Step	Algorithm:
1a	
4	where
2	
3	while do
2,3	$\wedge$
5a	where
6	
8	
5b	
7	
2	
	endwhile
2,3	$\wedge \neg($ $)$
1b	

<table>
<tr><th>Step</th><th>Algorithm: $[C] := \textsc{symm\_lu\_blk\_var1}(A, B, C)$</th></tr>
<tr><td>1a</td><td>$C = \widehat{C}$</td></tr>
<tr><td>4</td><td>$A \rightarrow \left(\begin{array}{c|c} A_{TL} & A_{TR} \\ \hline 0 & A_{BR} \end{array}\right), B \rightarrow \left(\begin{array}{c} B_T \\ \hline B_B \end{array}\right), C \rightarrow \left(\begin{array}{c} C_T \\ \hline C_B \end{array}\right)$
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<tr><td>5a</td><td>Determine block size b
$\left(\begin{array}{c|c} A_{TL} & A_{TR} \\ \hline 0 & A_{BR} \end{array}\right) \rightarrow \left(\begin{array}{c|c|c} A_{00} & A_{01} & A_{02} \\ \hline 0 & A_{11} & A_{12} \\ \hline 0 & 0 & A_{22} \end{array}\right), \left(\begin{array}{c} B_T \\ \hline B_B \end{array}\right) \rightarrow \left(\begin{array}{c} B_0 \\ \hline B_1 \\ \hline B_2 \end{array}\right), \left(\begin{array}{c} C_T \\ \hline C_B \end{array}\right) \rightarrow \left(\begin{array}{c} C_0 \\ \hline C_1 \\ \hline C_2 \end{array}\right)$
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<tr><td>6</td><td>$\left(\begin{array}{c} C_0 \\ \hline C_1 \\ \hline C_2 \end{array}\right) = \left(\begin{array}{c} A_{00}B_0 + A_{01}B_1^T + A_{02}B_2 + \widehat{C}_0 \\ \hline A_{01}^T B_0 + \widehat{C}_1 \\ \hline A_{02}^T B_0 + \widehat{C}_2 \end{array}\right)$</td></tr>
<tr><td>8</td><td>$C_1 := A_{11}B_1 + A_{12}B_2 + C_1$
$C_2 := A_{12}^T B_1 + C_2$</td></tr>
<tr><td>5b</td><td>$\left(\begin{array}{c|c} A_{TL} & A_{TR} \\ \hline 0 & A_{BR} \end{array}\right) \leftarrow \left(\begin{array}{c|c|c} A_{00} & A_{01} & A_{02} \\ \hline 0 & A_{11} & A_{12} \\ \hline 0 & 0 & A_{22} \end{array}\right), \left(\begin{array}{c} B_T \\ \hline B_B \end{array}\right) \leftarrow \left(\begin{array}{c} B_0 \\ \hline B_1 \\ \hline B_2 \end{array}\right), \left(\begin{array}{c} C_T \\ \hline C_B \end{array}\right) \leftarrow \left(\begin{array}{c} C_0 \\ \hline C_1 \\ \hline C_2 \end{array}\right)$</td></tr>
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<tr><td>1b</td><td>$[C] = \mathrm{symm\_lu}(A, B, \widehat{C})$</td></tr>
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Algorithm: $[C] := \textsc{symm\_lu\_blk\_var1}(A, B, C)$

$$A \rightarrow \left(\begin{array}{c|c} A_{TL} & A_{TR} \\ \hline 0 & A_{BR} \end{array}\right), B \rightarrow \left(\begin{array}{c} B_T \\ \hline B_B \end{array}\right), C \rightarrow \left(\begin{array}{c} C_T \\ \hline C_B \end{array}\right)$$

