<table>
<tr><td>Step</td><td>Algorithm: $C := AB + C$ where A is symmetric and stored in the lower triangular part</td></tr>
<tr><td>1a</td><td>$\{ C = \widehat{C} \qquad \}$</td></tr>
<tr><td>4</td><td>$A \rightarrow \left(\begin{array}{c|c} A_{TL} & A_{TR} \\ \hline A_{BL} & A_{BR} \end{array}\right), B \rightarrow \left(\begin{array}{c} B_T \\ \hline B_B \end{array}\right), C \rightarrow \left(\begin{array}{c} C_T \\ \hline C_B \end{array}\right)$
where A_{TL} is 0×0, B_T has 0 rows, C_T has 0 rows</td></tr>
<tr><td>2</td><td>$\left\{ \left(\begin{array}{c} C_T \\ \hline C_B \end{array}\right) = \left(\begin{array}{r} A_{TL}B_T + A_{BL}^T B_B + \widehat{C}_T \\ \hline \widehat{C}_B \end{array}\right) \right\}$</td></tr>
<tr><td>3</td><td>while $m(A_{TL}) < m(A)$ do</td></tr>
<tr><td>2,3</td><td>$\left\{ \left(\begin{array}{c} C_T \\ \hline C_B \end{array}\right) = \left(\begin{array}{r} A_{TL}B_T + A_{BL}^T B_B + \widehat{C}_T \\ \hline \widehat{C}_B \end{array}\right) \wedge m(A_{TL}) < m(A) \right\}$</td></tr>
<tr><td>5a</td><td>$\left(\begin{array}{c|c} A_{TL} & A_{TR} \\ \hline A_{BL} & A_{BR} \end{array}\right) \rightarrow \left(\begin{array}{c|cc} A_{00} & a_{01} & A_{02} \\ \hline a_{10}^T & \alpha_{11} & a_{12}^T \\ A_{20} & a_{21} & A_{22} \end{array}\right), \left(\begin{array}{c} B_T \\ \hline B_B \end{array}\right) \rightarrow \left(\begin{array}{c} B_0 \\ \hline b_1^T \\ B_2 \end{array}\right), \left(\begin{array}{c} C_T \\ \hline C_B \end{array}\right) \rightarrow \left(\begin{array}{c} C_0 \\ \hline c_1^T \\ C_2 \end{array}\right)$
where α_{11} is 1×1, b_1 has 1 row, c_1 has 1 row</td></tr>
<tr><td>6</td><td>$\left\{ \left(\begin{array}{c} C_0 \\ c_1^T \\ C_2 \end{array}\right) = \left(\begin{array}{r} A_{00}B_0 + (a_{10}^T)^T b_1^T + A_{20}^T B_2 + \widehat{C}_0 \\ \widehat{c}_1^T \\ \widehat{C}_2 \end{array}\right) \right\}$</td></tr>
<tr><td>8</td><td>$C_0 := A_{00}B_0 + a_{01}b_1^T + A_{02}B_2 + C_0$
$c_1^T := a_{10}^T B_0 + \alpha_{11} b_1^T + a_{21}^T B_2 + c_1^T$
$C_2 := A_{20}B_0 + a_{21}b_1^T + A_{22}B_2 + C_2$</td></tr>
<tr><td>7</td><td>$\left\{ \left(\begin{array}{c} C_0 \\ c_1^T \\ C_2 \end{array}\right) = \left(\begin{array}{r} A_{00}B_0 + (a_{10}^T)^T b_1^T + A_{20}^T B_2 + \widehat{C}_0 \\ a_{10}^T B_0 + \alpha_{11} b_1^T + a_{21}^T B_2 + \widehat{c}_1^T \\ \end{array}\right) \right\}$</td></tr>
<tr><td>5b</td><td>$\left(\begin{array}{c|c} A_{TL} & A_{TR} \\ \hline A_{BL} & A_{BR} \end{array}\right) \leftarrow \left(\begin{array}{cc|c} A_{00} & a_{01} & A_{02} \\ a_{10}^T & \alpha_{11} & a_{12}^T \\ \hline A_{20} & a_{21} & A_{22} \end{array}\right), \left(\begin{array}{c} B_T \\ \hline B_B \end{array}\right) \leftarrow \left(\begin{array}{c} B_0 \\ b_1^T \\ \hline B_2 \end{array}\right), \left(\begin{array}{c} C_T \\ \hline C_B \end{array}\right) \leftarrow \left(\begin{array}{c} C_0 \\ c_1^T \\ \hline C_2 \end{array}\right)$</td></tr>
<tr><td>2</td><td>$\left\{ \left(\begin{array}{c} C_T \\ \hline C_B \end{array}\right) = \left(\begin{array}{r} A_{TL}B_T + A_{BL}^T B_B + \widehat{C}_T \\ \hline \widehat{C}_B \end{array}\right) \right\}$</td></tr>
<tr><td></td><td>endwhile</td></tr>
<tr><td>2,3</td><td>$\left\{ \left(\begin{array}{c} C_T \\ \hline C_B \end{array}\right) = \left(\begin{array}{r} A_{TL}B_T + A_{BL}^T B_B + \widehat{C}_T \\ \hline \widehat{C}_B \end{array}\right) \wedge \neg(m(A_{TL}) < m(A)) \right\}$</td></tr>
<tr><td>1b</td><td>$\{ C = AB + \widehat{C} \qquad \}$</td></tr>
</table>

