Hands-on 3

```
function x = f(n)
    x = 1;
    for i = 1: n
        for j = 1: n
            x = x + 1;
```

1. Find the runtime of the algorithm mathematically.

→ To calculate how long algorithm takes, sum up all together operations inside both loops. The outer loop goes around n times, and every time this happens, there is another loop performed by the algorithm that is inside also goes around n times. There is constant time operation $x = x + 1$.

$$\therefore \quad T(n) = \sum_{i=1}^{n} \sum_{j=1}^{n} 1$$

$$T(n) = n \times n$$

$$= n^2$$

2) The runtime of the algorithm is $O(n^2)$.