

LAMPIRAN I

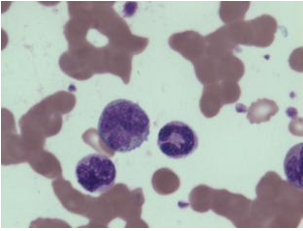
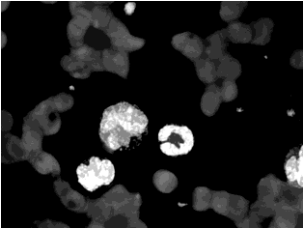
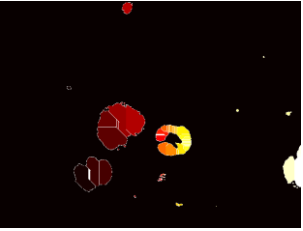
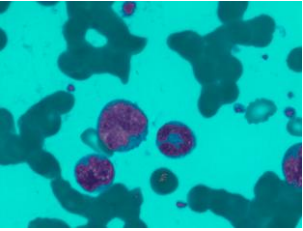
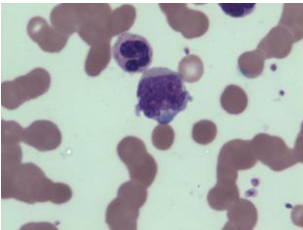
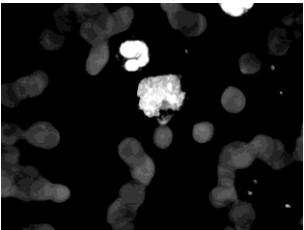
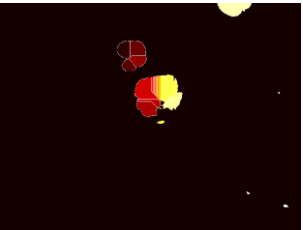
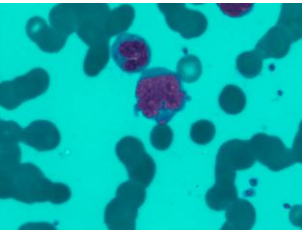
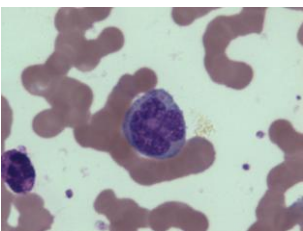
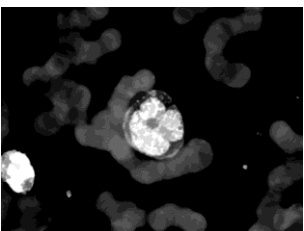
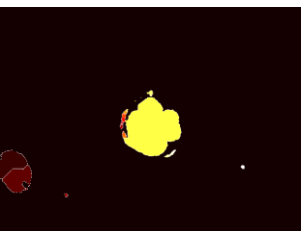
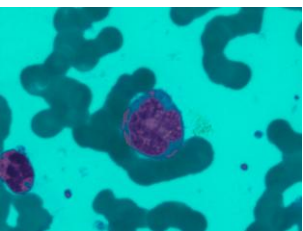
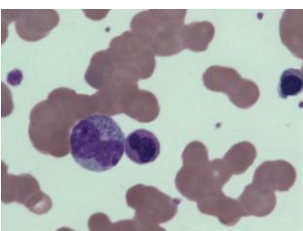
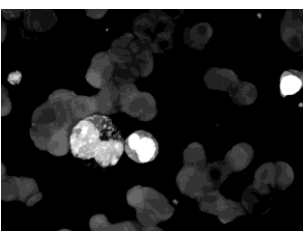