Step	Algorithm: $C := AB + C$ where A is symmetric and stored in the lower triangular part
1a	{ }
4	where
2	{ }
3	while do
2,3	{ $\wedge$ }
5a	where
6	{ }
8	$C_0 := A_{00}B_0 + a_{01}b_1^T + A_{02}B_2 + C_0$ $C_2 := A_{20}B_0 + a_{21}b_1^T + A_{22}B_2 + C_2$
7	{ }
5b	
2	{ }
	endwhile
2,3	{ $\wedge \neg($ $)$ }
1b	{ }

Step	Algorithm: $C := AB + C$ where A is symmetric and stored in the lower triangular part
1a	$\{ C = \widehat{C} \}$
4	where
2	$\{ \}$
3	while do
2,3	$\{ \wedge \}$
5a	where
6	$\{ \}$
8	$C_0 := A_{00} B_0 + a_{01} b_1^T + A_{02} B_2 + C_0$ $C_2 := A_{20} B_0 + a_{21} b_1^T + A_{22} B_2 + C_2$
7	$\{ \}$
5b	
2	$\{ \}$
	endwhile
2,3	$\{ \wedge \neg (\quad) \}$
1b	$\{ C = AB + \widehat{C} \}$

Step	Algorithm: $C := AB + C$ where A is symmetric and stored in the lower triangular part
1a	$\{ C = \widehat{C} \}$
4	where
2	$\left\{ \left(\frac{C_T}{C_B} \right) = \left(\frac{A_{TL} B_T + A_{BL}^T B_B + \widehat{C}_T}{\widehat{C}_B} \right) \right\}$
3	while do
2,3	$\left\{ \left(\frac{C_T}{C_B} \right) = \left(\frac{A_{TL} B_T + A_{BL}^T B_B + \widehat{C}_T}{\widehat{C}_B} \right) \wedge \right\}$
5a	where
6	$\left\{ \right\}$
8	$C_0 := A_{00} B_0 + a_{01} b_1^T + A_{02} B_2 + C_0$ $C_2 := A_{20} B_0 + a_{21} b_1^T + A_{22} B_2 + C_2$
7	$\left\{ \right\}$
5b	
2	$\left\{ \left(\frac{C_T}{C_B} \right) = \left(\frac{A_{TL} B_T + A_{BL}^T B_B + \widehat{C}_T}{\widehat{C}_B} \right) \right\}$
	endwhile
2,3	$\left\{ \left(\frac{C_T}{C_B} \right) = \left(\frac{A_{TL} B_T + A_{BL}^T B_B + \widehat{C}_T}{\widehat{C}_B} \right) \wedge \neg(\quad) \right\}$
1b	$\{ C = AB + \widehat{C} \}$

Step	Algorithm: $C := AB + C$ where A is symmetric and stored in the lower triangular part
1a	$\{C = \widehat{C}$ $\}$
4	where
2	$\left\{ \left(\frac{C_T}{C_B} \right) = \left(\frac{A_{TL}B_T + A_{BL}^T B_B + \widehat{C}_T}{\widehat{C}_B} \right) \right\}$
3	while $m(A_{TL}) < m(A)$ do
2,3	$\left\{ \left(\frac{C_T}{C_B} \right) = \left(\frac{A_{TL}B_T + A_{BL}^T B_B + \widehat{C}_T}{\widehat{C}_B} \right) \wedge m(A_{TL}) < m(A) \right\}$
5a	where
6	$\{$ $\}$
8	$C_0 := A_{00}B_0 + a_{01}b_1^T + A_{02}B_2 + C_0$ $C_2 := A_{20}B_0 + a_{21}b_1^T + A_{22}B_2 + C_2$
7	$\{$ $\}$
5b	
2	$\left\{ \left(\frac{C_T}{C_B} \right) = \left(\frac{A_{TL}B_T + A_{BL}^T B_B + \widehat{C}_T}{\widehat{C}_B} \right) \right\}$
	endwhile
2,3	$\left\{ \left(\frac{C_T}{C_B} \right) = \left(\frac{A_{TL}B_T + A_{BL}^T B_B + \widehat{C}_T}{\widehat{C}_B} \right) \wedge \neg(m(A_{TL}) < m(A)) \right\}$
1b	$\{C = AB + \widehat{C}$ $\}$

