計算機韌體實驗（P01）
3n+1問題/The 3n+1 Problem

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解題要訣

- 整數(int)的上限（最大值）
- 奇偶數的判定
  - 是否為2的倍數

int vs. long long

- int: 4 bytes
  - Max. 2^{31}-1 (2147483647)
- (after VC++ 2010) long long: 8bytes
  - Max. 2^{63}-1
  - Formatted character: %lld for printf() and scanf()

Lib. Function: scanf();

- 傳回成功讀取資料的個數
  - 遇檔尾(EOF, end of file, -1)結束，傳回-1
    - E.g. while(scanf("%d", &n) == 1){…}
    - E.g. while(scanf("%d", &n) != EOF) {…}

➢讀取**數值，字串(%s)**時**會**跳過空白

➢讀取**字元(%c)**時**不會**跳過空白

Promotion Rule

- Specify how types can be converted to other types without losing data
  - Covert a lower data type into a higher one (upgrade) without losing data; otherwise, a warning message is issued for degradation
    - E.g. int into long long

奇偶數的判定

```
21      while(scanf("%d", &n) == 1){//scanf() 傳回成功讀取資料的個數
22          nLong = n; //promotion rule
23
24          count = 0;
25          while(nLong > 1){
26              ++count;
27              if(nLong % 2 == 1){//判斷是否為奇數
28                  nLong = nLong*3 + 1;
29              }else{//偶數
30                  nLong /= 2;
31              }
32          }
33          printf("%d\n", count);
34      }
```