Binary Heaps: Homework 2

24/3/2020

1. By modifying the code written during the last lessons, provide an array-based implementation of binary heaps which avoids to swap the elements in the array `A`.
   (*Hint*: use two arrays, `key_pos` and `rev_pos`, of natural numbers reporting the position of the key of a node and the node corresponding to a given position, respectively)

2. Consider the next algorithm:

```
def Ex2(A)
  D ← build(A)

  while ¬ is_empty(D)
        extract_min(D)
  endwhile
enddef
```

   where `A` is an array. Compute the time-complexity of the algorithm when:

   - `build`, `is_empty`$\in \Theta(1)$, `extract_min`$\in \Theta(|D|)$;
   - `build`$\in \Theta(|A|)$, `is_empty`$\in \Theta(1)$, `extract_min`$\in O(\log |D|)$;