**國立臺灣科技大學**

**電子工程系**

資料結構

Lab1

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Methodology：

將所有字元照順序讀入，如果是左括號就使用Stack儲存，如果是右括號就和Stack pop data比對，如果錯誤就輸出錯誤訊息，其餘資料則不做動作，最後所有資料讀取完top會=-1，如果不為-1則出現錯誤訊息。

Code：

|  |
| --- |
| #include <stdio.h>  #include <stdlib.h>  #define \_CRT\_SECURE\_NO\_WARNINGS  void SelectionSort(int list[], int list2[], int n); //Sort資料  void SWAP(int\* a, int\* b); //SWAP資料  int whichBracket(char c); //判斷為何種括號  int judgeBracket(char c); //判斷左括號右刮號or不是括號  typedef struct Stack //Stack  {  int top;  int array[256];  }Stack;  int main()  {  int c = 0; //當前文件字元  int arrayindex = 0; //當前陣列index  int BracketError = 0; //如果配對失敗 = 1  int Match = 0; //括號Match數量  int Matcharray1[256] = { '\0' }; //match左括號index  int Matcharray2[256] = { '\0' }; //match右括號index  FILE\* inFILE; //input.txt  FILE\* outFILE; //output.txt  Stack CharStack; //字元Stack  Stack IndexStack; //IndexStack  CharStack.top = -1;  IndexStack.top = -1;    fopen\_s(&inFILE, "Input.txt", "r"); //開啟Input.txt  fopen\_s(&outFILE, "Output.txt", "w+"); //開啟Output.txt  if (inFILE == NULL) //檔案開啟是否正常  {  printf("fail to open file");  return -1;  }  while (c != EOF)  {  c = fgetc(inFILE);  if (c == '\n' || c == EOF) //資料換行  {  if (BracketError == 1|| CharStack.top != -1) //括號配對失敗  { //輸出至檔案  fprintf(outFILE, "-1\n");  fprintf(outFILE, "%d\n",IndexStack.array[0]);  }  else  { //資料配對成功  SelectionSort(Matcharray1,Matcharray2, Match); //排序資料  fprintf(outFILE, "1\n"); //輸出至檔案  for (int i = 0; i < Match; i++)fprintf(outFILE, "%d,%d;", Matcharray1[i], Matcharray2[i]);  fprintf(outFILE,"\n");  }  BracketError = 0; //initialize  arrayindex = 0;  CharStack.top = -1;  IndexStack.top = -1;  Match = 0;  }  else  {  switch (judgeBracket(c)) //判斷左括號右刮號  {  //是左括號:pushchar & pushindex  case 1: CharStack.array[++(CharStack.top)] = c;  IndexStack.array[++(IndexStack.top)] = arrayindex;  break;  //是右括號:pop & detect是否正確  case 2:  if(whichBracket(c)==whichBracket(CharStack.array[CharStack.top--]))  {  Matcharray1[Match] = (IndexStack.array[IndexStack.top--]);  Matcharray2[Match++] = arrayindex;  }  else BracketError = 1;  break;  default:break;  }  arrayindex++;  }  }  fclose(inFILE); //關閉Input.txt  fclose(outFILE); //關閉Output.txt  return 0;  }  int judgeBracket(char c)  {  if (c == '(' || c == '[' || c == '{') return 1;  else if (c == ')' || c == ']' || c == '}') return 2;  else return 0;  }  int whichBracket(char c)  {  if (c == '(' || c == ')') return 0;  if (c == '[' || c == ']') return 1;  if (c == '{' || c == '}') return 2;  }  void SelectionSort(int list[],int list2[], int n)  {  for (int i = 0; i < n - 1; i++) {  int min = i;  for (int j = i + 1; j < n; j++) if (list[j] < list[min]) min = j;  SWAP(&list[i], &list[min]);  SWAP(&list2[i], &list2[min]);  }  }  void SWAP(int\* a, int\* b)  {  int temp = \*a;  \*a = \*b;  \*b = temp;  } |

Result：一張含有 文字, 螢幕擷取畫面, 軟體, 陳列 的圖片

自動產生的描述

Discussion and Conclusion：

我原本將Struct Stack包裝成包含push pop top array

但我將語言從C++換成C時才發現Struct在C和C++的差別，C++的Struct裡面可以包含function，但是C的不能包含function。