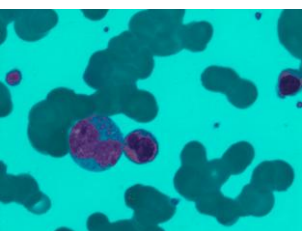
1. Data Akurasi Segmentasi Watershed

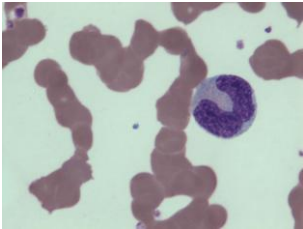
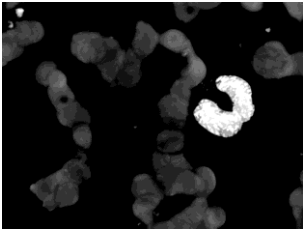
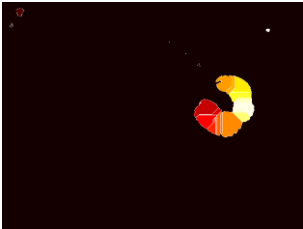
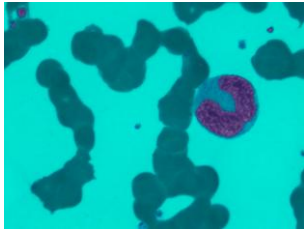
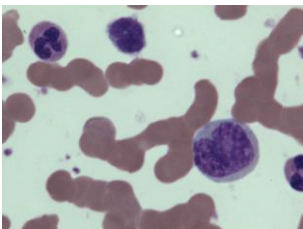
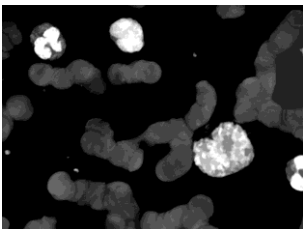
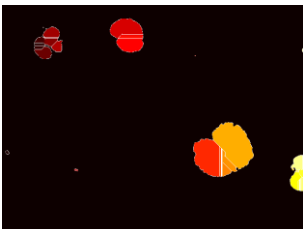
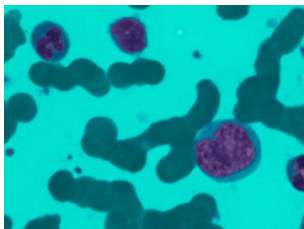
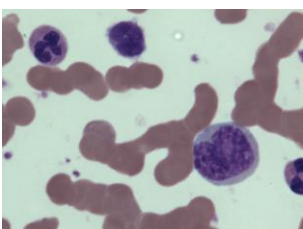
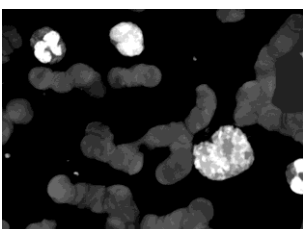
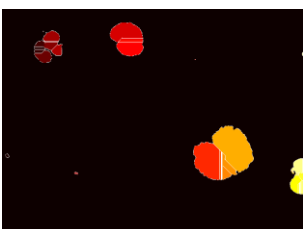
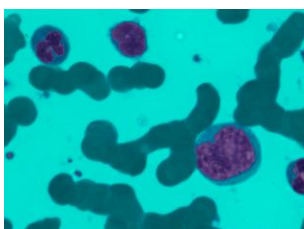
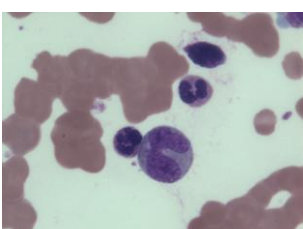
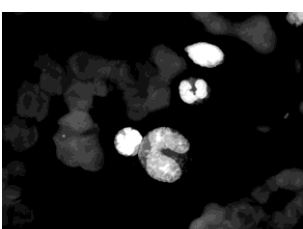