Step	Algorithm: $C := AB + C$ where A is symmetric and stored in the lower triangular part
1a	$\{ C = \widehat{C} \}$
4	$A \rightarrow \left(\begin{array}{c\|c} A_{TL} & A_{TR} \\ \hline A_{BL} & A_{BR} \end{array}\right)$, $B \rightarrow \left(\begin{array}{c} B_T \\ \hline B_B \end{array}\right)$, $C \rightarrow \left(\begin{array}{c} C_T \\ \hline C_B \end{array}\right)$ where A_{TL} is 0×0, B_T has 0 rows, C_T has 0 rows
2	$\left\{ \left(\begin{array}{c} C_T \\ \hline C_B \end{array}\right) = \left(\begin{array}{c} A_{TL}B_T + A_{BL}^T B_B + \widehat{C}_T \\ \hline \widehat{C}_B \end{array}\right) \right\}$
3	while $m(A_{TL}) < m(A)$ do
2,3	$\left\{ \left(\begin{array}{c} C_T \\ \hline C_B \end{array}\right) = \left(\begin{array}{c} A_{TL}B_T + A_{BL}^T B_B + \widehat{C}_T \\ \hline \widehat{C}_B \end{array}\right) \wedge m(A_{TL}) < m(A) \right\}$
5a	where
6	$\left\{ \quad \right\}$
8	$C_0 := A_{00}B_0 + a_{01}b_1^T + A_{02}B_2 + C_0$ $C_2 := A_{20}B_0 + a_{21}b_1^T + A_{22}B_2 + C_2$
7	$\left\{ \quad \right\}$
5b	
2	$\left\{ \left(\begin{array}{c} C_T \\ \hline C_B \end{array}\right) = \left(\begin{array}{c} A_{TL}B_T + A_{BL}^T B_B + \widehat{C}_T \\ \hline \widehat{C}_B \end{array}\right) \right\}$
	endwhile
2,3	$\left\{ \left(\begin{array}{c} C_T \\ \hline C_B \end{array}\right) = \left(\begin{array}{c} A_{TL}B_T + A_{BL}^T B_B + \widehat{C}_T \\ \hline \widehat{C}_B \end{array}\right) \wedge \neg(m(A_{TL}) < m(A)) \right\}$
1b	$\{ C = AB + \widehat{C} \}$

