

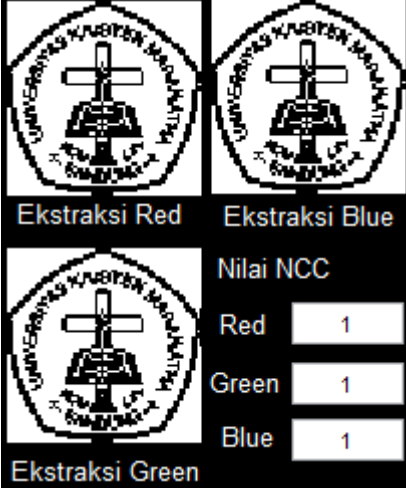
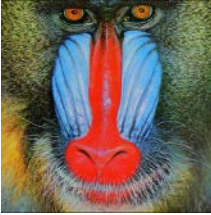
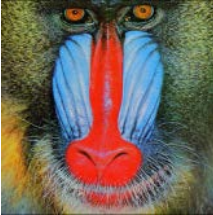
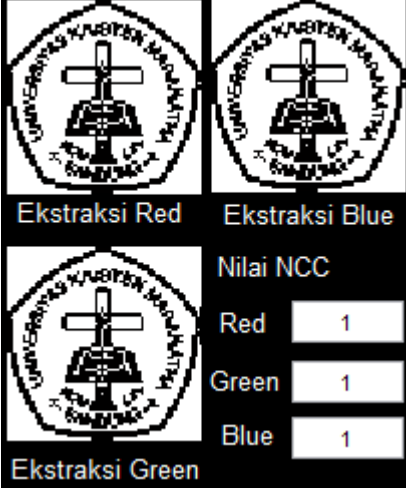
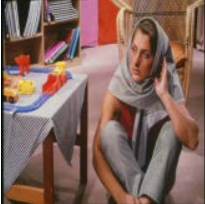
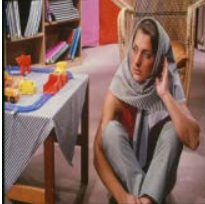
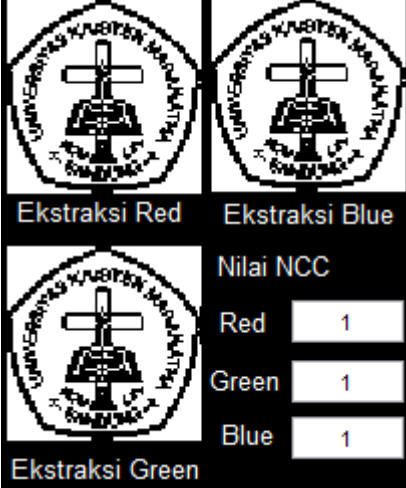

















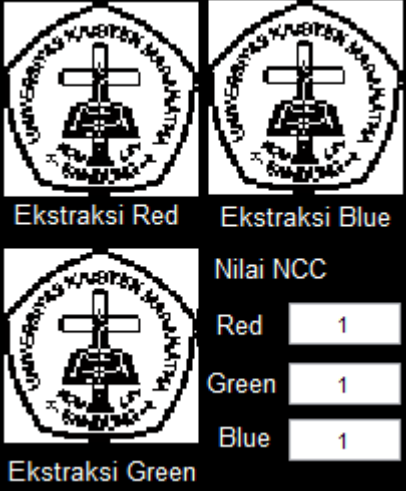


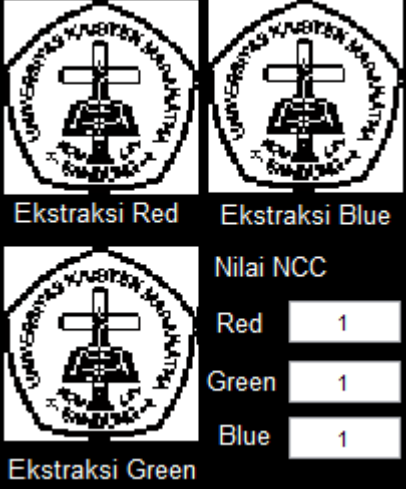

















LAMPIRAN – A
CITRA HASIL PERCOBAAN

1. Citra Hasil Watermarking

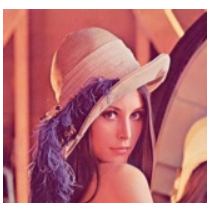
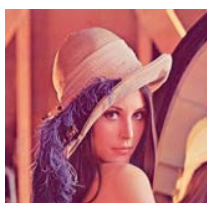

Nama Citra	Citra Asli $\alpha = 5$	Citra yang Telah Disisipkan <i>Watermark</i>	<i>Watermark</i> Hasil Ekstraksi dan Nilai NCC
Lena 256			
Baboon 256			
Barbara 256			


























<p>Lena 512</p>			 <p>Ekstraksi Red</p>  <p>Ekstraksi Blue</p>  <p>Ekstraksi Green</p> <p>Nilai NCC</p> <table border="1" data-bbox="1246 533 1442 689"> <tr> <td>Red</td> <td>1</td> </tr> <tr> <td>Green</td> <td>1</td> </tr> <tr> <td>Blue</td> <td>1</td> </tr> </table>	Red	1	Green	1	Blue	1
Red	1								
Green	1								
Blue	1								
<p>Baboon 512</p>			 <p>Ekstraksi Red</p>  <p>Ekstraksi Blue</p>  <p>Ekstraksi Green</p> <p>Nilai NCC</p> <table border="1" data-bbox="1246 1037 1442 1193"> <tr> <td>Red</td> <td>1</td> </tr> <tr> <td>Green</td> <td>1</td> </tr> <tr> <td>Blue</td> <td>1</td> </tr> </table>	Red	1	Green	1	Blue	1
Red	1								
Green	1								
Blue	1								
<p>Barbara 512</p>			 <p>Ekstraksi Red</p>  <p>Ekstraksi Blue</p>  <p>Ekstraksi Green</p> <p>Nilai NCC</p> <table border="1" data-bbox="1246 1552 1442 1709"> <tr> <td>Red</td> <td>1</td> </tr> <tr> <td>Green</td> <td>1</td> </tr> <tr> <td>Blue</td> <td>1</td> </tr> </table>	Red	1	Green	1	Blue	1
Red	1								
Green	1								
Blue	1								

Nama Citra	Citra Asli $\alpha = 7$	Citra yang Telah Disisipkan <i>Watermark</i>	<i>Watermark</i> Hasil Ekstraksi dan Nilai NCC
Lena 256			
Baboon 256			

<p>Barbara 256</p>			 Ekstraksi Red  Ekstraksi Blue  Ekstraksi Green <p>Nilai NCC</p> <table border="1" data-bbox="1241 533 1433 696"> <tr> <td>Red</td> <td>1</td> </tr> <tr> <td>Green</td> <td>1</td> </tr> <tr> <td>Blue</td> <td>1</td> </tr> </table>	Red	1	Green	1	Blue	1
Red	1								
Green	1								
Blue	1								
<p>Lena 512</p>			 Ekstraksi Red  Ekstraksi Blue  Ekstraksi Green <p>Nilai NCC</p> <table border="1" data-bbox="1241 1039 1433 1202"> <tr> <td>Red</td> <td>1</td> </tr> <tr> <td>Green</td> <td>1</td> </tr> <tr> <td>Blue</td> <td>1</td> </tr> </table>	Red	1	Green	1	Blue	1
Red	1								
Green	1								
Blue	1								
<p>Baboon 512</p>			 Ekstraksi Red  Ekstraksi Blue  Ekstraksi Green <p>Nilai NCC</p> <table border="1" data-bbox="1241 1554 1433 1718"> <tr> <td>Red</td> <td>1</td> </tr> <tr> <td>Green</td> <td>1</td> </tr> <tr> <td>Blue</td> <td>1</td> </tr> </table>	Red	1	Green	1	Blue	1
Red	1								
Green	1								
Blue	1								