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

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

Determine block size b

$$\left(\begin{array}{c|c} A_{TL} & A_{TR} \\ \hline 0 & A_{BR} \end{array}\right) \rightarrow \left(\begin{array}{c|c|c} A_{00} & A_{01} & A_{02} \\ \hline 0 & A_{11} & A_{12} \\ \hline 0 & 0 & A_{22} \end{array}\right), \left(\begin{array}{c} B_T \\ \hline B_B \end{array}\right) \rightarrow \left(\begin{array}{c} B_0 \\ \hline B_1 \\ \hline B_2 \end{array}\right), \left(\begin{array}{c} C_T \\ \hline C_B \end{array}\right) \rightarrow \left(\begin{array}{c} C_0 \\ \hline C_1 \\ \hline C_2 \end{array}\right)$$

where A_{11} is $b \times b$, B_1 has b rows, C_1 has b rows

$C_1 := A_{11}B_1 + A_{12}B_2 + C_1$

$C_2 := A_{12}^T B_1 + C_2$

$$\left(\begin{array}{c|c} A_{TL} & A_{TR} \\ \hline 0 & A_{BR} \end{array}\right) \leftarrow \left(\begin{array}{c|c|c} A_{00} & A_{01} & A_{02} \\ \hline 0 & A_{11} & A_{12} \\ \hline 0 & 0 & A_{22} \end{array}\right), \left(\begin{array}{c} B_T \\ \hline B_B \end{array}\right) \leftarrow \left(\begin{array}{c} B_0 \\ \hline B_1 \\ \hline B_2 \end{array}\right), \left(\begin{array}{c} C_T \\ \hline C_B \end{array}\right) \leftarrow \left(\begin{array}{c} C_0 \\ \hline C_1 \\ \hline C_2 \end{array}\right)$$

endwhile

Step	Algorithm: $[C] := \text{SYMM\_LU\_BLK\_VAR1}(A, B, C)$
1a	$C = \widehat{C}$
4	where
2	
3	while do
2,3	$\wedge$
5a	**Determine block size** where
6	
8	
5b	
7	
2	
	endwhile
2,3	$\wedge \neg($ $)$
1b	$[C] = \text{symm\_lu}(A, B, \widehat{C})$

