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	$\left\{ \left(\begin{array}{c} C_T \\ \hline C_B \end{array}\right) = \left(\begin{array}{ll} A_{TL}B_T + & \widehat{C}_T \\ \hline & \widehat{C}_B \end{array}\right) \right\}$
3	while $m(A_{TL}) < m(A)$ do
2,3	$\left\{ \left(\begin{array}{c} C_T \\ \hline C_B \end{array}\right) = \left(\begin{array}{ll} A_{TL}B_T + & \widehat{C}_T \\ \hline & \widehat{C}_B \end{array}\right) \wedge m(A_{TL}) < m(A) \right\}$
5a	$\left(\begin{array}{c\|c} A_{TL} & A_{TR} \\ \hline A_{BL} & A_{BR} \end{array}\right) \rightarrow \left(\begin{array}{c\|cc} A_{00} & a_{01} & A_{02} \\ \hline a_{10}^T & \alpha_{11} & a_{12}^T \\ A_{20} & a_{21} & A_{22} \end{array}\right)$, $\left(\begin{array}{c} B_T \\ \hline B_B \end{array}\right) \rightarrow \left(\begin{array}{c} B_0 \\ \hline b_1^T \\ B_2 \end{array}\right)$, $\left(\begin{array}{c} C_T \\ \hline C_B \end{array}\right) \rightarrow \left(\begin{array}{c} C_0 \\ \hline c_1^T \\ C_2 \end{array}\right)$ where α_{11} is 1×1, b_1 has 1 row, c_1 has 1 row
6	$\left\{ \left(\begin{array}{c} C_0 \\ c_1^T \\ C_2 \end{array}\right) = \left(\begin{array}{ll} A_{00}B_0 + & \widehat{C}_0 \\ & \widehat{c}_1^T \\ & \widehat{C}_2 \end{array}\right) \right\}$
8	$C_0 := \textcolor{lightgray}{A_{00}B_0 +} (a_{10}^T)^T b_1^T + \textcolor{lightgray}{A_{02}B_2 +} C_0$ $c_1^T := a_{10}^T B_0 + \alpha_{11} b_1^T + \textcolor{lightgray}{a_{12}^T B_2 +} c_1^T$ $\textcolor{lightgray}{C_2 := A_{20}B_0 + a_{21}b_1^T + A_{22}B_2 + C_2}$
7	$\left\{ \left(\begin{array}{c} C_0 \\ c_1^T \\ C_2 \end{array}\right) = \left(\begin{array}{ll} A_{00}B_0 + (a_{10}^T)^T b_1^T + & \widehat{C}_0 \\ a_{10}^T B_0 + \alpha_{11} b_1^T + & \widehat{c}_1^T \\ & \widehat{C}_2 \end{array}\right) \right\}$
5b	$\left(\begin{array}{c\|c} A_{TL} & A_{TR} \\ \hline A_{BL} & A_{BR} \end{array}\right) \leftarrow \left(\begin{array}{cc\|c} A_{00} & a_{01} & A_{02} \\ a_{10}^T & \alpha_{11} & a_{12}^T \\ \hline A_{20} & a_{21} & A_{22} \end{array}\right)$, $\left(\begin{array}{c} B_T \\ \hline B_B \end{array}\right) \leftarrow \left(\begin{array}{c} B_0 \\ b_1^T \\ \hline B_2 \end{array}\right)$, $\left(\begin{array}{c} C_T \\ \hline C_B \end{array}\right) \leftarrow \left(\begin{array}{c} C_0 \\ c_1^T \\ \hline C_2 \end{array}\right)$
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	endwhile
2,3	$\left\{ \left(\begin{array}{c} C_T \\ \hline C_B \end{array}\right) = \left(\begin{array}{ll} A_{TL}B_T + & \widehat{C}_T \\ \hline & \widehat{C}_B \end{array}\right) \wedge \neg(m(A_{TL}) < m(A)) \right\}$
1b	$\{C = AB + \widehat{C}$ $\}$

Step	Algorithm: $C := AB + C$ where A is symmetric and stored in the lower triangular part
1a	$\{ \quad \}$
4	where
2	$\{ \quad \}$
3	while do
2,3	$\{ \quad \wedge \quad \}$
5a	where
6	$\{ \quad \}$
8	$A_{00}B_0+$ $A_{02}B_2+$ $a_{12}^T B_2+$ $C_2 := A_{20}B_0 + a_{21}b_1^T + A_{22}B_2 + C_2$
7	$\{ \quad \}$
5b	
2	$\{ \quad \}$
	endwhile
2,3	$\{ \quad \wedge \neg(\quad) \quad \}$
1b	$\{ \quad \}$

Step	Algorithm: $C := AB + C$ where A is symmetric and stored in the lower triangular part
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7	$\{ \quad \}$
5b	
2	$\{ \quad \}$
	endwhile
2,3	$\{ \quad \wedge \neg(\quad) \quad \}$
1b	$\{ C = AB + \widehat{C} \}$

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

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

$$C_0 := A_{00}B_0 + (a_{10}^T)^T b_1^T + A_{02}B_2 + C_0$$
$$c_1^T := a_{10}^T B_0 + \alpha_{11} b_1^T + a_{12}^T B_2 + c_1^T$$
$$C_2 := A_{20}B_0 + a_{21} b_1^T + A_{22}B_2 + C_2$$

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

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

$$C_0 := (a_{10}^T)^T b_1^T + C_0$$

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

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

endwhile