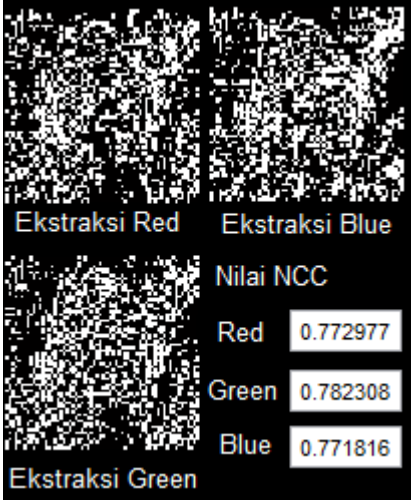


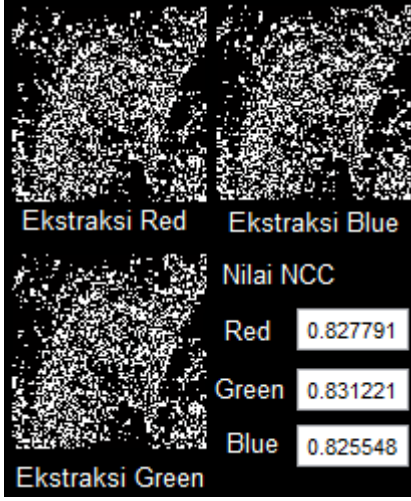
<p>Barbara 512</p>			
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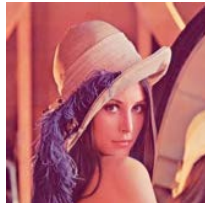



<p>Nama Citra</p>	<p>Citra Asli $\alpha = 10$</p>	<p>Citra yang Telah Disisipkan <i>Watermark</i></p>	<p><i>Watermark</i> Hasil Ekstraksi dan Nilai NCC</p>
<p>Lena 256</p>			

<p>Baboon 256</p>			<table border="1"> <tbody> <tr> <td></td> <td></td> </tr> <tr> <td>Ekstraksi Red</td> <td>Ekstraksi Blue</td> </tr> <tr> <td></td> <td>Nilai NCC</td> </tr> <tr> <td>Ekstraksi Green</td> <td>Red <input type="text" value="1"/></td> </tr> <tr> <td></td> <td>Green <input type="text" value="1"/></td> </tr> <tr> <td></td> <td>Blue <input type="text" value="1"/></td> </tr> </tbody> </table>			Ekstraksi Red	Ekstraksi Blue		Nilai NCC	Ekstraksi Green	Red <input type="text" value="1"/>		Green <input type="text" value="1"/>		Blue <input type="text" value="1"/>
															
Ekstraksi Red	Ekstraksi Blue														
	Nilai NCC														
Ekstraksi Green	Red <input type="text" value="1"/>														
	Green <input type="text" value="1"/>														
	Blue <input type="text" value="1"/>														
<p>Barbara 256</p>			<table border="1"> <tbody> <tr> <td></td> <td></td> </tr> <tr> <td>Ekstraksi Red</td> <td>Ekstraksi Blue</td> </tr> <tr> <td></td> <td>Nilai NCC</td> </tr> <tr> <td>Ekstraksi Green</td> <td>Red <input type="text" value="1"/></td> </tr> <tr> <td></td> <td>Green <input type="text" value="1"/></td> </tr> <tr> <td></td> <td>Blue <input type="text" value="1"/></td> </tr> </tbody> </table>			Ekstraksi Red	Ekstraksi Blue		Nilai NCC	Ekstraksi Green	Red <input type="text" value="1"/>		Green <input type="text" value="1"/>		Blue <input type="text" value="1"/>
															
Ekstraksi Red	Ekstraksi Blue														
	Nilai NCC														
Ekstraksi Green	Red <input type="text" value="1"/>														
	Green <input type="text" value="1"/>														
	Blue <input type="text" value="1"/>														
<p>Lena 512</p>			<table border="1"> <tbody> <tr> <td></td> <td></td> </tr> <tr> <td>Ekstraksi Red</td> <td>Ekstraksi Blue</td> </tr> <tr> <td></td> <td>Nilai NCC</td> </tr> <tr> <td>Ekstraksi Green</td> <td>Red <input type="text" value="1"/></td> </tr> <tr> <td></td> <td>Green <input type="text" value="1"/></td> </tr> <tr> <td></td> <td>Blue <input type="text" value="1"/></td> </tr> </tbody> </table>			Ekstraksi Red	Ekstraksi Blue		Nilai NCC	Ekstraksi Green	Red <input type="text" value="1"/>		Green <input type="text" value="1"/>		Blue <input type="text" value="1"/>
															
Ekstraksi Red	Ekstraksi Blue														
	Nilai NCC														
Ekstraksi Green	Red <input type="text" value="1"/>														
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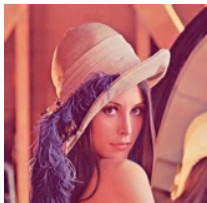


<p>Baboon 512</p>			<table border="1"> <tbody> <tr> <td></td> <td></td> </tr> <tr> <td>Ekstraksi Red</td> <td>Ekstraksi Blue</td> </tr> <tr> <td></td> <td>Nilai NCC</td> </tr> <tr> <td>Ekstraksi Green</td> <td>Red <input type="text" value="1"/></td> </tr> <tr> <td></td> <td>Green <input type="text" value="1"/></td> </tr> <tr> <td></td> <td>Blue <input type="text" value="1"/></td> </tr> </tbody> </table>			Ekstraksi Red	Ekstraksi Blue		Nilai NCC	Ekstraksi Green	Red <input type="text" value="1"/>		Green <input type="text" value="1"/>		Blue <input type="text" value="1"/>
															
Ekstraksi Red	Ekstraksi Blue														
	Nilai NCC														
Ekstraksi Green	Red <input type="text" value="1"/>														
	Green <input type="text" value="1"/>														
	Blue <input type="text" value="1"/>														
<p>Barbara 512</p>			<table border="1"> <tbody> <tr> <td></td> <td></td> </tr> <tr> <td>Ekstraksi Red</td> <td>Ekstraksi Blue</td> </tr> <tr> <td></td> <td>Nilai NCC</td> </tr> <tr> <td>Ekstraksi Green</td> <td>Red <input type="text" value="1"/></td> </tr> <tr> <td></td> <td>Green <input type="text" value="1"/></td> </tr> <tr> <td></td> <td>Blue <input type="text" value="1"/></td> </tr> </tbody> </table>			Ekstraksi Red	Ekstraksi Blue		Nilai NCC	Ekstraksi Green	Red <input type="text" value="1"/>		Green <input type="text" value="1"/>		Blue <input type="text" value="1"/>
															
Ekstraksi Red	Ekstraksi Blue														
	Nilai NCC														
Ekstraksi Green	Red <input type="text" value="1"/>														
	Green <input type="text" value="1"/>														
	Blue <input type="text" value="1"/>														


2. Hasil ekstraksi *watermark* citra Lena yang telah disisipkan *watermark* dan di kompres dengan faktor kualitas (Q)=0,dan 10.






