Ejercio 2

1.

```
1  void f1(vector<int> &vec)                  //n = |v|/2
2  {
3      i = vec.size() / 2;                    //2
4      while (i >= 0) {                       //1 + n
5          vec[vec.size() / 2 - i] = i;       //3n
6          vec[vec.size() / 2 + i] = 0;       //3n
7          i--;                               //n
8      }
9  }
```

- i = v.size() / 2; $\equiv 2$
- i >= 0; $\equiv 1$

- $ciclo \equiv 1 + n * ($
  - i >=0; $\equiv 1$
  - vec[vec.size()/2-1] = i; $\equiv 3$
  - vec[vec.size()/2+1] = i; $\equiv 3$
  - i–; $\equiv 1$

)

$t(n) = 4 + 8n \equiv O(n)$

2.

```
1  // pre: |vec| > 20000
2  void f2(vector<int> &vec){                 //n = |v|/2
3      i = 0;                                 //1
4      while(i<10000){                        //1 + 10000
5          vec[vec.size() / 2 - i] = i;       //30000
6          vec[vec.size() / 2 + i] = i;       //30000
7          i++;                               //10000
8      }
9  }
```

- $i = 0; \equiv 1$

- $ciclo \equiv 1 + 10000 * ($
  - $i < 10000 \equiv 1$
  - $vec[vec.size()/2 - i] = 1; \equiv 3$
  - $vec[vec.size()/2 + i] = 1; \equiv 3$
  - $i++; \equiv 1$

)

$t(n) = 80002 \equiv O(1)$

3.

```
1  int f3(vector<int> &v1, int e) {     //n=|v|
2      int i = 0;                       //1
3      while (v1[i] != e) {             //1+n
4          i++;                         //n
5      }
6      return i;
7  }
```

- int i = 0; $\equiv 1$
- $ciclo \equiv 1 + n * ($
  - $v1[i] != e \equiv 1$

- $i++; \equiv 1$

)

$t(n) = 2 + 2n \equiv O(n)$

4.

```
1  void f4(vector<int> &vec) {                  //n = |vec|
2      int rec = 0;                             //1
3      int max_iter = 1000;                     //1
4      if (max_iter > vec.size()){              //1
5          max_iter = vec.size();               //1
6      }
7
8      for (int i=0; i< max_iter; i++){         //1 + 1 + n + n
9          for(int j=0; j<max_iter; i++){       //n * (1 + 1 + n + n)
10             res += vec[i] * vec[j];          //n*n*(3)
11         }
12     }
13 }
```

- int rec = 0; $\equiv 1$
- int max_iter = 1000; $\equiv 1$
- max_iteer > vec.size(); $\equiv 1$
- max_iteer = vec.size(); $\equiv 1$
- $ciclo \equiv 2 + n * ($
  - $ciclo \equiv 2 + n * ($
    - res += vec[i]*vec[j]$\equiv 3$

)

)

$t(n) = 6 + n * (2 + 3n) \equiv O(n^2)$

5.

```
1  void f5(vector<int> &v1, vector<int> &v2){  //n=|v1|, m=|v2|
2      vector<int> res();
3      for(int i=0;i<v1.size(); i++){          //1+1+n+n
4          res.push_back(v1[i]);               //n
5      }
6      for(int i=0;i<v2.size();i++){           //1+1+m+m
7          res.push_back(v2[i]);               //m
8      }
9      return res;
10 }
```

- int rec = 0; $\equiv 1$
- int max_iter = 1000; $\equiv 1$
- max_iteer > vec.size(); $\equiv 1$
- max_iteer = vec.size(); $\equiv 1$
- $ciclo \equiv 2 + n * ($
  - $ciclo \equiv 2 + m * ($
    - res += vec[i]*vec[j]$\equiv 3$

)

)

$t(n) = 6 + n * (2 + 3m) \equiv O(n * m)$