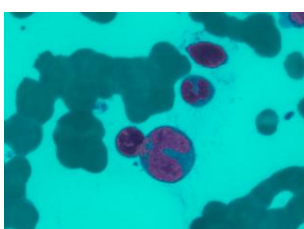
Gambar (*.bmp)	Benar	Salah
Chronic Myeloid Leukemia		
1	✓	
2	✓	
3	✓	
4	✓	
5	✓	
6	✓	
7	✓	
8	✓	
9	✓	
10	✓	
11	✓	
12	✓	
13	✓	
14	✓	
15		✓
16	✓	
17	✓	
18	✓	
19	✓	
20	✓	
21		✓
Akurasi	90,47%	
Acute Myeloid Leukemia		
22	✓	
23	✓	
24	✓	
25	✓	
26	✓	
27	✓	
28	✓	
29	✓	
30	✓	
Akurasi	100%	

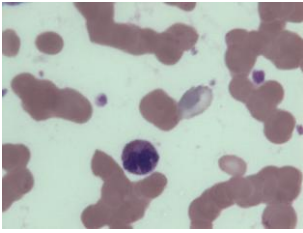
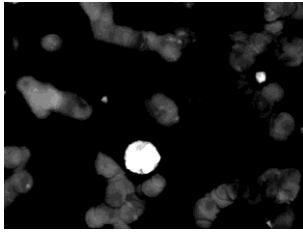
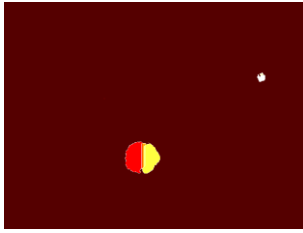
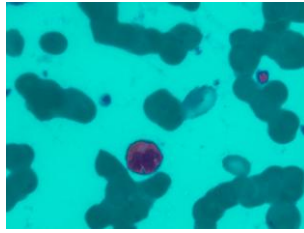
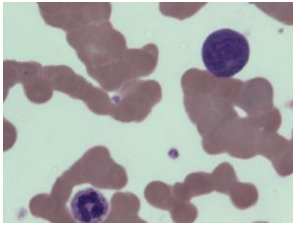
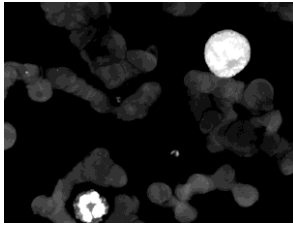
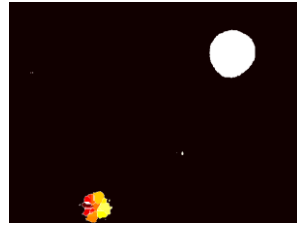
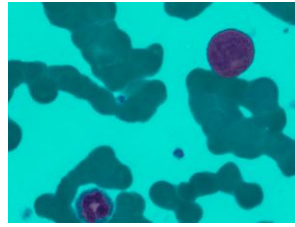
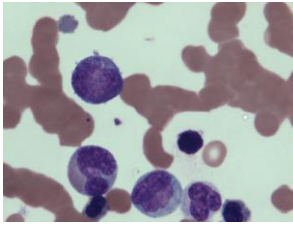
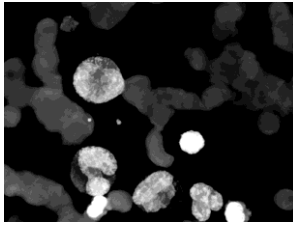
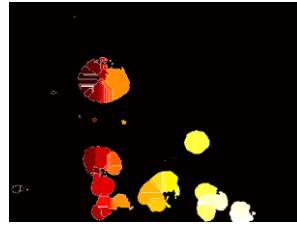
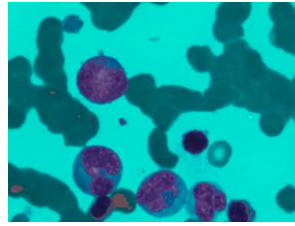
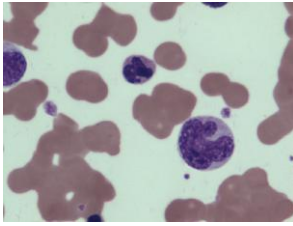
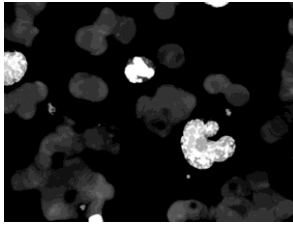
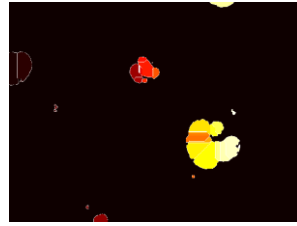
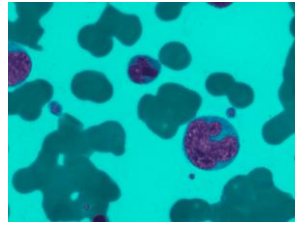
2. Waktu Komputasi Watershed