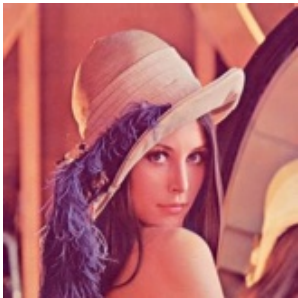




Nama Citra	Citra terwatermark	Citra terwatermark di kompres Q=0	Watermark Hasil Ekstraksi dan Nilai NCC
Lena 256	 <p style="text-align: center;">$\alpha = 5$</p>		 <p>Ekstraksi Red Ekstraksi Blue</p> <p>Nilai NCC</p> <p>Red 0.772977</p> <p>Green 0.782308</p> <p>Blue 0.771816</p> <p>Ekstraksi Green</p>
Lena 512	 <p style="text-align: center;">$\alpha = 5$</p>		 <p>Ekstraksi Red Ekstraksi Blue</p> <p>Nilai NCC</p> <p>Red 0.827791</p> <p>Green 0.831221</p> <p>Blue 0.825548</p> <p>Ekstraksi Green</p>

<p>Lena 256</p>	 <p>$\alpha = 7$</p>		  <p>Ekstraksi Red Ekstraksi Blue</p>  <p>Nilai NCC</p> <p>Red 0.789632</p> <p>Green 0.804908</p> <p>Blue 0.79101</p> <p>Ekstraksi Green</p>
<p>Lena 512</p>	 <p>$\alpha = 7$</p>		  <p>Ekstraksi Red Ekstraksi Blue</p>  <p>Nilai NCC</p> <p>Red 0.84807</p> <p>Green 0.85117</p> <p>Blue 0.847284</p> <p>Ekstraksi Green</p>
<p>Lena 256</p>	 <p>$\alpha = 10$</p>		  <p>Ekstraksi Red Ekstraksi Blue</p>  <p>Nilai NCC</p> <p>Red 0.812287</p> <p>Green 0.819951</p> <p>Blue 0.807525</p> <p>Ekstraksi Green</p>



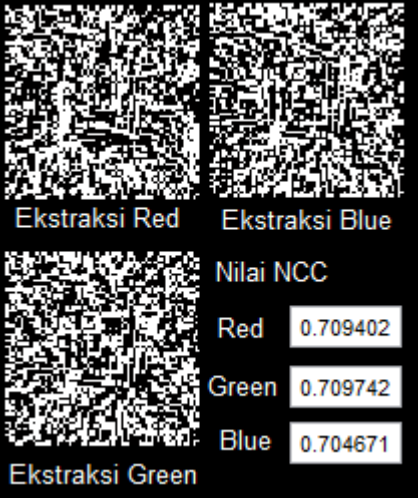


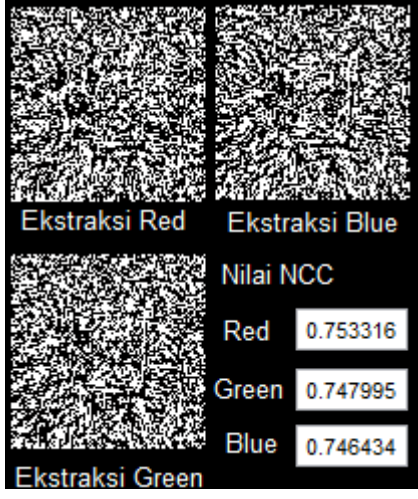
Lena 512	 <p style="text-align: center;">$\alpha = 10$</p>		
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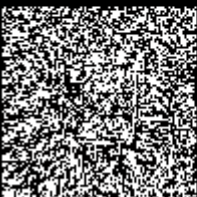





Nama Citra	Citra terwatermark	Citra terwatermark di kompres Q=10	Watermark Hasil Ekstraksi dan Nilai NCC
Lena 256	 <p style="text-align: center;">$\alpha = 5$</p>		



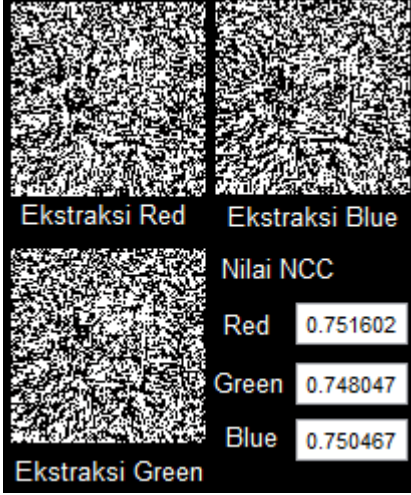
<p>Lena 512</p>	 <p>$\alpha = 5$</p>		 Ekstraksi Red  Ekstraksi Blue  Ekstraksi Green Nilai NCC Red <input type="text" value="0.987983"/> Green <input type="text" value="0.996408"/> Blue <input type="text" value="0.986363"/>
<p>Lena 256</p>	 <p>$\alpha = 7$</p>		 Ekstraksi Red  Ekstraksi Blue  Ekstraksi Green Nilai NCC Red <input type="text" value="0.989342"/> Green <input type="text" value="0.998599"/> Blue <input type="text" value="0.9858"/>
<p>Lena 512</p>	 <p>$\alpha = 7$</p>		 Ekstraksi Red  Ekstraksi Blue  Ekstraksi Green Nilai NCC Red <input type="text" value="0.996576"/> Green <input type="text" value="0.999427"/> Blue <input type="text" value="0.994691"/>


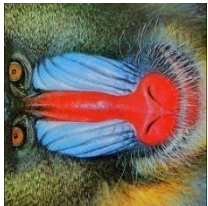
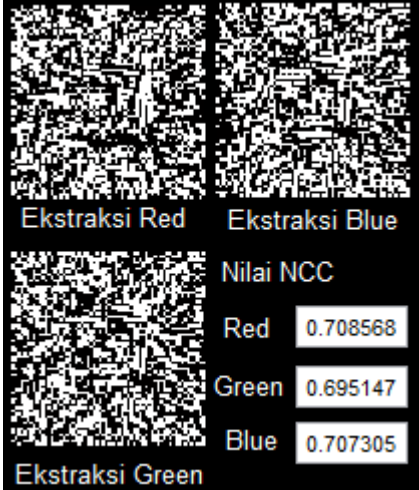
<p>Lena 256</p>	 <p>$\alpha = 10$</p>		 Ekstraksi Red  Ekstraksi Blue  Ekstraksi Green <p>Nilai NCC</p> <p>Red <input type="text" value="0.997201"/></p> <p>Green <input type="text" value="1"/></p> <p>Blue <input type="text" value="0.994406"/></p>
<p>Lena 512</p>	 <p>$\alpha = 10$</p>		 Ekstraksi Red  Ekstraksi Blue  Ekstraksi Green <p>Nilai NCC</p> <p>Red <input type="text" value="0.999428"/></p> <p>Green <input type="text" value="0.999918"/></p> <p>Blue <input type="text" value="0.99869"/></p>


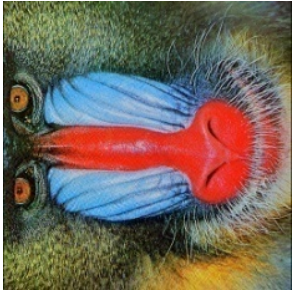

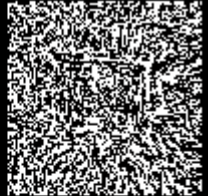
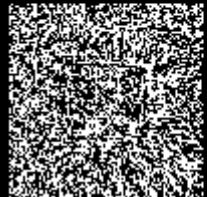

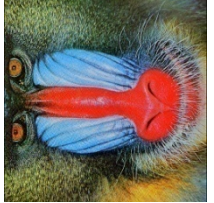






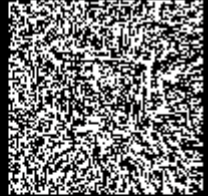
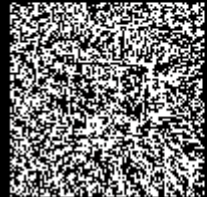
3. Hasil ekstraksi *watermark* citra Baboon yang telah disisipkan *watermark* dan di rotasi dengan rotasi kanan 90°, kiri 90°, dan 180°.