<table>
<tr><th>Step</th><th>Algorithm: $C := AB + C$ where A is symmetric and stored in the lower triangular part</th></tr>
<tr><td>1a</td><td>$\{ C = \widehat{C} \}$</td></tr>
<tr><td>4</td><td>$A \rightarrow \left(\begin{array}{c|c} A_{TL} & A_{TR} \\ \hline A_{BL} & A_{BR} \end{array} \right), B \rightarrow \left(\begin{array}{c} B_T \\ \hline B_B \end{array} \right), C \rightarrow \left(\begin{array}{c} C_T \\ \hline C_B \end{array} \right)$
where A_{TL} is 0×0, B_T has 0 rows, C_T has 0 rows</td></tr>
<tr><td>2</td><td>$\left\{ \left(\begin{array}{c} C_T \\ \hline C_B \end{array} \right) = \left(\begin{array}{r} A_{TL} B_T + A_{BL}^T B_B + \widehat{C}_T \\ \hline \widehat{C}_B \end{array} \right) \right\}$</td></tr>
<tr><td>3</td><td>while $m(A_{TL}) < m(A)$ do</td></tr>
<tr><td>2,3</td><td>$\left\{ \left(\begin{array}{c} C_T \\ \hline C_B \end{array} \right) = \left(\begin{array}{r} A_{TL} B_T + A_{BL}^T B_B + \widehat{C}_T \\ \hline \widehat{C}_B \end{array} \right) \wedge m(A_{TL}) < m(A) \right\}$</td></tr>
<tr><td>5a</td><td>$\left(\begin{array}{c|c} A_{TL} & A_{TR} \\ \hline A_{BL} & A_{BR} \end{array} \right) \rightarrow \left(\begin{array}{c|cc} A_{00} & a_{01} & A_{02} \\ \hline a_{10}^T & \alpha_{11} & a_{12}^T \\ A_{20} & a_{21} & A_{22} \end{array} \right), \left(\begin{array}{c} B_T \\ \hline B_B \end{array} \right) \rightarrow \left(\begin{array}{c} B_0 \\ \hline b_1^T \\ B_2 \end{array} \right), \left(\begin{array}{c} C_T \\ \hline C_B \end{array} \right) \rightarrow \left(\begin{array}{c} C_0 \\ \hline c_1^T \\ C_2 \end{array} \right)$
where α_{11} is 1×1, b_1 has 1 row, c_1 has 1 row</td></tr>
<tr><td>6</td><td>$\{ \}$</td></tr>
<tr><td>8</td><td>$C_0 := A_{00} B_0 + a_{01} b_1^T + A_{02} B_2 + C_0$
$C_2 := A_{20} B_0 + a_{21} b_1^T + A_{22} B_2 + C_2$</td></tr>
<tr><td>7</td><td>$\{ \}$</td></tr>
<tr><td>5b</td><td>$\left(\begin{array}{c|c} A_{TL} & A_{TR} \\ \hline A_{BL} & A_{BR} \end{array} \right) \leftarrow \left(\begin{array}{cc|c} A_{00} & a_{01} & A_{02} \\ a_{10}^T & \alpha_{11} & a_{12}^T \\ \hline A_{20} & a_{21} & A_{22} \end{array} \right), \left(\begin{array}{c} B_T \\ \hline B_B \end{array} \right) \leftarrow \left(\begin{array}{c} B_0 \\ b_1^T \\ \hline B_2 \end{array} \right), \left(\begin{array}{c} C_T \\ \hline C_B \end{array} \right) \leftarrow \left(\begin{array}{c} C_0 \\ c_1^T \\ \hline C_2 \end{array} \right)$</td></tr>
<tr><td>2</td><td>$\left\{ \left(\begin{array}{c} C_T \\ \hline C_B \end{array} \right) = \left(\begin{array}{r} A_{TL} B_T + A_{BL}^T B_B + \widehat{C}_T \\ \hline \widehat{C}_B \end{array} \right) \right\}$</td></tr>
<tr><td></td><td>endwhile</td></tr>
<tr><td>2,3</td><td>$\left\{ \left(\begin{array}{c} C_T \\ \hline C_B \end{array} \right) = \left(\begin{array}{r} A_{TL} B_T + A_{BL}^T B_B + \widehat{C}_T \\ \hline \widehat{C}_B \end{array} \right) \wedge \neg (m(A_{TL}) < m(A)) \right\}$</td></tr>
<tr><td>1b</td><td>$\{ C = AB + \widehat{C} \}$</td></tr>
</table>

<table>
<tr><th>Step</th><th>Algorithm: $C := AB + C$ where A is symmetric and stored in the lower triangular part</th></tr>
<tr><td>1a</td><td>$\{ C = \widehat{C} \}$</td></tr>
<tr><td>4</td><td>$A \rightarrow \left(\begin{array}{c|c} A_{TL} & A_{TR} \\ \hline A_{BL} & A_{BR} \end{array}\right)$, $B \rightarrow \left(\begin{array}{c} B_T \\ \hline B_B \end{array}\right)$, $C \rightarrow \left(\begin{array}{c} C_T \\ \hline C_B \end{array}\right)$
where A_{TL} is 0×0, B_T has 0 rows, C_T has 0 rows</td></tr>
<tr><td>2</td><td>$\left\{ \left(\begin{array}{c} C_T \\ \hline C_B \end{array}\right) = \left(\begin{array}{r} A_{TL}B_T + A_{BL}^T B_B + \widehat{C}_T \\ \hline \widehat{C}_B \end{array}\right) \right\}$</td></tr>
<tr><td>3</td><td>while $m(A_{TL}) < m(A)$ do</td></tr>
<tr><td>2,3</td><td>$\left\{ \left(\begin{array}{c} C_T \\ \hline C_B \end{array}\right) = \left(\begin{array}{r} A_{TL}B_T + A_{BL}^T B_B + \widehat{C}_T \\ \hline \widehat{C}_B \end{array}\right) \wedge m(A_{TL}) < m(A) \right\}$</td></tr>
<tr><td>5a</td><td>$\left(\begin{array}{c|c} A_{TL} & A_{TR} \\ \hline A_{BL} & A_{BR} \end{array}\right) \rightarrow \left(\begin{array}{c|cc} A_{00} & a_{01} & A_{02} \\ \hline a_{10}^T & \alpha_{11} & a_{12}^T \\ A_{20} & a_{21} & A_{22} \end{array}\right)$, $\left(\begin{array}{c} B_T \\ \hline B_B \end{array}\right) \rightarrow \left(\begin{array}{c} B_0 \\ \hline b_1^T \\ B_2 \end{array}\right)$, $\left(\begin{array}{c} C_T \\ \hline C_B \end{array}\right) \rightarrow \left(\begin{array}{c} C_0 \\ \hline c_1^T \\ C_2 \end{array}\right)$
where α_{11} is 1×1, b_1 has 1 row, c_1 has 1 row</td></tr>
<tr><td>6</td><td>$\left\{ \left(\begin{array}{c} C_0 \\ c_1^T \\ C_2 \end{array}\right) = \left(\begin{array}{r} A_{00}B_0 + (a_{10}^T)^T b_1^T + A_{20}^T B_2 + \widehat{C}_0 \\ \widehat{c}_1^T \\ \widehat{C}_2 \end{array}\right) \right\}$</td></tr>
<tr><td>8</td><td>$C_0 := A_{00}B_0 + a_{01}b_1^T + A_{02}B_2 + C_0$