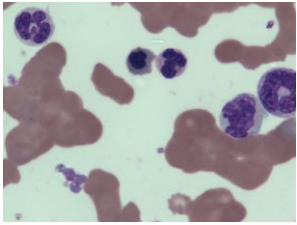
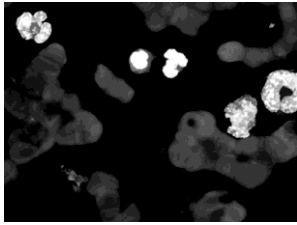
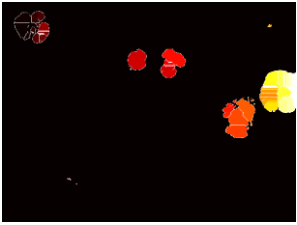
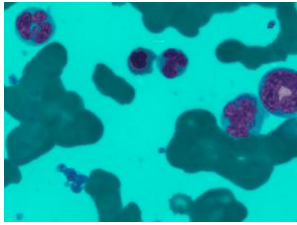
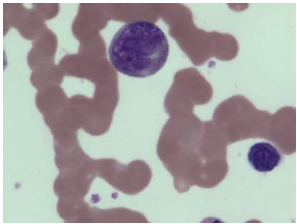
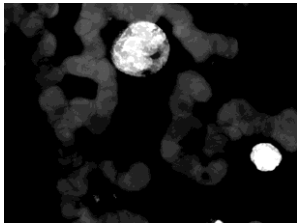

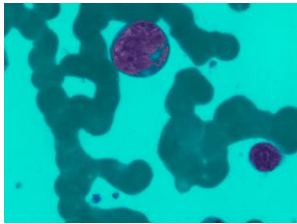
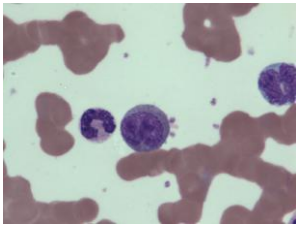
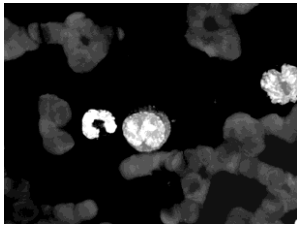
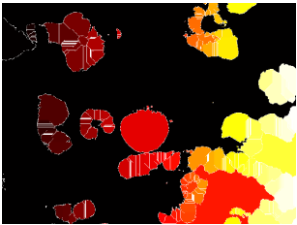
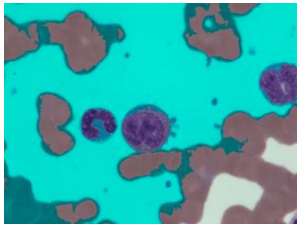
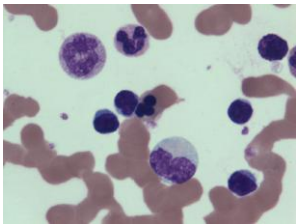
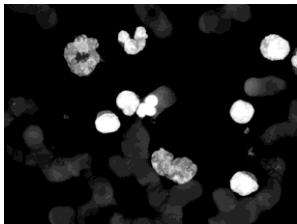
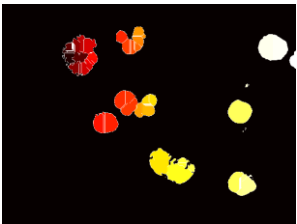
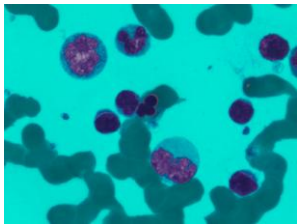
Gambar (*.bmp)	Waktu Komputasi
Chronic Myeloid Leukemia	
1	0,69
2	0,70
3	0,72
4	0,69
5	0,68
6	0,93
7	0,94
8	0,92
9	0,91
10	0,90
11	0,96
12	0,92
13	0,94
14	0,92
15	1,15
16	0,97
17	0,97
18	0,91
19	0,94
20	0,93
21	1,08
Average	0,89
Acute Myeloid Leukemia	
22	0,93
23	1,00
24	0,90
25	0,89
26	0,95
27	0,93
28	0,95
29	0,97
30	0,92
Average	0,94

