$\therefore$ Loop invariant holds.

Maintenance: Let, the loop invariant hold just before the start of the iteration when $i=x$, where $1 \le x \le numTerms$. ~~X. For all indices K where $1 \le K < x$, the no. of elements corresponding to each column j where $0 \le j < a[0].col$ has been~~

$\therefore$ For every column index j in the range $0 \le j < a[0].col$, the value $rowTerms[j]$ is equal to the no. of times $a[K].col == j$ $\forall K, 1 \le K < x$.

- Now, $a[x].col$ returns the column no. y of the non-zero element $a[x].value$. We know, $0 \le y < a[0].col$. Since, now we have encountered one more non-zero element of column y, we must increase the count by 1, i.e. $rowTerms[y]{+}{+} \Leftrightarrow rowTerms[a[x].col]{+}{+}$. We are doing just that on Line 11.
- Just before the start of the next iteration, i updates to $(x+1)$. We can easily see that $\forall K', 1 \le K' < x$, when $a[K'].col \neq y$, $rowTerms[a[K'].col]$ has not been updated when $i=x$.

$\therefore$ It's clear that the loop invariant still holds.

Termination: The loop terminates when $i = numTerms+1$. By the loop invariant, for every column index j in the range $0 \le j < a[0].col$, the value $rowTerms[j]$ is equal to the no. of times $a[K].col == j$ $\forall K$ s.t. $1 \le K \le numTerms$.

$\therefore$ For matrix $a[\,]$, $rowTerms[j]$ holds the no. of non-zero elements of $a[\,]$ having column index j, where $0 \le j < a[0].col$. We can conclude this because by line 4, $numTerms$ holds the no. of non-zero elements of $a[\,]$ and they are stored in $a[\,]$ starting from index 1 to $numTerms$

$\square$