CS 170

Collaborators: None

1 - 5.

easy parts, refer to solution for help.

6.

(a) **Algorithm description**:
function polynomial($[a_0, a_1, \ldots, a_n], x$)

$result = 0$

for $i = 0$ to n

$result \mathrel{+}= a_i * x^i$

return $result$

Runtime analysis: In each iteration, there is one plus and at most $n + 1$ multiply. Since there are n iterations in total, the time is $\mathcal{O}(n^2)$.

(b) **Algorithm description**:
function fast_polynomial($[a_0, a_1, \ldots, a_n], x$)

$result = 1$

for $i = n$ to 1

$result \mathrel{+}= x * a_i + a_{i-1}$

return $result$

Runtime analysis: Each iteration costs only constant time, so the total time is $\mathcal{O}(n)$