

compare function in the switch ^{condn.} since $\text{terms}[\text{startA}].\text{expon} = 2K+2 > \text{terms}[\text{startB}].\text{expon} = 2K+1$, 1 is returned and lines 16-18 is executed. On line 18, startA is updated to 1.

• Again, the while loop condn. holds. Notice startA to finishA represents the polynomial $(x^{2K} + x^{2K-2} + \dots + x^0)$ and startB to finishB represents the polynomial $(x^{2K-1} + x^{2K-3} + \dots + x^1 + x^0)$. By I.H., lines 16-18 further executes K times and lines 6-9 further executes $K+1$ times.

• Total execution: 1) lines 6-9: $(K+1)+1 = K+2$ 2) lines 16-18: $K+1$

\therefore lines 6-9 and lines 16-18 will be executed $(n+1)$ and n times respectively. \square

• By correctness of compare function, it returns 0 only when $\text{terms}[\text{startA}].\text{expon} = \text{terms}[\text{startB}].\text{expon}$. We know, the given polynomials $A(x)$ and $B(x)$ have no exponents in common. \therefore lines 10-15 will be executed 0 times.

\therefore The switch condition on line 5 executes: $(n+1)+0+n = (2n+1)$ times.

\therefore The while loop condition on line 4 executes $(2n+2)$ times.

The last time the while loop body iterates is when $\text{terms}[\text{startA}].\text{expon} = 0$ and $\text{terms}[\text{startB}].\text{expon} = 1$. $\text{startA} = \text{finishA} = n$ and $\text{startB} = \text{finishB} = 2n+1$

We have already justified that lines 6-9 will be evaluated, startB updates to $2n+2$, the while loop condn. (line 4) is not satisfied and loop terminates.

It's easy to see that line 20 runs 2 times, line 21 runs 1 time.

Similarly line 22 runs 1 time, line 23 runs 0 times.

Line 24 runs 1 time \square

6) The declarations that follow give us another representation of the polynomial ADT. $\text{terms}[i][0].\text{expon}$ gives the number of nonzero terms in the i th polynomial.