D   Argue That Horner's Rule Correctly Evaluates a Polynomial

The following code fragment implements Horner's Rule for numerical solution of a polynomial of degree n:

```
1     y = 0;
2     i = n;
3     while (i >= 0) {
4            y = a[i] + x * y;
5            i = i - 1;
6     }
```

In addition, the problem statement proposed a loop invariant for this code fragment:

$$y = \sum_{k=0}^{n-(i+1)} a_{k+i+1} x^k$$

The argument comprises two parts.

First, manual calculations demonstrate that the code fragment is correct for the first few base cases:

$n = 0$: $y = a_0$
$n = 1$: $y = a_0 + a_1 x$
$n = 2$: $y = a_0 + a_1 x + a_2 x^2$

Second, the proposed loop invariant is proven correct through the initialization, maintenance, and termination phases, as demonstrated in Part C.