計算機韌體實驗（P12）
追蹤試算表中的儲存格/Spreadsheet Tracking

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解題要訣

- 先將所有操作儲存，然後對於每個查詢重新執行這些操作
- Type vector<*type*> 的向量可以儲存任意長度的*type*陣列
  - vector is define in <vector>

```
12 typedef struct command{
13     char c[3]; //"EX", "DC", "DR", "IC", "IR"
14     int r1, c1, r2, c2;
15     int a;
16     int x[10]; //依題意
17 }CMD;
18 vector<CMD> cmd;
```

儲存操作

- 向量元素的存取（注意向量的大小與合法範圍）

```
34          for(i=0; i<n; i++){
35              cmd.resize(cmd.size()+1);  Member Function
36              scanf("%s", cmd[i].c);
37              if(cmd[i].c[0] == 'E'){
38                  scanf("%d%d%d%d", &cmd[i].r1, &cmd[i].c1, &cmd[i].r2, &cmd[i].c2);
39              }else{
40                  scanf("%d", &cmd[i].a);
41                  for(j=0; j<cmd[i].a; j++){
42                      scanf("%d", &cmd[i].x[j]);
43                  }
44              }
45          }
```

執行操作：Ex

```
90          if(cmd[i].c[0] == 'E'){ //"EX"
91              if(cmd[i].r1 == *r0 && cmd[i].c1 == *c0){
92                  *r0 = cmd[i].r2;
93                  *c0 = cmd[i].c2;
94              }else if(cmd[i].r2 == *r0 && cmd[i].c2 == *c0){
95                  *r0 = cmd[i].r1;
96                  *c0 = cmd[i].c1;
97              }
98          }else{//計算列變化量, 行變化量
```

執行操作：IR, IC, DR, DC

```
98          }else{//計算列變化量, 行變化量
99              dr = dc = 0;
100             for(j=0; j<cmd[i].a; j++){
101                 x = cmd[i].x[j];
102                 if(cmd[i].c[0] == 'I'){
103                     if(cmd[i].c[1] == 'R' && *r0 >= x) dr++; //"IR"
104                     if(cmd[i].c[1] == 'C' && *c0 >= x) dc++; //"IC"
105                 }else{//cmd[i].c[0] == 'D'
106                     if(cmd[i].c[1] == 'R' && *r0 == x) return 0; //"DR" : 所在列被刪除
107                     if(cmd[i].c[1] == 'C' && *c0 == x) return 0; //"DC" : 所在欄被刪除
108                     if(cmd[i].c[1] == 'R' && *r0 > x) dr--; //"DR"
109                     if(cmd[i].c[1] == 'C' && *c0 > x) dc--; //"DC"
110                 }
111             }
112             *r0 += dr;//更新
113             *c0 += dc;
114         }
```

Member Functions

- size_type vector::size();
  - Return the number of elements in the vector
  - size_type is an alias of unsinged int
- void vector::resize(size_type *n*);
  - Resize the vector so that it contains *n* elements
  - If *n* is greater than the current size, the vector is expanded

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