Step	Algorithm: $[C] := \text{SYMM\_LU\_BLK\_VAR1}(A, B, C)$
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2	$\left(\frac{C_T}{C_B}\right) = \left(\frac{A_{TL}B_T + A_{TR}B_B + \widehat{C}_T}{A_{TR}^T B_T + \widehat{C}_B}\right)$
3	while do
2,3	$\left(\frac{C_T}{C_B}\right) = \left(\frac{A_{TL}B_T + A_{TR}B_B + \widehat{C}_T}{A_{TR}^T B_T + \widehat{C}_B}\right) \wedge$
5a	**Determine block size** where
6	
8	
5b	
7	
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3	while $m(A_{TL}) < m(A)$ do
2,3	$\left(\frac{C_T}{C_B}\right) = \left(\frac{A_{TL}B_T + A_{TR}B_B + \widehat{C}_T}{A_{TR}^T B_T + \widehat{C}_B}\right) \wedge m(A_{TL}) < m(A)$
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2	$\left(\begin{array}{c} C_T \\ \hline C_B \end{array}\right) = \left(\begin{array}{c} A_{TL}B_T + A_{TR}B_B + \widehat{C}_T \\ \hline A_{TR}^T B_T + \widehat{C}_B \end{array}\right)$
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6	
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3	while $m(A_{TL}) < m(A)$ do
2,3	$\left(\begin{array}{c} C_T \\ \hline C_B \end{array}\right) = \left(\begin{array}{c} A_{TL}B_T + A_{TR}B_B + \widehat{C}_T \\ \hline A_{TR}^T B_T + \widehat{C}_B \end{array}\right) \wedge m(A_{TL}) < m(A)$
5a	**Determine block size b** $\left(\begin{array}{c\|c} A_{TL} & A_{TR} \\ \hline 0 & A_{BR} \end{array}\right) \rightarrow \left(\begin{array}{c\|c\|c} A_{00} & A_{01} & A_{02} \\ \hline 0 & A_{11} & A_{12} \\ \hline 0 & 0 & A_{22} \end{array}\right)$, $\left(\begin{array}{c} B_T \\ \hline B_B \end{array}\right) \rightarrow \left(\begin{array}{c} B_0 \\ \hline B_1 \\ \hline B_2 \end{array}\right)$, $\left(\begin{array}{c} C_T \\ \hline C_B \end{array}\right) \rightarrow \left(\begin{array}{c} C_0 \\ \hline C_1 \\ \hline C_2 \end{array}\right)$ where A_{11} is $b \times b$, B_1 has b rows, C_1 has b rows
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8	
5b	$\left(\begin{array}{c\|c} A_{TL} & A_{TR} \\ \hline 0 & A_{BR} \end{array}\right) \leftarrow \left(\begin{array}{c\|c\|c} A_{00} & A_{01} & A_{02} \\ \hline 0 & A_{11} & A_{12} \\ \hline 0 & 0 & A_{22} \end{array}\right)$, $\left(\begin{array}{c} B_T \\ \hline B_B \end{array}\right) \leftarrow \left(\begin{array}{c} B_0 \\ \hline B_1 \\ \hline B_2 \end{array}\right)$, $\left(\begin{array}{c} C_T \\ \hline C_B \end{array}\right) \leftarrow \left(\begin{array}{c} C_0 \\ \hline C_1 \\ \hline C_2 \end{array}\right)$
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3	while $m(A_{TL}) < m(A)$ do
2,3	$\left(\begin{array}{c} C_T \\ \hline C_B \end{array}\right) = \left(\begin{array}{c} A_{TL}B_T + A_{TR}B_B + \widehat{C}_T \\ \hline A_{TR}^T B_T + \widehat{C}_B \end{array}\right) \wedge m(A_{TL}) < m(A)$
5a	**Determine block size** b $\left(\begin{array}{c\|c} A_{TL} & A_{TR} \\ \hline 0 & A_{BR} \end{array}\right) \rightarrow \left(\begin{array}{c\|c\|c} A_{00} & A_{01} & A_{02} \\ \hline 0 & A_{11} & A_{12} \\ \hline 0 & 0 & A_{22} \end{array}\right)$, $\left(\begin{array}{c} B_T \\ \hline B_B \end{array}\right) \rightarrow \left(\begin{array}{c} B_0 \\ \hline B_1 \\ \hline B_2 \end{array}\right)$, $\left(\begin{array}{c} C_T \\ \hline C_B \end{array}\right) \rightarrow \left(\begin{array}{c} C_0 \\ \hline C_1 \\ \hline C_2 \end{array}\right)$ where A_{11} is $b \times b$, B_1 has b rows, C_1 has b rows
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5b	$\left(\begin{array}{c\|c} A_{TL} & A_{TR} \\ \hline 0 & A_{BR} \end{array}\right) \leftarrow \left(\begin{array}{c\|c\|c} A_{00} & A_{01} & A_{02} \\ \hline 0 & A_{11} & A_{12} \\ \hline 0 & 0 & A_{22} \end{array}\right)$, $\left(\begin{array}{c} B_T \\ \hline B_B \end{array}\right) \leftarrow \left(\begin{array}{c} B_0 \\ \hline B_1 \\ \hline B_2 \end{array}\right)$, $\left(\begin{array}{c} C_T \\ \hline C_B \end{array}\right) \leftarrow \left(\begin{array}{c} C_0 \\ \hline C_1 \\ \hline C_2 \end{array}\right)$
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<tr><td>2</td><td>$\left(\begin{array}{c} C_T \\ \hline C_B \end{array}\right) = \left(\begin{array}{c} A_{TL}B_T + A_{TR}B_B + \widehat{C}_T \\ \hline A_{TR}^T B_T + \widehat{C}_B \end{array}\right)$</td></tr>
<tr><td>3</td><td>while $m(A_{TL}) < m(A)$ do</td></tr>
<tr><td>2,3</td><td>$\left(\begin{array}{c} C_T \\ \hline C_B \end{array}\right) = \left(\begin{array}{c} A_{TL}B_T + A_{TR}B_B + \widehat{C}_T \\ \hline A_{TR}^T B_T + \widehat{C}_B \end{array}\right) \wedge m(A_{TL}) < m(A)$</td></tr>
<tr><td>5a</td><td>Determine block size b
$\left(\begin{array}{c|c} A_{TL} & A_{TR} \\ \hline 0 & A_{BR} \end{array}\right) \rightarrow \left(\begin{array}{c|c|c} A_{00} & A_{01} & A_{02} \\ \hline 0 & A_{11} & A_{12} \\ \hline 0 & 0 & A_{22} \end{array}\right)$, $\left(\begin{array}{c} B_T \\ \hline B_B \end{array}\right) \rightarrow \left(\begin{array}{c} B_0 \\ \hline B_1 \\ \hline B_2 \end{array}\right)$, $\left(\begin{array}{c} C_T \\ \hline C_B \end{array}\right) \rightarrow \left(\begin{array}{c} C_0 \\ \hline C_1 \\ \hline C_2 \end{array}\right)$
where A_{11} is $b \times b$, B_1 has b rows, C_1 has b rows</td></tr>
<tr><td>6</td><td>$\left(\begin{array}{c} C_0 \\ \hline C_1 \\ \hline C_2 \end{array}\right) = \left(\begin{array}{c} A_{00}B_0 + A_{01}B_1^T + A_{02}B_2 + \widehat{C}_0 \\ \hline A_{01}^T B_0 + \widehat{C}_1 \\ \hline A_{02}^T B_0 + \widehat{C}_2 \end{array}\right)$</td></tr>
<tr><td>8</td><td>$C_1 := A_{11}B_1 + A_{12}B_2 + C_1$
$C_2 := A_{12}^T B_1 + C_2$</td></tr>
<tr><td>5b</td><td>$\left(\begin{array}{c|c} A_{TL} & A_{TR} \\ \hline 0 & A_{BR} \end{array}\right) \leftarrow \left(\begin{array}{c|c|c} A_{00} & A_{01} & A_{02} \\ \hline 0 & A_{11} & A_{12} \\ \hline 0 & 0 & A_{22} \end{array}\right)$, $\left(\begin{array}{c} B_T \\ \hline B_B \end{array}\right) \leftarrow \left(\begin{array}{c} B_0 \\ \hline B_1 \\ \hline B_2 \end{array}\right)$, $\left(\begin{array}{c} C_T \\ \hline C_B \end{array}\right) \leftarrow \left(\begin{array}{c} C_0 \\ \hline C_1 \\ \hline C_2 \end{array}\right)$</td></tr>
<tr><td>7</td><td>$\left(\begin{array}{c} C_0 \\ \hline C_1 \\ \hline C_2 \end{array}\right) = \left(\begin{array}{c} A_{00}B_0 + A_{01}B_1 + A_{02}B_2 + \widehat{C}_0 \\ \hline A_{01}B_0 + A_{11}B_1 + A_{12}B_2 + \widehat{C}_1 \\ \hline A_{02}B_0 + A_{12}B_1 + \widehat{C}_2 \end{array}\right)$</td></tr>
<tr><td>2</td><td>$\left(\begin{array}{c} C_T \\ \hline C_B \end{array}\right) = \left(\begin{array}{c} A_{TL}B_T + A_{TR}B_B + \widehat{C}_T \\ \hline A_{TR}^T B_T + \widehat{C}_B \end{array}\right)$</td></tr>
<tr><td></td><td>endwhile</td></tr>
<tr><td>2,3</td><td>$\left(\begin{array}{c} C_T \\ \hline C_B \end{array}\right) = \left(\begin{array}{c} A_{TL}B_T + A_{TR}B_B + \widehat{C}_T \\ \hline A_{TR}^T B_T + \widehat{C}_B \end{array}\right) \wedge \neg(m(A_{TL}) < m(A))$</td></tr>
<tr><td>1b</td><td>$[C] = \text{symm\_lu}(A, B, \widehat{C})$</td></tr>
</table>