$C_2 := A_{20}B_0 + a_{21}b_1^T + A_{22}B_2 + C_2$</td></tr>
<tr><td>7</td><td>$\left\{ \quad \right\}$</td></tr>
<tr><td>5b</td><td>$\left(\begin{array}{c|c} A_{TL} & A_{TR} \\ \hline A_{BL} & A_{BR} \end{array}\right) \leftarrow \left(\begin{array}{cc|c} A_{00} & a_{01} & A_{02} \\ a_{10}^T & \alpha_{11} & a_{12}^T \\ \hline A_{20} & a_{21} & A_{22} \end{array}\right)$, $\left(\begin{array}{c} B_T \\ \hline B_B \end{array}\right) \leftarrow \left(\begin{array}{c} B_0 \\ b_1^T \\ \hline B_2 \end{array}\right)$, $\left(\begin{array}{c} C_T \\ \hline C_B \end{array}\right) \leftarrow \left(\begin{array}{c} C_0 \\ c_1^T \\ \hline C_2 \end{array}\right)$</td></tr>
<tr><td>2</td><td>$\left\{ \left(\begin{array}{c} C_T \\ \hline C_B \end{array}\right) = \left(\begin{array}{r} A_{TL}B_T + A_{BL}^T B_B + \widehat{C}_T \\ \hline \widehat{C}_B \end{array}\right) \right\}$</td></tr>
<tr><td></td><td>endwhile</td></tr>
<tr><td>2,3</td><td>$\left\{ \left(\begin{array}{c} C_T \\ \hline C_B \end{array}\right) = \left(\begin{array}{r} A_{TL}B_T + A_{BL}^T B_B + \widehat{C}_T \\ \hline \widehat{C}_B \end{array}\right) \wedge \neg(m(A_{TL}) < m(A)) \right\}$</td></tr>
<tr><td>1b</td><td>$\{ C = AB + \widehat{C} \}$</td></tr>
</table>

