

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

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

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

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

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

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

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'''	1
c_2'''	1
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}'''	$n-m$

- $m = (2 * R) + 1 \wedge n = |s|$
- $T_{filtradoMediana}(m) = c_1''' + c_2''' + c_3''' + c_4''' \cdot (m+1) + c_5''' \cdot m + c_6''' \cdot m + c_7''' + c_8''' + c_9''' \cdot (n-m+1) + c_{10}''' \cdot (n-m) + c_{11}''' \cdot (n-m-1) + c_{12}''' \cdot m \cdot (n-m) + c_{13}''' \cdot (n-m)$
- $T_{filtradoMediana}(m) \in O(m \cdot (n-m))$