Step	Algorithm: $[C] := \textsc{symm\_lu\_blk\_var1}(A, B, C)$
	$A \rightarrow \left(\begin{array}{c\|c} A_{TL} & A_{TR} \\ \hline 0 & A_{BR} \end{array}\right)$, $B \rightarrow \left(\begin{array}{c} B_T \\ \hline B_B \end{array}\right)$, $C \rightarrow \left(\begin{array}{c} C_T \\ \hline C_B \end{array}\right)$ where A_{TL} is 0×0, B_T has 0 rows, C_T has 0 rows
	while $m(A_{TL}) < m(A)$ do
	Determine block size b $\left(\begin{array}{c\|c} A_{TL} & A_{TR} \\ \hline 0 & A_{BR} \end{array}\right) \rightarrow \left(\begin{array}{c\|c\|c} A_{00} & A_{01} & A_{02} \\ \hline 0 & A_{11} & A_{12} \\ \hline 0 & 0 & A_{22} \end{array}\right)$, $\left(\begin{array}{c} B_T \\ \hline B_B \end{array}\right) \rightarrow \left(\begin{array}{c} B_0 \\ \hline B_1 \\ \hline B_2 \end{array}\right)$, $\left(\begin{array}{c} C_T \\ \hline C_B \end{array}\right) \rightarrow \left(\begin{array}{c} C_0 \\ \hline C_1 \\ \hline C_2 \end{array}\right)$ where A_{11} is $b \times b$, B_1 has b rows, C_1 has b rows
	$C_1 := A_{11} B_1 + A_{12} B_2 + C_1$ $C_2 := A_{12}^T B_1 + C_2$
	$\left(\begin{array}{c\|c} A_{TL} & A_{TR} \\ \hline 0 & A_{BR} \end{array}\right) \leftarrow \left(\begin{array}{c\|c\|c} A_{00} & A_{01} & A_{02} \\ \hline 0 & A_{11} & A_{12} \\ \hline 0 & 0 & A_{22} \end{array}\right)$, $\left(\begin{array}{c} B_T \\ \hline B_B \end{array}\right) \leftarrow \left(\begin{array}{c} B_0 \\ \hline B_1 \\ \hline B_2 \end{array}\right)$, $\left(\begin{array}{c} C_T \\ \hline C_B \end{array}\right) \leftarrow \left(\begin{array}{c} C_0 \\ \hline C_1 \\ \hline C_2 \end{array}\right)$
	endwhile