<table>
<tr><th>Step</th><th>Algorithm: $C := AB + C$ where A is symmetric and stored in the lower triangular part</th></tr>
<tr><td>1a</td><td>$\{C = \widehat{C} \}$</td></tr>
<tr><td>4</td><td>$A \rightarrow \left(\begin{array}{c|c} A_{TL} & A_{TR} \\ \hline A_{BL} & A_{BR} \end{array}\right), B \rightarrow \left(\begin{array}{c} B_T \\ \hline B_B \end{array}\right), C \rightarrow \left(\begin{array}{c} C_T \\ \hline C_B \end{array}\right)$
where A_{TL} is 0×0, B_T has 0 rows, C_T has 0 rows</td></tr>
<tr><td>2</td><td>$\left\{ \left(\begin{array}{c} C_T \\ \hline C_B \end{array}\right) = \left(\begin{array}{r} A_{TL}B_T + A_{BL}^T B_B + \widehat{C}_T \\ \hline \widehat{C}_B \end{array}\right) \right\}$</td></tr>
<tr><td>3</td><td>while $m(A_{TL}) < m(A)$ do</td></tr>
<tr><td>2,3</td><td>$\left\{ \left(\begin{array}{c} C_T \\ \hline C_B \end{array}\right) = \left(\begin{array}{r} A_{TL}B_T + A_{BL}^T B_B + \widehat{C}_T \\ \hline \widehat{C}_B \end{array}\right) \wedge m(A_{TL}) < m(A) \right\}$</td></tr>
<tr><td>5a</td><td>$\left(\begin{array}{c|c} A_{TL} & A_{TR} \\ \hline A_{BL} & A_{BR} \end{array}\right) \rightarrow \left(\begin{array}{c|cc} A_{00} & a_{01} & A_{02} \\ \hline a_{10}^T & \alpha_{11} & a_{12}^T \\ A_{20} & a_{21} & A_{22} \end{array}\right), \left(\begin{array}{c} B_T \\ \hline B_B \end{array}\right) \rightarrow \left(\begin{array}{c} B_0 \\ \hline b_1^T \\ B_2 \end{array}\right), \left(\begin{array}{c} C_T \\ \hline C_B \end{array}\right) \rightarrow \left(\begin{array}{c} C_0 \\ \hline c_1^T \\ C_2 \end{array}\right)$
where α_{11} is 1×1, b_1 has 1 row, c_1 has 1 row</td></tr>
<tr><td>6</td><td>$\left\{ \left(\begin{array}{c} C_0 \\ c_1^T \\ C_2 \end{array}\right) = \left(\begin{array}{r} A_{00}B_0 + (a_{10}^T)^T b_1^T + A_{20}^T B_2 + \widehat{C}_0 \\ \widehat{c}_1^T \\ \widehat{C}_2 \end{array}\right) \right\}$</td></tr>
<tr><td>8</td><td>$C_0 := A_{00}B_0 + a_{01}b_1^T + A_{02}B_2 + C_0$
$C_2 := A_{20}B_0 + a_{21}b_1^T + A_{22}B_2 + C_2$</td></tr>
<tr><td>7</td><td>$\left\{ \left(\begin{array}{c} C_0 \\ c_1^T \\ C_2 \end{array}\right) = \left(\begin{array}{r} A_{00}B_0 + (a_{10}^T)^T b_1^T + A_{20}^T B_2 + \widehat{C}_0 \\ a_{10}^T B_0 + \alpha_{11} b_1^T + a_{21}^T B_2 + \widehat{c}_1^T \\ \; \end{array}\right) \right\}$</td></tr>
<tr><td>5b</td><td>$\left(\begin{array}{c|c} A_{TL} & A_{TR} \\ \hline A_{BL} & A_{BR} \end{array}\right) \leftarrow \left(\begin{array}{cc|c} A_{00} & a_{01} & A_{02} \\ a_{10}^T & \alpha_{11} & a_{12}^T \\ \hline A_{20} & a_{21} & A_{22} \end{array}\right), \left(\begin{array}{c} B_T \\ \hline B_B \end{array}\right) \leftarrow \left(\begin{array}{c} B_0 \\ b_1^T \\ \hline B_2 \end{array}\right), \left(\begin{array}{c} C_T \\ \hline C_B \end{array}\right) \leftarrow \left(\begin{array}{c} C_0 \\ c_1^T \\ \hline C_2 \end{array}\right)$</td></tr>
<tr><td>2</td><td>$\left\{ \left(\begin{array}{c} C_T \\ \hline C_B \end{array}\right) = \left(\begin{array}{r} A_{TL}B_T + A_{BL}^T B_B + \widehat{C}_T \\ \hline \widehat{C}_B \end{array}\right) \right\}$</td></tr>
<tr><td></td><td>endwhile</td></tr>
<tr><td>2,3</td><td>$\left\{ \left(\begin{array}{c} C_T \\ \hline C_B \end{array}\right) = \left(\begin{array}{r} A_{TL}B_T + A_{BL}^T B_B + \widehat{C}_T \\ \hline \widehat{C}_B \end{array}\right) \wedge \neg(m(A_{TL}) < m(A)) \right\}$</td></tr>
<tr><td>1b</td><td>$\{C = AB + \widehat{C} \}$</td></tr>
</table>