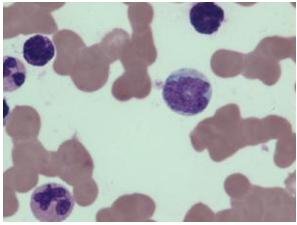
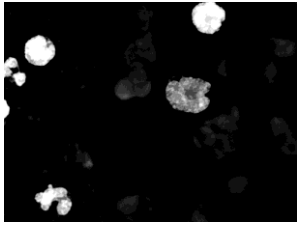
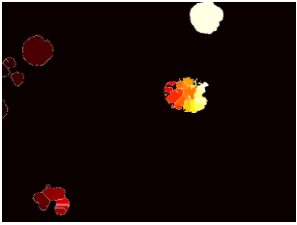
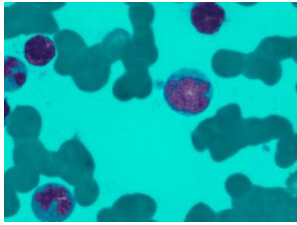
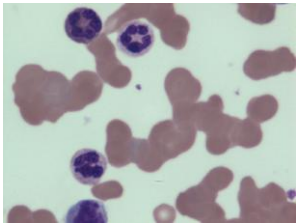
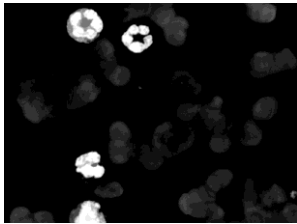
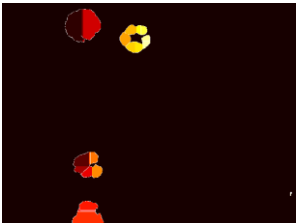
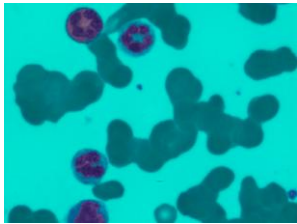
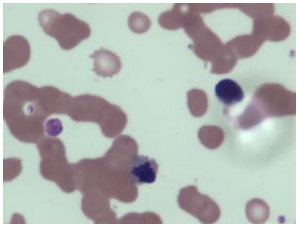
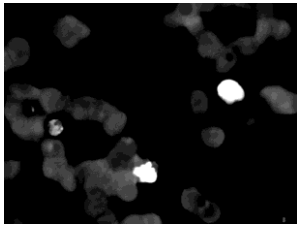
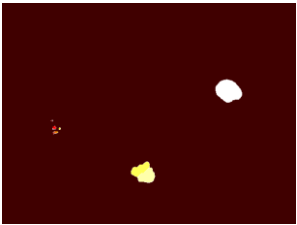
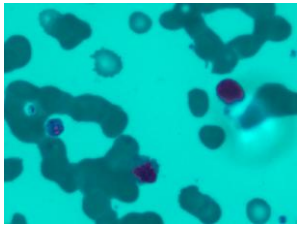
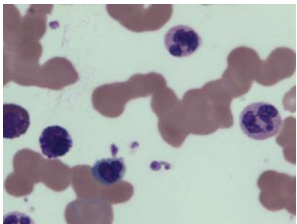
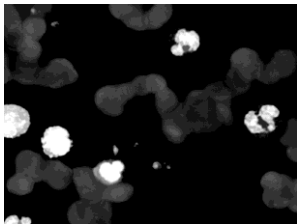
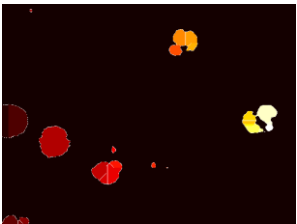
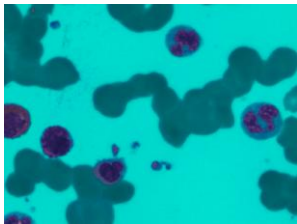
LAMPIRAN II
PROSES SEGMENTASI WATERSHED