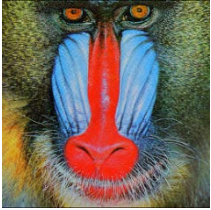




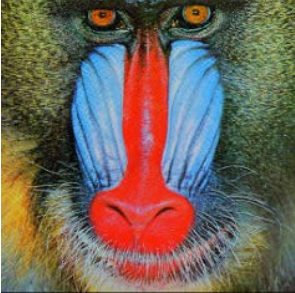




Nama Citra	Citra terwatermark	Citra terwatermark di rotasi kanan 90°	Watermark Hasil Ekstraksi dan Nilai NCC
Baboon 256	 <p style="text-align: center;">$\alpha = 5$</p>		 <p>Ekstraksi Red Ekstraksi Blue</p> <p>Nilai NCC</p> <p>Red 0.709402</p> <p>Green 0.709742</p> <p>Blue 0.704671</p> <p>Ekstraksi Green</p>
Baboon 512	 <p style="text-align: center;">$\alpha = 5$</p>		 <p>Ekstraksi Red Ekstraksi Blue</p> <p>Nilai NCC</p> <p>Red 0.753316</p> <p>Green 0.747995</p> <p>Blue 0.746434</p> <p>Ekstraksi Green</p>

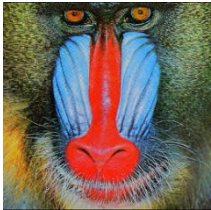

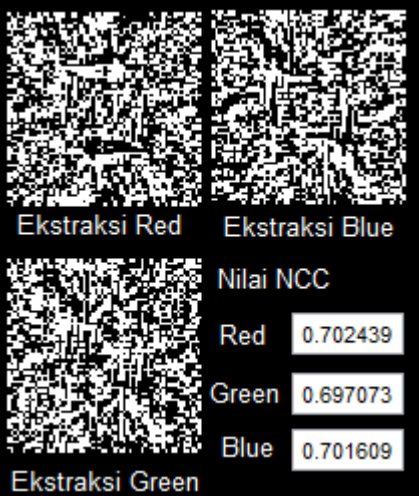


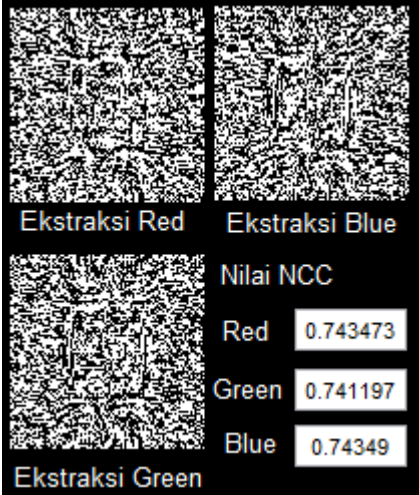
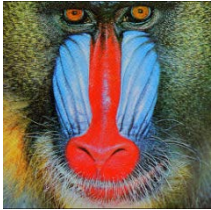

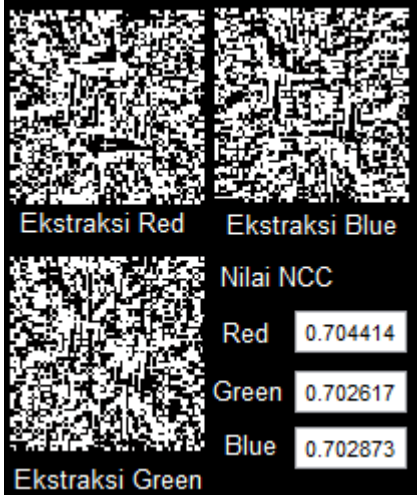
<p>Baboon 256</p>	 <p>$\alpha = 7$</p>		 Ekstraksi Red  Ekstraksi Blue  Ekstraksi Green <p>Nilai NCC</p> <p>Red <input type="text" value="0.711295"/></p> <p>Green <input type="text" value="0.71064"/></p> <p>Blue <input type="text" value="0.704501"/></p>
<p>Baboon 512</p>	 <p>$\alpha = 7$</p>		 Ekstraksi Red  Ekstraksi Blue  Ekstraksi Green <p>Nilai NCC</p> <p>Red <input type="text" value="0.752373"/></p> <p>Green <input type="text" value="0.7479"/></p> <p>Blue <input type="text" value="0.748047"/></p>
<p>Baboon 256</p>	 <p>$\alpha = 10$</p>		 Ekstraksi Red  Ekstraksi Blue  Ekstraksi Green <p>Nilai NCC</p> <p>Red <input type="text" value="0.712271"/></p> <p>Green <input type="text" value="0.712633"/></p> <p>Blue <input type="text" value="0.705353"/></p>




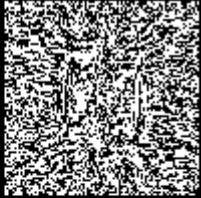









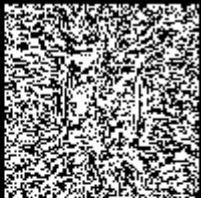

<p>Baboon 512</p>	 <p>$\alpha = 10$</p>		 <p>Ekstraksi Red Ekstraksi Blue</p> <p>Ekstraksi Green</p> <p>Nilai NCC</p> <p>Red 0.751602</p> <p>Green 0.748047</p> <p>Blue 0.750467</p>
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Nama Citra	Citra terwatermark	Citra terwatermark di rotasi kiri 90°	Watermark Hasil Ekstraksi dan Nilai NCC
<p>Baboon 256</p>	 <p>$\alpha = 5$</p>		 <p>Ekstraksi Red Ekstraksi Blue</p> <p>Ekstraksi Green</p> <p>Nilai NCC</p> <p>Red 0.708568</p> <p>Green 0.695147</p> <p>Blue 0.707305</p>





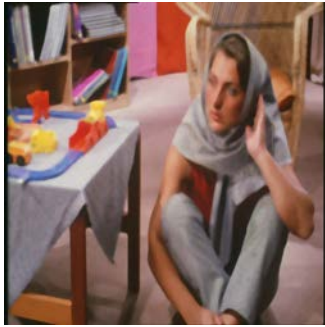
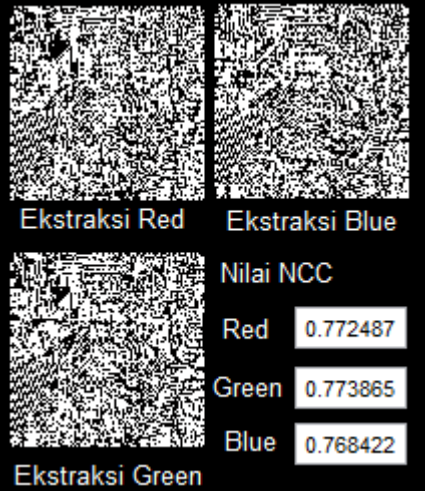
<p>Baboon 512</p>	 <p>$\alpha = 5$</p>		 Ekstraksi Red  Ekstraksi Blue  Ekstraksi Green <p>Nilai NCC</p> <p>Red 0.746541</p> <p>Green 0.745613</p> <p>Blue 0.744539</p>
<p>Baboon 256</p>	 <p>$\alpha = 7$</p>		 Ekstraksi Red  Ekstraksi Blue  Ekstraksi Green <p>Nilai NCC</p> <p>Red 0.708704</p> <p>Green 0.69803</p> <p>Blue 0.706485</p>
<p>Baboon 512</p>	 <p>$\alpha = 7$</p>		 Ekstraksi Red  Ekstraksi Blue  Ekstraksi Green <p>Nilai NCC</p> <p>Red 0.746322</p> <p>Green 0.745185</p> <p>Blue 0.745174</p>