<table>
<tr><th>Step</th><th>Algorithm: $C := AB + C$ where A is symmetric and stored in the lower triangular part</th></tr>
<tr><td>1a</td><td>$\{ C = \widehat{C} \}$</td></tr>
<tr><td>4</td><td>$A \rightarrow \left(\begin{array}{c|c} A_{TL} & A_{TR} \\ \hline A_{BL} & A_{BR} \end{array}\right), B \rightarrow \left(\begin{array}{c} B_T \\ \hline B_B \end{array}\right), C \rightarrow \left(\begin{array}{c} C_T \\ \hline C_B \end{array}\right)$
where A_{TL} is 0×0, B_T has 0 rows, C_T has 0 rows</td></tr>
<tr><td>2</td><td>$\left\{ \left(\begin{array}{c} C_T \\ \hline C_B \end{array}\right) = \left(\begin{array}{r} A_{TL}B_T + A_{BL}^T B_B + \widehat{C}_T \\ \hline \widehat{C}_B \end{array}\right) \right\}$</td></tr>
<tr><td>3</td><td>while $m(A_{TL}) < m(A)$ do</td></tr>
<tr><td>2,3</td><td>$\left\{ \left(\begin{array}{c} C_T \\ \hline C_B \end{array}\right) = \left(\begin{array}{r} A_{TL}B_T + A_{BL}^T B_B + \widehat{C}_T \\ \hline \widehat{C}_B \end{array}\right) \wedge m(A_{TL}) < m(A) \right\}$</td></tr>
<tr><td>5a</td><td>$\left(\begin{array}{c|c} A_{TL} & A_{TR} \\ \hline A_{BL} & A_{BR} \end{array}\right) \rightarrow \left(\begin{array}{c|cc} A_{00} & a_{01} & A_{02} \\ \hline a_{10}^T & \alpha_{11} & a_{12}^T \\ A_{20} & a_{21} & A_{22} \end{array}\right), \left(\begin{array}{c} B_T \\ \hline B_B \end{array}\right) \rightarrow \left(\begin{array}{c} B_0 \\ \hline b_1^T \\ B_2 \end{array}\right), \left(\begin{array}{c} C_T \\ \hline C_B \end{array}\right) \rightarrow \left(\begin{array}{c} C_0 \\ \hline c_1^T \\ C_2 \end{array}\right)$
where α_{11} is 1×1, b_1 has 1 row, c_1 has 1 row</td></tr>
<tr><td>6</td><td>$\left\{ \left(\begin{array}{c} C_0 \\ c_1^T \\ C_2 \end{array}\right) = \left(\begin{array}{r} A_{00}B_0 + (a_{10}^T)^T b_1^T + A_{20}^T B_2 + \widehat{C}_0 \\ \widehat{c}_1^T \\ \widehat{C}_2 \end{array}\right) \right\}$</td></tr>
<tr><td>8</td><td>$C_0 := A_{00}B_0 + a_{01}b_1^T + A_{02}B_2 + C_0$
$c_1^T := a_{10}^T B_0 + \alpha_{11} b_1^T + a_{21}^T B_2 + c_1^T$
$C_2 := A_{20}B_0 + a_{21}b_1^T + A_{22}B_2 + C_2$</td></tr>
<tr><td>7</td><td>$\left\{ \left(\begin{array}{c} C_0 \\ c_1^T \\ C_2 \end{array}\right) = \left(\begin{array}{r} A_{00}B_0 + (a_{10}^T)^T b_1^T + A_{20}^T B_2 + \widehat{C}_0 \\ a_{10}^T B_0 + \alpha_{11} b_1^T + a_{21}^T B_2 + \widehat{c}_1^T \\ \end{array}\right) \right\}$</td></tr>
<tr><td>5b</td><td>$\left(\begin{array}{c|c} A_{TL} & A_{TR} \\ \hline A_{BL} & A_{BR} \end{array}\right) \leftarrow \left(\begin{array}{cc|c} A_{00} & a_{01} & A_{02} \\ a_{10}^T & \alpha_{11} & a_{12}^T \\ \hline A_{20} & a_{21} & A_{22} \end{array}\right), \left(\begin{array}{c} B_T \\ \hline B_B \end{array}\right) \leftarrow \left(\begin{array}{c} B_0 \\ b_1^T \\ \hline B_2 \end{array}\right), \left(\begin{array}{c} C_T \\ \hline C_B \end{array}\right) \leftarrow \left(\begin{array}{c} C_0 \\ c_1^T \\ \hline C_2 \end{array}\right)$</td></tr>
<tr><td>2</td><td>$\left\{ \left(\begin{array}{c} C_T \\ \hline C_B \end{array}\right) = \left(\begin{array}{r} A_{TL}B_T + A_{BL}^T B_B + \widehat{C}_T \\ \hline \widehat{C}_B \end{array}\right) \right\}$</td></tr>
<tr><td></td><td>endwhile</td></tr>
<tr><td>2,3</td><td>$\left\{ \left(\begin{array}{c} C_T \\ \hline C_B \end{array}\right) = \left(\begin{array}{r} A_{TL}B_T + A_{BL}^T B_B + \widehat{C}_T \\ \hline \widehat{C}_B \end{array}\right) \wedge \neg (m(A_{TL}) < m(A)) \right\}$</td></tr>
<tr><td>1b</td><td>$\{ C = AB + \widehat{C} \}$</td></tr>
</table>

