2-3 Correctness of Horners rule

a. In terms of Θ-notation, what is the running time of this code fragment for Horners rule?

Answer

$\Theta(n)$

b. Write pseudocode to implement the naive polynomial-evaluation algorithm that computes each term of the polynomial from scratch. What is the running time of this algorithm? How does it compare to Horners rule?

Answer

NAIVE-POLINOMIAL-EVALUATION(A, x)

```
1  sum = 0
2  for j = 1 to A.length − 1
3        y = A[j]
4        for i = 1 to j
5              y = y · x
6        sum = sum + y
```

This naive implementation has $T(n) = n(n-1)(n-2)...(n-k) = n!$. So, the worst-case running time is $\Theta(n!)$. As we seem on **prob1-1** the $n!$ is pretty bad compared to the linear complexity of Horner's rule.

c.

Answer

d.

Answer