Algorithm: $[C] := \text{SYMM\_LU\_BLK\_VAR1}(A, B, C)$

$$A \rightarrow \left(\begin{array}{c|c} A_{TL} & A_{TR} \\ \hline 0 & A_{BR} \end{array}\right), B \rightarrow \left(\begin{array}{c} B_T \\ \hline B_B \end{array}\right), C \rightarrow \left(\begin{array}{c} C_T \\ \hline C_B \end{array}\right)$$

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

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

Determine block size b

$$\left(\begin{array}{c|c} A_{TL} & A_{TR} \\ \hline 0 & A_{BR} \end{array}\right) \rightarrow \left(\begin{array}{c|c|c} A_{00} & A_{01} & A_{02} \\ \hline 0 & A_{11} & A_{12} \\ \hline 0 & 0 & A_{22} \end{array}\right), \left(\begin{array}{c} B_T \\ \hline B_B \end{array}\right) \rightarrow \left(\begin{array}{c} B_0 \\ \hline B_1 \\ \hline B_2 \end{array}\right), \left(\begin{array}{c} C_T \\ \hline C_B \end{array}\right) \rightarrow \left(\begin{array}{c} C_0 \\ \hline C_1 \\ \hline C_2 \end{array}\right)$$

where A_{11} is $b \times b$, B_1 has b rows, C_1 has b rows

$C_1 := A_{11}B_1 + A_{12}B_2 + C_1$

$C_2 := A_{12}^T B_1 + C_2$

$$\left(\begin{array}{c|c} A_{TL} & A_{TR} \\ \hline 0 & A_{BR} \end{array}\right) \leftarrow \left(\begin{array}{c|c|c} A_{00} & A_{01} & A_{02} \\ \hline 0 & A_{11} & A_{12} \\ \hline 0 & 0 & A_{22} \end{array}\right), \left(\begin{array}{c} B_T \\ \hline B_B \end{array}\right) \leftarrow \left(\begin{array}{c} B_0 \\ \hline B_1 \\ \hline B_2 \end{array}\right), \left(\begin{array}{c} C_T \\ \hline C_B \end{array}\right) \leftarrow \left(\begin{array}{c} C_0 \\ \hline C_1 \\ \hline C_2 \end{array}\right)$$

endwhile