Algorithm: $C := AB + C$ where A is symmetric and stored in the lower triangular part

$$A \rightarrow \left(\begin{array}{c|c} A_{TL} & A_{TR} \\ \hline A_{BL} & A_{BR} \end{array}\right), \; B \rightarrow \left(\begin{array}{c} B_T \\ \hline B_B \end{array}\right), \; C \rightarrow \left(\begin{array}{c} C_T \\ \hline C_B \end{array}\right)$$

where A_{TL} is 0×0, B_T has 0 rows, C_T has 0 rows

while $m(A_{TL}) < m(A)$ do

$$\left(\begin{array}{c|c} A_{TL} & A_{TR} \\ \hline A_{BL} & A_{BR} \end{array}\right) \rightarrow \left(\begin{array}{c|cc} A_{00} & a_{01} & A_{02} \\ \hline a_{10}^T & \alpha_{11} & a_{12}^T \\ A_{20} & a_{21} & A_{22} \end{array}\right), \; \left(\begin{array}{c} B_T \\ \hline B_B \end{array}\right) \rightarrow \left(\begin{array}{c} B_0 \\ \hline b_1^T \\ B_2 \end{array}\right), \; \left(\begin{array}{c} C_T \\ \hline C_B \end{array}\right) \rightarrow \left(\begin{array}{c} C_0 \\ \hline c_1^T \\ C_2 \end{array}\right)$$

where α_{11} is 1×1, b_1 has 1 row, c_1 has 1 row

$C_0 := A_{00}B_0 + a_{01}b_1^T + A_{02}B_2 + C_0$

$c_1^T := a_{10}^T B_0 + \alpha_{11} b_1^T + a_{21}^T B_2 + c_1^T$

$C_2 := A_{20}B_0 + a_{21}b_1^T + A_{22}B_2 + C_2$

$$\left(\begin{array}{c|c} A_{TL} & A_{TR} \\ \hline A_{BL} & A_{BR} \end{array}\right) \leftarrow \left(\begin{array}{cc|c} A_{00} & a_{01} & A_{02} \\ a_{10}^T & \alpha_{11} & a_{12}^T \\ \hline A_{20} & a_{21} & A_{22} \end{array}\right), \; \left(\begin{array}{c} B_T \\ \hline B_B \end{array}\right) \leftarrow \left(\begin{array}{c} B_0 \\ b_1^T \\ \hline B_2 \end{array}\right), \; \left(\begin{array}{c} C_T \\ \hline C_B \end{array}\right) \leftarrow \left(\begin{array}{c} C_0 \\ c_1^T \\ \hline C_2 \end{array}\right)$$

endwhile

Algorithm: $C := AB + C$ where A is symmetric and stored in the lower triangular part

$$A \rightarrow \left(\begin{array}{c|c} A_{TL} & A_{TR} \\ \hline A_{BL} & A_{BR} \end{array} \right), \; B \rightarrow \left(\begin{array}{c} B_T \\ \hline B_B \end{array} \right), \; C \rightarrow \left(\begin{array}{c} C_T \\ \hline C_B \end{array} \right)$$

where A_{TL} is 0×0, B_T has 0 rows, C_T has 0 rows

while $m(A_{TL}) < m(A)$ **do**

$$\left(\begin{array}{c|c} A_{TL} & A_{TR} \\ \hline A_{BL} & A_{BR} \end{array} \right) \rightarrow \left(\begin{array}{c|cc} A_{00} & a_{01} & A_{02} \\ \hline a_{10}^T & \alpha_{11} & a_{12}^T \\ A_{20} & a_{21} & A_{22} \end{array} \right), \; \left(\begin{array}{c} B_T \\ \hline B_B \end{array} \right) \rightarrow \left(\begin{array}{c} B_0 \\ \hline b_1^T \\ B_2 \end{array} \right), \; \left(\begin{array}{c} C_T \\ \hline C_B \end{array} \right) \rightarrow \left(\begin{array}{c} C_0 \\ \hline c_1^T \\ C_2 \end{array} \right)$$

where α_{11} is 1×1, b_1 has 1 row, c_1 has 1 row

$$c_1^T := a_{10}^T B_0 + \alpha_{11} b_1^T + a_{21}^T B_2 + c_1^T$$

$$\left(\begin{array}{c|c} A_{TL} & A_{TR} \\ \hline A_{BL} & A_{BR} \end{array} \right) \leftarrow \left(\begin{array}{cc|c} A_{00} & a_{01} & A_{02} \\ a_{10}^T & \alpha_{11} & a_{12}^T \\ \hline A_{20} & a_{21} & A_{22} \end{array} \right), \; \left(\begin{array}{c} B_T \\ \hline B_B \end{array} \right) \leftarrow \left(\begin{array}{c} B_0 \\ b_1^T \\ \hline B_2 \end{array} \right), \; \left(\begin{array}{c} C_T \\ \hline C_B \end{array} \right) \leftarrow \left(\begin{array}{c} C_0 \\ c_1^T \\ \hline C_2 \end{array} \right)$$

endwhile