撰寫 C 程式用到的核心語法

丁培毅

型態宣告與定義

`int i;`	整數變數
`int *j, k;`	j: 整數指標變數, k: 整數變數
`unsigned char *ch;`	ch: 無正負號字元變數的指標變數
`double f[10];`	10 個倍精準浮點數的陣列
`char nextChar(int, char*);`	2 個參數的函式
`int a[3][5][10];`	3 個元素的陣列, 每一個元素是 5 個子元素的陣列, 每一個子元素是 10 個整數的陣列
`int *func1(float);`	回傳整數指標的函式, 此函式接受單一浮點數參數
`int (*func2)(void);`	函數指標變數, 指到的函式不接受參數, 回傳整數值

輸入輸出

- #include <stdio.h>
- scanf(), getchar(), gets(), fscanf(), getc(), fgets(), sscanf()
  %d, %f, %lf, %c, %lld (%I64d), %s, %n, %[abc], space
- printf(), putchar(), puts(), fprintf(), fputc(), fputs(), sprintf()
  %d, %f, %c, %lld (%I64d), %s, other char
- FILE *fp = fopen("input.txt", "r");
  …fscanf(), fgets(), getc(), ftell(), fseek(), rewind() …
  fclose(fp);
- FILE *fp = fopen("output.txt", "w");
  …fprintf(), fputs(), putc(), fflush(), …
  fclose(fp);

函式

- Function definition
  return_type func_name(func_parameters)
  {
  　statements
  }
- Function call
  func_name(func_arguments) … used as a return_type expr
- Function prototype
  return_type func_name(func_parameters);
- Function pointer
  return_type (*func_ptr)(func_parameters);
- Function call with function pointer
  (*func_ptr)(func_arguments) … used as a return_type expr

條件判斷

- **if (**condition**)**
  compound_statement
- **if (**condition**)**
  compound_statement
  else
  compound_statement
- **if (**condition**)**
  compound_statement
  else if
  compound_statement
  else if
  compound_statement
  else
  compound_statement

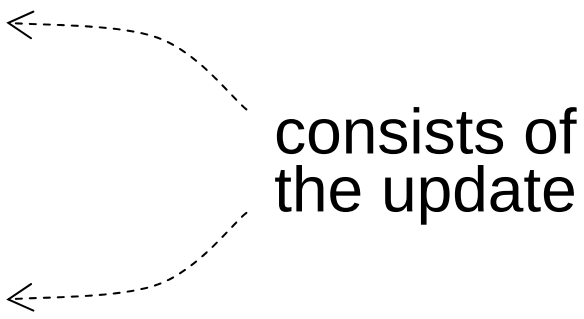
- **switch (**int_value**)**
  {
  case value1**:**
  statements
  break;
  case value2**:**
  statements
  case value3:
  statements
  break;
  default:
  statements
  }
- condition **?** stmt1 **:** stmt2

迴圈

- **for (**initialization**;** looping_condition**;** update**)**
  compound_statement

- initialization
  while (looping_condition**)**
  compound_statement

- **do**
  compound_statement
  while (looping_condition**);**



陣列

- Definition
  type name[size];
- Usage
  name[index]　　*(name+index)

- Multi-dimensional
  type name[size1][size2];

  typedef type newType[size2];
  newType name[size1];

結構

- Definition

```
struct Name {
    type field1;
    type field2;
    …
};
struct Name sVar, sVar2, sArray[size], *sPtr = &sVar;
        (C++: Name sVar, sVar2, sArray[size], *sPtr = &sVar;)
typedef struct Name NAME;
NAME sVar, sVar2, sArray[size], *sPtr = &sVar;
```

- Usage

```
sVar.field1    sPtr->field2    (*sPtr).field2
sVar = sVar2;
```

指標

- Definition

  type *ptr;

  type *ptr_array[size]; // typedef type *PTR;
  // PTR ptr_array[size];

  type (*ptr_to_array)[size]; // typedef type ARY[size];
  // ARY *ptr_to_array;

- Usage

  type var, *ptr = &var;

  *ptr is the same as var

  struct {int x; double y} svar, *ptr = &svar;

  *ptr is the same as svar

  ptr->x is the same as (*ptr).x