Now, obviously the term has an meaning only if the sum is non-zero. ∴ We have justified lines 11-13.

∵ Both terms[x] and terms[y] have same exponents, we increase startA and startB by 1 on line 14 and break from the switch block on line 15.

- It's easy to see that the loop invariant still holds before the start of the next iteration.

Termination: The while loop terminates when atleast one of (startA = finishA+1) or (startB = finishB+1) holds.

- Let, startA = finishA+1 be True. $\boxed{\therefore \text{startA} = \text{startB} \text{ (initial)}}$ now. The index has crossed all the terms from 0 to finishA in array terms where the polynomial A is represented. ∴ By using the loop invariant, $\forall i$, $0 \leq i \leq \text{startA}-1 = \text{finishA}$, the correct corresponding coefficient for the term x^i in the polynomial D has been computed. ∴ All exponents of polynomial A has been given their respective correct coefficient for the polynomial D. On lines 22-23, we attach the coefficients of the respective exponents for the rest of the polynomial B into polynomial D.
- It's very easy to prove it correct.

- The case when startB = finishB+1 holds is exactly similar to the above case.

∴ The polynomial addition function is correct □

Analysis of padd

- Let m and n be the no. of nonzero terms in A and B respectively. If $m > 0$ and $n > 0$, the while loop is entered. Each iteration of the loop requires O(1) time. At each iteration, we increment the value of startA or startB or both.