<p>Baboon 256</p>	 <p>$\alpha = 10$</p>		 Ekstraksi Red  Ekstraksi Blue  Ekstraksi Green <p>Nilai NCC</p> <p>Red 0.710912</p> <p>Green 0.704179</p> <p>Blue 0.70851</p>
<p>Baboon 512</p>	 <p>$\alpha = 10$</p>		 Ekstraksi Red  Ekstraksi Blue  Ekstraksi Green <p>Nilai NCC</p> <p>Red 0.746735</p> <p>Green 0.74583</p> <p>Blue 0.743539</p>

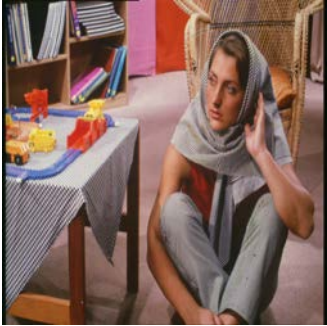

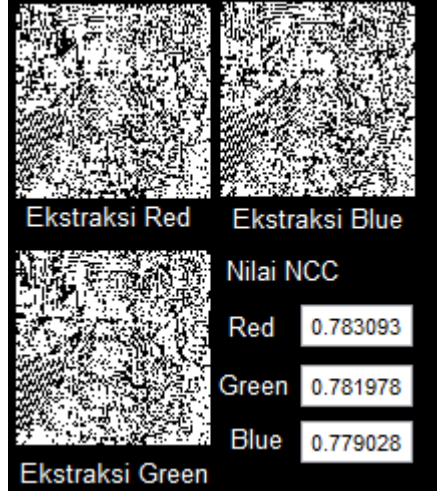
Nama Citra	Citra terwatermark	Citra terwatermark di rotasi 180°	Watermark Hasil Ekstraksi dan Nilai NCC
Baboon 256	 <p style="text-align: center;">$\alpha = 5$</p>		 <p>Ekstraksi Red Ekstraksi Blue</p> <p>Ekstraksi Green</p> <p>Nilai NCC</p> <p>Red 0.702439</p> <p>Green 0.697073</p> <p>Blue 0.701609</p>
Baboon 512	 <p style="text-align: center;">$\alpha = 5$</p>		 <p>Ekstraksi Red Ekstraksi Blue</p> <p>Ekstraksi Green</p> <p>Nilai NCC</p> <p>Red 0.743473</p> <p>Green 0.741197</p> <p>Blue 0.74349</p>
Baboon 256	 <p style="text-align: center;">$\alpha = 7$</p>		 <p>Ekstraksi Red Ekstraksi Blue</p> <p>Ekstraksi Green</p> <p>Nilai NCC</p> <p>Red 0.704414</p> <p>Green 0.702617</p> <p>Blue 0.702873</p>



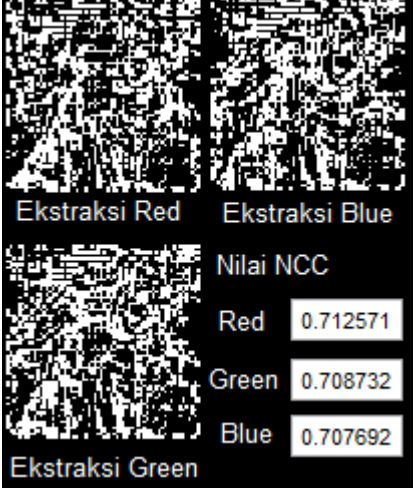


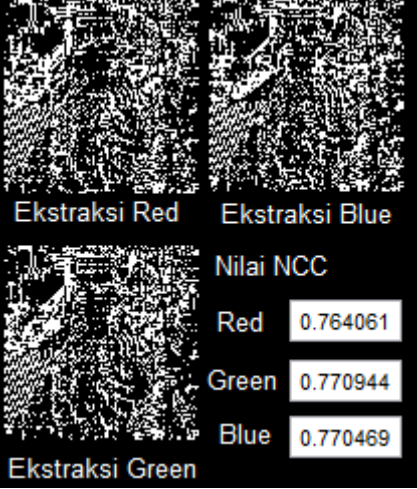
<p>Baboon 512</p>	 <p>$\alpha = 7$</p>		 Ekstraksi Red  Ekstraksi Blue  Ekstraksi Green <p>Nilai NCC</p> <p>Red 0.743318</p> <p>Green 0.741582</p> <p>Blue 0.742714</p>
<p>Baboon 256</p>	 <p>$\alpha = 10$</p>		 Ekstraksi Red  Ekstraksi Blue  Ekstraksi Green <p>Nilai NCC</p> <p>Red 0.709858</p> <p>Green 0.702584</p> <p>Blue 0.704152</p>
<p>Baboon 512</p>	 <p>$\alpha = 10$</p>		 Ekstraksi Red  Ekstraksi Blue  Ekstraksi Green <p>Nilai NCC</p> <p>Red 0.744994</p> <p>Green 0.742232</p> <p>Blue 0.742913</p>
















4. Hasil ekstraksi *watermark* citra Barbara yang telah disisipkan *watermark* dan di *median filtering* 3x3 dan 7x7 piksel.

Nama Citra	Citra terwatermark	Citra terwatermark di <i>median filtering</i> 3x3	Watermark Hasil Ekstraksi dan Nilai NCC
Barbara 256	 <p style="text-align: center;">$\alpha = 5$</p>		 <p>Ekstraksi Red Ekstraksi Blue</p> <p>Ekstraksi Green</p> <p>Nilai NCC</p> <p>Red 0.709964</p> <p>Green 0.705586</p> <p>Blue 0.703911</p>
Barbara 512	 <p style="text-align: center;">$\alpha = 5$</p>		 <p>Ekstraksi Red Ekstraksi Blue</p> <p>Ekstraksi Green</p> <p>Nilai NCC</p> <p>Red 0.772487</p> <p>Green 0.773865</p> <p>Blue 0.768422</p>

<p>Barbara 256</p>	 <p>$\alpha = 7$</p>		 Ekstraksi Red  Ekstraksi Blue  Ekstraksi Green Nilai NCC Red 0.714164 Green 0.706333 Blue 0.710591
<p>Barbara 512</p>	 <p>$\alpha = 7$</p>		 Ekstraksi Red  Ekstraksi Blue  Ekstraksi Green Nilai NCC Red 0.778585 Green 0.77709 Blue 0.773197
<p>Barbara 256</p>	 <p>$\alpha = 10$</p>		 Ekstraksi Red  Ekstraksi Blue  Ekstraksi Green Nilai NCC Red 0.717172 Green 0.710788 Blue 0.714398



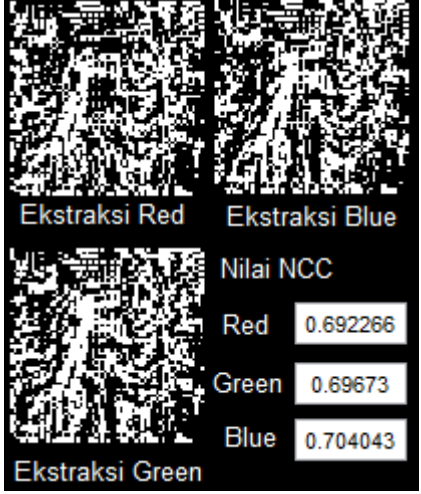
<p>Barbara 512</p>	 <p style="text-align: center;">$\alpha = 10$</p>		
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Nama Citra	Citra terwatermark	Citra terwatermark di median filter 7x7	Watermark Hasil Ekstraksi dan Nilai NCC
<p>Barbara 256</p>	 <p style="text-align: center;">$\alpha = 5$</p>		
<p>Barbara 512</p>	 <p style="text-align: center;">$\alpha = 5$</p>		











