# 2019/4/9 XX1072078 郭俊志 hw3

1. 程式概念
- 下方為file tree

```
XX1072078_hw3
| - - 3-1
|     | - -hw3_1.cpp
|     | - -input.txt
| - - 3-2
|     | - -hw2_2.cpp
|     | - -BTS.h
|     | - -BTS.cpp
```

- 使用方式

$ cd
$ git clone https://github.com/tony92151/algorithm_homework.git
$ cd ~/algorithm_homework/hw3/3-1
$ g++ hw3_1.cpp && ./a.out

$ cd ~/algorithm_homework/hw3/3-2
$ g++ hw3_2.cpp && ./a.out

- 3-1
- 用selection 找出第三小的數值，再用InsertionSort驗證

RANDOMIZED-SELECT$(A, p, r, i)$

1  **if** $p == r$
2      **return** $A[p]$
3  $q =$ RANDOMIZED-PARTITION$(A, p, r)$
4  $k = q - p + 1$
5  **if** $i == k$        **//** the pivot value is the answer
6      **return** $A[q]$
7  **elseif** $i < k$
8      **return** RANDOMIZED-SELECT$(A, p, q - 1, i)$
9  **else return** RANDOMIZED-SELECT$(A, q + 1, r, i - k)$

RANDOMIZED-PARTITION$(A, p, r)$

1  $i =$ RANDOM$(p, r)$
2  exchange $A[r]$ with $A[i]$
3  **return** PARTITION$(A, p, r)$

PARTITION$(A, p, r)$

1  $x = A[r]$
2  $i = p - 1$
3  **for** $j = p$ **to** $r - 1$
4      **if** $A[j] \leq x$
5          $i = i + 1$
6          exchange $A[i]$ with $A[j]$
7  exchange $A[i + 1]$ with $A[r]$
8  **return** $i + 1$

```
~/Documents/github_project/algorithm_homework/XX1072078_hw3_v/3-1    master • ?   g++ hw3_1.cpp && ./a.out
Length:20
Array : 68  12  19  53  0  11  4  67  79  32  45  67  62  58  43  98  24  9  3  21
Find 3th small number
Result : 4
New array : 0  3  4  9  11  12  19  21  24  32  43  45  53  58  62  67  67  68  79  98
~/Documents/github_project/algorithm_homework/XX1072078_hw3_v/3-1    master • ?
```

- BTS

```
~/Documents/github_project/algorithm_homework/XX1072078_hw3_v/3-2    master ●  g++ hw3_2.cpp && ./a.out
init BTS :
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19

Remove 10 from BTS :
0 1 2 3 4 5 6 7 8 9 11 12 13 14 15 16 17 18 19

Add 50 in BTS :
0 1 2 3 4 5 6 7 8 9 11 12 13 14 15 16 17 18 19 50
~/Documents/github_project/algorithm_homework/XX1072078_hw3_v/3-2    master ●
```