計算機韌體實驗（P18）
團體佇列/Queue

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佇列: queue

- queue<*type*>是一種先進先出(First-In First-Out, FIFO)的容器
  - queue is define in <queue>
- 主要運算
  - 由後端(back)推入(push)
  - 由前端(front)彈出(pop)

解題要訣

- 使用map記錄每個隊員所屬的團隊

```
26          map<int, int> team; //block scope
```

- 每個團隊有一個佇列queue管理隊員

```
36          queue<int> elementQueue[1000]; //elemnetQueue[i]: queue of elements of team i
```

- 團隊整體亦有一個佇列queue管理團隊

```
35          queue<int> teamQueue;
```

記錄所有隊員的團隊編號

```
27          for(i=0; i<t; i++){
28              scanf("%d", &n);//n: the number of elements of team i
29              while(n--){
30                  scanf("%d",  &x);//x: element
31                  team[x] = i;
32              }
33          }
```

ENQUEUE x

- 編號為x的人進入長隊

```
52              }else if(cmd[0] == 'E'){//ENQUEUE
53                  scanf("%d", &x);
54                  t0 = team[x];
55                  if(elementQueue[t0].empty()){ Member Function
56                      teamQueue.push(t0); Member Function
57                  }
58                  elementQueue[t0].push(x);
59              }
```

DEQUEUE

- 移除長隊的佇列首

```
45              }else if(cmd[0] == 'D'){//DEQUEUE
46                  t0 = teamQueue.front(); Member Function
47                  cout << elementQueue[t0].front() << endl;
48                  elementQueue[t0].pop(); Member Function
49                  if(elementQueue[t0].empty()){
50                      teamQueue.pop();
51                  }
```

Member Functions (1/2)

- bool queue::empty();
  - Test whether the queue is empty
- void queue::push(const value_type &val);
  - Insert a copy of val at the end of the queue (after its current last element)\

*Member Function*s (2/2)

- value_type queue::front(void);
  - Return a reference to the front (oldest) element in the queue
- void queue::pop(void)
  - Remove the element on the front of the queue, effectively reducing its size by one