## Worksheet 8

1. Find a closed form to the following recurrence relation: $a_{n}=5 a_{n-1}-6 a_{n-2}+n, a_{0}=0, a_{1}=1$
2. Give an algorithm to decide if $n$ is even. How fast is your algorithm (what is the time complexity of your algorithm)?
3. Give an algorithm that, given a list of integers $a_{1}, a_{2}, \ldots, a_{n}$, counts the number of even integers in this list. How fast is your algorithms (what is the time complexity)?
4. Which of the following functions are $O(1)$ ? $O(n)$ ? $O\left(n^{2}\right)$ ?
(a) $\log \left(n^{5}\right)$
(b) $n^{5}$
(c) $n \log (n+5)$
(d) $\sin (n)$
(e) $\log ^{23470}(n)$
(f) $\frac{1}{n^{2}}$
(g) $n \log \left(n^{9}\right)+n+54032$