<p>Barbara 256</p>	 $\alpha = 7$		 Ekstraksi Red Ekstraksi Blue  Nilai NCC Red 0.714204 Green 0.709714 Blue 0.708788  Ekstraksi Green
<p>Barbara 512</p>	 $\alpha = 7$		 Ekstraksi Red Ekstraksi Blue  Nilai NCC Red 0.765069 Green 0.772785 Blue 0.770021  Ekstraksi Green
<p>Barbara 256</p>	 $\alpha = 10$		 Ekstraksi Red Ekstraksi Blue  Nilai NCC Red 0.713138 Green 0.708889 Blue 0.709806  Ekstraksi Green

Barbara 512	 $\alpha = 10$		 <p>Ekstraksi Red Ekstraksi Blue</p> <p>Nilai NCC</p> <p>Red 0.765037</p> <p>Green 0.773588</p> <p>Blue 0.770974</p> <p>Ekstraksi Green</p>
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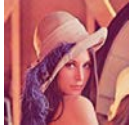




5. Hasil ekstraksi *watermark* citra Barbara yang telah disisipkan *watermark* dan dilakukan proses *cropping* 25%.


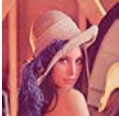








Nama Citra	Citra terwatermark	Citra terwatermark di <i>cropping</i>	<i>Watermark</i> Hasil Ekstraksi dan Nilai NCC
Barbara 256	 $\alpha = 5$		 <p>Ekstraksi Red Ekstraksi Blue</p> <p>Nilai NCC</p> <p>Red 0.692266</p> <p>Green 0.69673</p> <p>Blue 0.704043</p> <p>Ekstraksi Green</p>


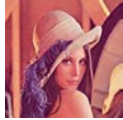




<p>Baboon 512</p>	 $\alpha = 5$		 Ekstraksi Red  Ekstraksi Blue Nilai NCC Red <input type="text" value="0.750779"/> Green <input type="text" value="0.757695"/> Blue <input type="text" value="0.749279"/> Ekstraksi Green
<p>Baboon 256</p>	 $\alpha = 7$		 Ekstraksi Red  Ekstraksi Blue Nilai NCC Red <input type="text" value="0.689383"/> Green <input type="text" value="0.698192"/> Blue <input type="text" value="0.705353"/> Ekstraksi Green
<p>Baboon 512</p>	 $\alpha = 7$		 Ekstraksi Red  Ekstraksi Blue Nilai NCC Red <input type="text" value="0.750512"/> Green <input type="text" value="0.759169"/> Blue <input type="text" value="0.754987"/> Ekstraksi Green

<p>Baboon</p> <p>256</p>	 <p>$\alpha = 10$</p>		 <p>Ekstraksi Red</p>  <p>Ekstraksi Blue</p>  <p>Ekstraksi Green</p> <p>Nilai NCC</p> <p>Red <input type="text" value="0.689623"/></p> <p>Green <input type="text" value="0.702791"/></p> <p>Blue <input type="text" value="0.708512"/></p>
<p>Baboon</p> <p>512</p>	 <p>$\alpha = 10$</p>		 <p>Ekstraksi Red</p>  <p>Ekstraksi Blue</p>  <p>Ekstraksi Green</p> <p>Nilai NCC</p> <p>Red <input type="text" value="0.748946"/></p> <p>Green <input type="text" value="0.759301"/></p> <p>Blue <input type="text" value="0.755225"/></p>

6. Hasil ekstraksi *watermark* citra Lena yang telah disisipkan *watermark* dan dilakukan proses *scaling* 50%.

Nama Citra	Citra terwatermark	Citra terwatermark di <i>scaling</i>	Watermark Asli dan Watermark Hasil Ekstraksi
Lena 256	 <p style="text-align: center;">$\alpha = 5$</p>		
Lena 512	 <p style="text-align: center;">$\alpha =$</p>		

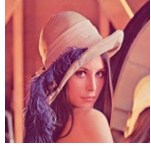
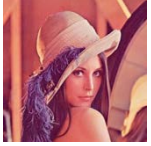
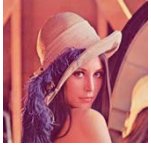
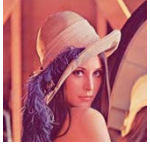








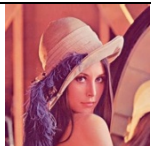
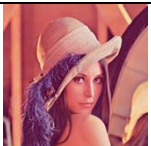
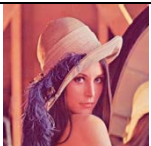
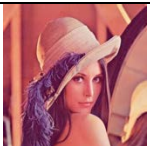

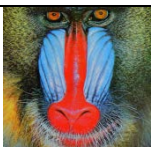


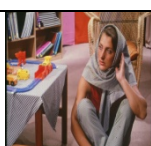
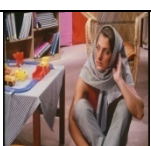
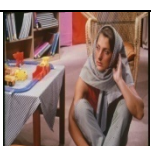
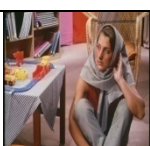
<p>Lena 256</p>	 <p>$\alpha = 7$</p>		 Ekstraksi Red  Ekstraksi Blue  Ekstraksi Green <p>Nilai NCC</p> <p>Red 0.907915</p> <p>Green 0.905259</p> <p>Blue 0.906506</p>
<p>Lena 512</p>	 <p>$\alpha = 7$</p>		 Ekstraksi Red  Ekstraksi Blue  Ekstraksi Green <p>Nilai NCC</p> <p>Red 0.979734</p> <p>Green 0.980492</p> <p>Blue 0.981885</p>

<p>Lena 256</p>	 <p>$\alpha = 10$</p>		 <p>Ekstraksi Red Ekstraksi Blue</p> <p>Ekstraksi Green</p> <p>Nilai NCC</p> <p>Red 0.913105</p> <p>Green 0.911455</p> <p>Blue 0.908556</p>
<p>Lena 512</p>	 <p>$\alpha = 10$</p>		 <p>Ekstraksi Red Ekstraksi Blue</p> <p>Ekstraksi Green</p> <p>Nilai NCC</p> <p>Red 0.981642</p> <p>Green 0.982031</p> <p>Blue 0.982109</p>

LAMPIRAN – B

DATA MOS


Mean Opinion Score (MOS) kualitas citra setelah disisipkan watermark

Nama Citra	Citra Asli	Citra yang Telah Disisipkan Watermark dengan $\alpha=5$	Citra yang Telah Disisipkan Watermark dengan $\alpha=7$	Citra yang Telah Disisipkan Watermark dengan $\alpha=10$
Lena 256				
Baboon 256				
Barbara 256				
Lena 512				
Baboon 512				
Barbara 512				

Kriteria penilaian kualitatif yang digunakan adalah :


1. *Excellent* yang direpresentasikan dengan angka 5, citra terwatermark mempunyai kualitas yang sangat baik yaitu sama persis dengan citra asli (*host image*).
2. *Good* yang direpresentasikan dengan angka 4, citra terwatermark mempunyai kualitas baik yaitu sama dengan citra asli (*host image*).
3. *Fair* yang direpresentasikan dengan angka 3, citra terwatermark mempunyai kualitas cukup baik yaitu agak berbeda dengan citra asli (*host image*).
4. *Poor* yang direpresentasikan dengan angka 2, citra terwatermark mempunyai kualitas buruk yaitu berbeda dengan citra asli (*host image*).
5. *Unsatisfactory* yang direpresentasikan dengan angka 1, citra terwatermark mempunyai kualitas sangat buruk yaitu sangat berbeda dengan citra asli (*host image*).

