Filtrado Mediana

swap

```
1 void swap(vector<int> &w, int i, int j) {
2     int aux = w[i];
3     w[i] = w[j];
4     w[j] = aux;
5 }
```

c_1	1
c_2	1
c_3	1

- $m = |w|$
- $T_{swap}(m) = c_1 + c_2 + c_3$
- $T_{swap}(m) \in O(1)$

insert

```
1 void insert(vector<int> &w, int i) {
2     int j = i;
3     while (j > 0 && w[j] < w[j - 1]) {
4         swap(w, j, j - 1);
5         j--;
6     }
7 }
```

c'_1	1
c'_2	m+1
c'_3	m
c'_4	m

- $m = |w|$
- $T_{insert}(m) = c'_1 + c'_2 \cdot (m+1) + c'_3 \cdot m + c'_4 \cdot m$
- $T_{insert}(m) \in O(m)$

insertionSort

```
1  vector<int> insertionSort(vector<int> w) {
2      vector<int> res = w;
3
4      int i = 0;
5      while (i < w.size()) {
6          insert(res, i);
7          i++;
8      }
9
10     return res;
11 }
```

c''_1	1
c''_2	m+1
$c''_3 \cdot m$	m
c''_4	m
c''_5	1

- $m = |w|$
- $T_{insertSort}(m) = c''_1 + c''_2 \cdot (m+1) + c''_3 \cdot m^2 + c''_4 \cdot m + c''_5$
- $T_{insertSort}(m) \in O(m^2)$

filtradoMediana

```
1  void filtradoMediana(senial &s, int R, int prof, int freq) {
2      vector<int> w((2 * R) + 1, 0);
3      vector<int> wOrdenada((2 * R) + 1);
4
5      int j = 2 * R;
6      while (j >= 0) {
7          w[j] = s[j];
8          j--;
9      }
10
11     int i = R;
12     int fin = s.size() - R;
13     while (i < fin) {
14         if (i != R) {
15             w[i - R - 1] = s[i + R];
16         }
17         wOrdenada = insertionSort(w);
18         s[i] = wOrdenada[R];
19         i++;
20     }
21 }
```

c'''_1	m
c'''_2	m
c'''_3	1
c'''_4	m + 1
c'''_5	m
c'''_6	m
c'''_7	1
c'''_8	1
c'''_9	n-m+1
c'''_{10}	n-m
c'''_{11}	n-m-1
$c'''_{12} \cdot m$	n-m
c'''_{13}	n-m
c'''_{14}	n-m

- $m = (2 * R) + 1 \land n = |s|$
- $T_{filtradoMediana}(n) = c'''_1 + c'''_2 + c'''_3 + c'''_4 \cdot (m+1) + c'''_5 \cdot m + c'''_6 \cdot m + c'''_7 + c'''_8 + c'''_9 \cdot (n-m+1) + c'''_{10} \cdot (n-m) + c'''_{11} \cdot (n-m-1) + c'''_{12} \cdot m \cdot (n-m) + c'''_{13} \cdot (n-m)$
- $T_{filtradoMediana}(n) \in O(m \cdot (n-m))$
- $m \in [5, 9]$
- $T_{filtradoMediana}(n) \in O(n)$