Claim: lines 6–9 and lines 16–18 will be executed ~~n times each~~ $(n+1)$ and n times respectively

Proof: The proof will be by mathematical induction on the degree n of the polynomial.

Base Case: $n=0$. Here $A(x)=x^0$ and $B(x)=x^1$. $startA=finishA=0$ and $startB=finishB=1$. (Initially)

- The while loop condn. on line 4 holds. By correctness of compare function on line 5 inside the switch conditional, $\because 0<1$, -1 is returned and lines 6–9 will be evaluated. On line 8, we update value of $startB$ to 2 and break out from the switch block on line 9. Now on line 4, the while condn. fails because $startB=2>finishB=1$.

$\therefore$ Lines 6–9 gets executed $(n+1=1)$ time and lines 16–18 will be executed $n=0$ time.

Induction hypothesis: $n=K$. $A(x)=x^{2K}+x^{2(K-1)}+\ldots\ldots+x^2+x^0$ and $B(x)=x^{2K+1}+x^{2K-1}+\ldots\ldots+x^3+x$. $startA=0$, $finishA=K$ and $startB=K+1$, $finishB=2K+1$ (Initially).

~~So~~ We assume that lines 6–9 will be executed $(K+1)$ times and lines 16–18 will be executed K times.

Induction Step: $n=K+1$. $A(x)=x^{2K+2}+x^{2K}+x^{2K-2}+\ldots\ldots+x^2+x^0$ and $B(x)=x^{2K+3}+x^{2K+1}+\ldots\ldots+x^3+x$. $startA=0$, $finishA=K+1$ and $startB=K+2$, $finishB=2K+3$ (Initially).

- The while loop condition holds (line 4). On line 5, by correctness of the compare function in the switch condn, since $2K+2<2K+3$, -1 is returned and lines 6–9 is evaluated. On line 8, we update $startB$ to $K+2$ and on line 9 we break out from the switch condition.
- The while loop condition again holds (line 4). On line 5, by correctness of the