Nama : Bonnie I.M.
0422108

Tanda tangan : 


citra	$\alpha = 5$	$\alpha = 7$	$\alpha = 10$
Lena 256	4	4	3
Lena 512	4	4	4
Baboon 256	3	5	4
Baboon 512	4	4	4
Barbara 256	4	3	4
Barbara 512	3	3	4

Nama : Toger Hugo
0422023


Tanda tangan : 

citra	$\alpha = 5$	$\alpha = 7$	$\alpha = 10$
Lena 256	4	3	4
Lena 512	5	5	4
Baboon 256	4	4	5
Baboon 512	3	4	4
Barbara 256	4	4	4
Barbara 512	4	4	4


Nama : Ivan S
0821049

Tanda tangan : 

citra	$\alpha = 5$	$\alpha = 7$	$\alpha = 10$
Lena 256	4	3	4
Lena 512	4	3	4
Baboon 256	3	5	3
Baboon 512	4	4	4
Barbara 256	4	4	3
Barbara 512	4	4	4

Nama : BOB RICARDO SIMANDUNTA^{SE}
0651429 Tanda tangan : 

citra	$\alpha = 5$	$\alpha = 7$	$\alpha = 10$
Lena 256	3	3	4
Lena 512	4	3	4
Baboon 256	3	4	4
Baboon 512	4	4	4
Barbara 256	4	5	4
Barbara 512	4	4	4


Nama : DANLI
0622106 Tanda tangan : 


citra	$\alpha = 5$	$\alpha = 7$	$\alpha = 10$
Lena 256	3	4	5
Lena 512	4	3	4
Baboon 256	4	4	4
Baboon 512	5	3	3
Barbara 256	4	4	4
Barbara 512	4	4	4


Nama : Adi Christ T.T.
0422024 Tanda tangan : 


citra	$\alpha = 5$	$\alpha = 7$	$\alpha = 10$
Lena 256	4	5	3
Lena 512	4	4	4
Baboon 256	3	4	4
Baboon 512	4	3	4
Barbara 256	4	4	4
Barbara 512	3	3	4


Nama : DANIEL A.S 0222132		Tanda tangan : 	
citra	$\alpha = 5$	$\alpha = 7$	$\alpha = 10$
Lena 256	3	4	5
Lena 512	3	4	4
Baboon 256	4	3	4
Baboon 512	5	4	3
Barbara 256	3	3	3
Barbara 512	3	3	3

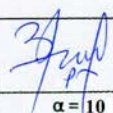
Nama : Froni A.S 0822102		Tanda tangan : 	
citra	$\alpha = 5$	$\alpha = 7$	$\alpha = 10$
Lena 256	4	4	3
Lena 512	4	3	4
Baboon 256	4	4	3
Baboon 512	4	4	3
Barbara 256	4	4	4
Barbara 512	3	5	4


Nama : Ricky Picanto 0727036		Tanda tangan : 	
citra	$\alpha = 5$	$\alpha = 7$	$\alpha = 10$
Lena 256	3	4	4
Lena 512	3	4	4
Baboon 256	4	3	4
Baboon 512	3	3	3
Barbara 256	3	3	4
Barbara 512	4	3	4


Nama : Benny Jarbaba 0421055		Tanda tangan : 	
citra	$\alpha = 5$	$\alpha = 7$	$\alpha = 10$
Lena 256	4	4	5
Lena 512	4	4	5
Baboon 256	3	4	4
Baboon 512	4	3	4
Barbara 256	4	4	3
Barbara 512	4	4	4

Nama : ARIO S 0622058		Tanda tangan : 	
citra	$\alpha = 5$	$\alpha = 7$	$\alpha = 10$
Lena 256	3	4	4
Lena 512	4	5	5
Baboon 256	3	4	4
Baboon 512	3	3	4
Barbara 256	4	4	3
Barbara 512	4	4	4

Nama : RAMBO BARASA 1120079		Tanda tangan : 	
citra	$\alpha = 5$	$\alpha = 7$	$\alpha = 10$
Lena 256	4	4	11
Lena 512	4	3	3
Baboon 256	3	4	4
Baboon 512	4	5	4
Barbara 256	4	4	4
Barbara 512	4	3	4

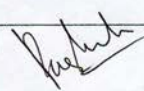
Nama : PURWANTO.H 0622112		Tanda tangan : 	
citra	$\alpha = 5$	$\alpha = 7$	$\alpha = 10$
Lena 256	4	3	4
Lena 512	4	4	3
Baboon 256	3	4	4
Baboon 512	4	3	4
Barbara 256	5	4	4
Barbara 512	4	4	4

Nama : Ramses Nababan 0822066		Tanda tangan : 	
citra	$\alpha = 5$	$\alpha = 7$	$\alpha = 10$
Lena 256	3	4	4
Lena 512	4	5	3
Baboon 256	4	4	4
Baboon 512	3	3	3
Barbara 256	4	4	4
Barbara 512	4	4	4

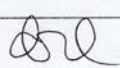
Nama : hendro		Tanda tangan : 	
citra	$\alpha = 5$	$\alpha = 7$	$\alpha = 10$
Lena 256	3	4	3
Lena 512	4	5	4
Baboon 256	3	4	4
Baboon 512	3	3	4
Barbara 256	4	3	4
Barbara 512	4	4	4

Nama : TATA TARIGAN Tanda tangan : 


citra	$\alpha = 5$	$\alpha = 7$	$\alpha = 10$
Lena 256	4	5	4
Lena 512	3	4	4
Baboon 256	4	4	4
Baboon 512	4	5	5
Barbara 256	4	4	4
Barbara 512	4	4	4

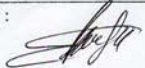
Nama : Pauliah H. Purba
0A22097 Tanda tangan : 


citra	$\alpha = 5$	$\alpha = 7$	$\alpha = 10$
Lena 256	4	4	4
Lena 512	3	4	3
Baboon 256	4	3	4
Baboon 512	4	3	4
Barbara 256	3	4	4
Barbara 512	3	3	4

Nama : andy situmorang Tanda tangan : 

citra	$\alpha = 5$	$\alpha = 7$	$\alpha = 10$
Lena 256	3	4	4
Lena 512	4	4	4
Baboon 256	4	3	3
Baboon 512	3	4	4
Barbara 256	4	4	4
Barbara 512	4	4	4

Nama : <i>Jonathan. A. H</i> 0812065		Tanda tangan : 	
citra	$\alpha = 5$	$\alpha = 7$	$\alpha = 10$
Lena 256	5	4	4
Lena 512	4	4	5
Baboon 256	4	4	4
Baboon 512	5	4	4
Barbara 256	4	4	4
Barbara 512	4	4	4

Nama : <i>Eriko Nanggolan.</i> 0672026		Tanda tangan : 	
citra	$\alpha = 5$	$\alpha = 7$	$\alpha = 10$
Lena 256	4	4	4
Lena 512	3	4	4
Baboon 256	4	3	3
Baboon 512	3	3	4
Barbara 256	3	4	4
Barbara 512	3	4	4

Nama : <i>Ahmad Taufiq</i> 0322142		Tanda tangan : 	
citra	$\alpha = 5$	$\alpha = 7$	$\alpha = 10$
Lena 256	4	3	4
Lena 512	4	3	4
Baboon 256	3	4	4
Baboon 512	4	4	4
Barbara 256	4	3	5
Barbara 512	3	4	4

