES][RATINGS];
const char *topics[ISSUES] = { "Global Warming", "The Economy",
                               "War", "Health Care", "Education" };

int main() {
    int response, i;
    do
    {
        printf("Please rate the following topics on a scale from 1 - 10"
            "\n 1 = least important, 10 = most important\n");

        for (i = 0; i < ISSUES; i++) {

            do {
                printf("%s? ", topics[i]);
                scanf_s("%d", &response);
            } while (response < 1 || response>10);

            recordResponse(i, response);
        }

        printf("Enter 1 to stop. Enter 0 to rate the issues again.");
        scanf_s("%d", &response);

    } while (response != 1);

    displayResults();
    system("pause");
    return 0;
}
```

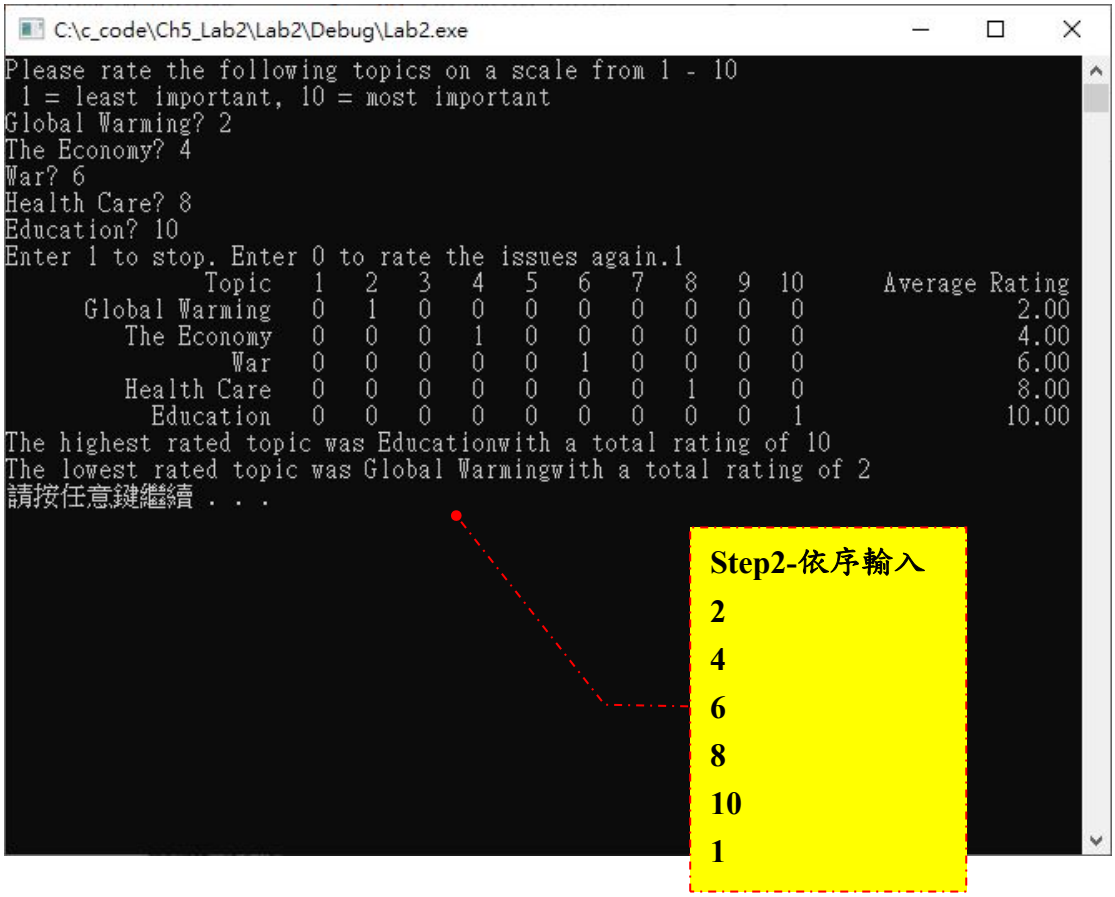
```
44  void recordResponse(int issue, int rating) {
45      responses[issue][rating - 1]++;
46  }
47
48  void highestRatings() {
49
50      int highRating = 0;
51      int highTopic = 0;
52      int i, j;
53
54      for (i = 0; i < ISSUES; i++) {
55          int topicRating = 0;
56          for (j = 0; j < RATINGS; j++) {
57              topicRating += responses[i][j] * (j + 1);
58          }
59
60          if (highRating < topicRating) {
61              highRating = topicRating;
62              highTopic = i;
63          }
64      }
65
66      printf("The highest rated topic was ");
67      printf("%s", topics[highTopic]);
68      printf("with a total rating of %d\n", highRating);
69
70
71  }
```