LAMPIRAN – C
LISTING PROGRAM

Program Utama Proses Watermarking

```
function varargout = GUIku(varargin)

gui_Singleton = 1;
gui_State = struct('gui_Name',       mfilename, ...
                  'gui_Singleton',   gui_Singleton, ...
                  'gui_OpeningFcn',  @GUIku_OpeningFcn, ...
                  'gui_OutputFcn',  @GUIku_OutputFcn, ...
                  'gui_LayoutFcn',   [] , ...
                  'gui_Callback',    []);
if nargin && ischar(varargin{1})
    gui_State.gui_Callback = str2func(varargin{1});
end

if nargin
    [varargout{1:nargout}] = gui_mainfcn(gui_State, varargin{:});
else
    gui_mainfcn(gui_State, varargin{:});
end

function GUIku_OpeningFcn(hObject, eventdata, handles, varargin)
handles.output = hObject;
guidata(hObject, handles);

function varargout = GUIku_OutputFcn(hObject, eventdata, handles)
varargout{1} = handles.output;

function edit1_Callback(hObject, eventdata, handles)

function edit1_CreateFcn(hObject, eventdata, handles)
if ispc && isequal(get(hObject,'BackgroundColor'),
get(0,'defaultUiControlBackgroundColor'))
    set(hObject,'BackgroundColor','white');
end

function pushbutton1_Callback(hObject, eventdata, handles)

global im1;
global Sglob;

clc

%Start Program Penyisipan
[FileName,PathName,FilterIndex] = uigetfile('.bmp','Pilih
Gambar');
pathimg = [PathName FileName];
citra = imread(pathimg);
axes(handles.axes1);
%Menampilkan Gambar ke Axes 1
imshow(citra);
T = double(citra);

[FileName2,PathName2,FilterIndex] = uigetfile('.bmp','Pilih
Watermark');
```

```

pathimg2 = [PathName2 FileName2];

%Pengambilan image watermark
img = imread(pathimg2);
[a b c] = size(img);
if c > 1
    img_W = rgb2gray(img);
else
    img_W = img;
end
level = graythresh(img_W);
W = im2bw(img_W,level);
axes(handles.axes2);
imshow(W);

[filename pathname] = uiputfile('*.bmp','Simpan file citra
watermark black and white');
imwrite(W,[pathname filename]);

%Pemecahan Gambar berdasarkan RGB
Rk = T(:,:,1);
Gk = T(:,:,2);
Bk = T(:,:,3);

alfa = str2double(get(handles.edit4,'String'));

H(:,:,1)=ceil(penyisipan_per_channel(Rk,W,alfa));
H(:,:,2)=ceil(penyisipan_per_channel(Gk,W,alfa));
H(:,:,3)=ceil(penyisipan_per_channel(Bk,W,alfa));

%Hasil citra terwatermark di tampilkan
axes(handles.axes3);
im1 = H;
imshow(uint8(H));
[filename pathname] = uiputfile('*.bmp','Simpan file citra
terwatermark');
imwrite(uint8(im1),[pathname filename]);

%Hitung PSNR
citra_host = T;
inR = double(citra_host(:,:,1));
inG = double(citra_host(:,:,2));
inB = double(citra_host(:,:,3));

iw = im1;
rw = double(iw(:,:,1));
gw = double(iw(:,:,2));
bw = double(iw(:,:,3));

[lebar tinggi lapis] = size(citra_host);
nilai_MSE = 0;
for k=1:tinggi
    for h=1:lebar
        nilai_MSE = nilai_MSE + ( (inR(k,h)-rw(k,h)).^2 +
(inG(k,h)-gw(k,h)).^2 + (inB(k,h)-bw(k,h)).^2 ) ./ (3.* tinggi .*
lebar);
    end
end

```



```

end

nilai_PSNR = 10.*(log10((255.^2)/nilai_MSE));
set(handles.edit3, 'String', nilai_PSNR);

function edit2_Callback(hObject, eventdata, handles)
function edit2_CreateFcn(hObject, eventdata, handles)

if ispc && isequal(get(hObject, 'BackgroundColor'),
get(0, 'defaultUiControlBackgroundColor'))
    set(hObject, 'BackgroundColor', 'white');
end

function pushbutton2_Callback(hObject, eventdata, handles)
Sglob = get_S_host(handles);

% proses ekstraksi
[filename pathname] = uigetfile('*.*', 'Pilih citra terwatermark');
imgku = imread([pathname filename]);
axes(handles.axes5);
imshow(imgku);

[FileName2, PathName2, FilterIndex] = uigetfile('.bmp', 'Pilih
Watermark');
pathimg2 = [PathName2 FileName2];

%Membaca gambar watermark
img = imread(pathimg2);
if islogical(img)
    W = img;

else
    [a b c] = size(img);
    if c > 1
        img_W = rgb2gray(img);
    else
        img_W = img;
    end
    level = graythresh(img_W);
    W = im2bw(img_W, level);
end
axes(handles.axes6);
imshow(W);

%Pemecahan Citra terwatermark ke RGB
alfa = str2double(get(handles.edit4, 'String'));
M_star = double(imgku);

R = M_star(:, :, 1);
G = M_star(:, :, 2);
B = M_star(:, :, 3);

W_star_bw = ekstraksi_per_channel(R, W, alfa, Sglob{1});
axes(handles.axes7);
imshow(W);
ncc = fungsi_NCC(W_star_bw, W);
set(handles.edit5, 'String', ncc);

```

```
[filename pathname] = uiputfile('*.bmp','Simpan file citra
watermark hasil ekstraksi channel Red');
imwrite(W,[pathname filename]);
```

```
W_star_bw = ekstraksi_per_channel(G, W, alfa, Sglob{2});
axes(handles.axes8);
imshow(W);
ncc = fungsi_NCC(W_star_bw,W);
set(handles.edit6,'String',ncc);
[filename pathname] = uiputfile('*.bmp','Simpan file citra
watermark hasil ekstraksi channel Green');
imwrite(W,[pathname filename]);
```

```
W_star_bw = ekstraksi_per_channel(B, W, alfa, Sglob{3});
axes(handles.axes9);
imshow(W);
ncc = fungsi_NCC(W_star_bw, W);
set(handles.edit7,'String',ncc);
[filename pathname] = uiputfile('*.bmp','Simpan file citra
watermark hasil ekstraksi channel Blue');
imwrite(W,[pathname filename]);
```

```
function edit3_Callback(hObject, eventdata, handles)
function edit3_CreateFcn(hObject, eventdata, handles)
if ispc && isequal(get(hObject,'BackgroundColor'),
get(0,'defaultUicontrolBackgroundColor'))
    set(hObject,'BackgroundColor','white');
end
```

```
function edit4_Callback(hObject, eventdata, handles)
```

```
function edit4_CreateFcn(hObject, eventdata, handles)
if ispc && isequal(get(hObject,'BackgroundColor'),
get(0,'defaultUicontrolBackgroundColor'))
    set(hObject,'BackgroundColor','white');
end
```

```
function edit5_Callback(hObject, eventdata, handles)
function edit5_CreateFcn(hObject, eventdata, handles)
if ispc && isequal(get(hObject,'BackgroundColor'),
get(0,'defaultUicontrolBackgroundColor'))
    set(hObject,'BackgroundColor','white');
end
```

```
function edit6_Callback(hObject, eventdata, handles)
function edit6_CreateFcn(hObject, eventdata, handles)
if ispc && isequal(get(hObject,'BackgroundColor'),
get(0,'defaultUicontrolBackgroundColor'))
    set(hObject,'BackgroundColor','white');
end
```

```
function edit7_Callback(hObject, eventdata, handles)
function edit7_CreateFcn(hObject, eventdata, handles)
if ispc && isequal(get(hObject,'BackgroundColor'),
get(0,'defaultUicontrolBackgroundColor'))
    set(hObject,'BackgroundColor','white');
end
```