```
72
73  void lowestRatings() {
74
75      int lowRating = 0;
76      int lowTopic = 0;
77      int i, j;
78
79      for (i = 0; i < ISSUES; i++) {
80          int topicRating = 0;
81
82          for (j = 0; j < RATINGS; j++) {
83              topicRating += responses[i][j] * (j + 1);
84          }
85
86          if (i == 0) {
87              lowRating = topicRating;
88          }
89          if (lowRating > topicRating) {
90              lowRating = topicRating;
91              lowRating = i;
92          }
93      }
94
95      printf("The lowest rated topic was ");
96      printf("%s", topics[lowTopic]);
97      printf("with a total rating of %d\n", lowRating);
98
99  }
```

```c
float averageRating(int issue) {
    float total = 0;
    int counter = 0;
    int i;

    for (i = 0; i < RATINGS; i++) {

        if (responses[issue][i] != 0) {
            total += responses[issue][i] * (i + 1);
            counter += responses[issue][i];
        }

    }
    return total / counter;
}

void displayResults() {

    int i, j;
    printf("%20s", "Topic");

    for (i = 1; i <= RATINGS; i++) {
        printf("%4d", i);
    }

    printf("%20s", "Average Rating");

    for (i = 0; i < ISSUES; i++) {

        printf("%20s", topics[i]);

        for (j = 0; j < RATINGS; j++) {
            printf("%4d", responses[i][j]);
        }

        printf("%20.2f", averageRating(i));
    }

    highestRatings();
    lowestRatings();

}
```

4. 執行與測試程式結果


Step1-點選開始偵測，進行偵測
Lab2 - Microsoft Visual Studio
檔案(F) 編輯(E) 檢視(V) 專案(P) 建置(B) 偵錯(D) 小組(M) 工具(T) 測試(S) 分析(N) 視窗(W) 說明(H)
Debug
x86
本機 Windows 偵錯工具
自動
方案總管
搜尋方案總管 (Ctrl+;)
方案 'Lab2' (1 專案)
Lab2
參考
外部相依性
include
source
main.c
main.c
Lab2
(全域範圍)
#include <stdio.h>
#include <stdlib.h>
#define ISSUES 5
#define RATINGS 10
void recordResponse(int issue, int rating);
void highestRatings();
void lowestRatings();
float averageRating(int issue);
void displayResults();
int responses[ISSUES][RATINGS];
const char *topics[ISSUES] = { "Global Warming",
"War", "Health Care"


C:\c_code\Ch5_Lab2\Lab2\Debug\Lab2.exe
Please rate the following topics on a scale from 1 - 10
1 = least important, 10 = most important
Global Warming? 2
The Economy? 4
War? 6
Health Care? 8
Education? 10
Enter 1 to stop. Enter 0 to rate the issues again.1
Topic 1 2 3 4 5 6 7 8 9 10 Average Rating
Global Warming 0 1 0 0 0 0 0 0 0 0 2.00
The Economy 0 0 0 1 0 0 0 0 0 0 4.00
War 0 0 0 0 0 1 0 0 0 0 6.00
Health Care 0 0 0 0 0 0 0 1 0 0 8.00
Education 0 0 0 0 0 0 0 0 0 1 10.00
The highest rated topic was Educationwith a total rating of 10
The lowest rated topic was Global Warmingwith a total rating of 2
請按任意鍵繼續 . . .
Step2-依序輸入
2
4
6
8
10
1