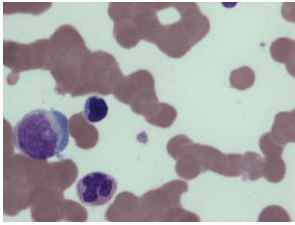
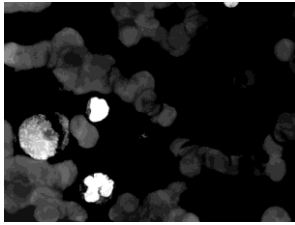
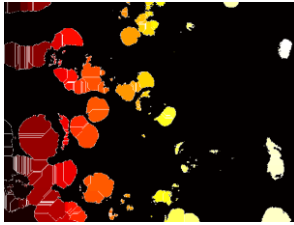
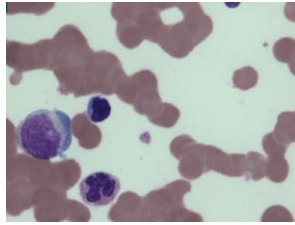
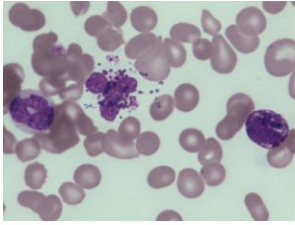
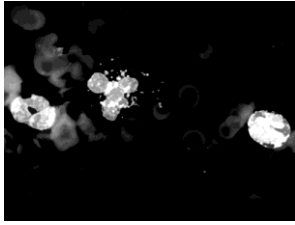
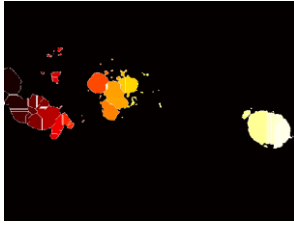
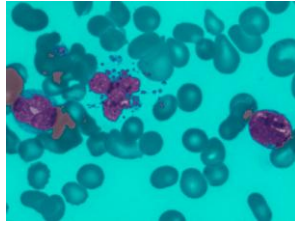
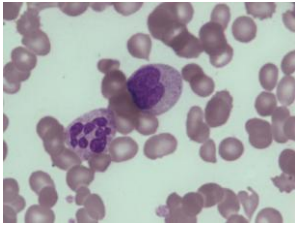
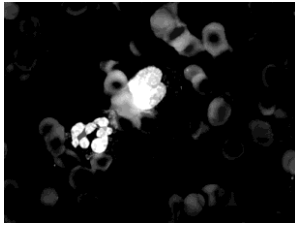

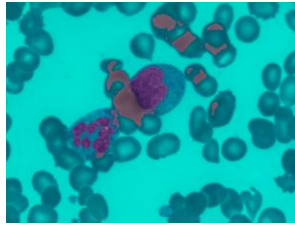
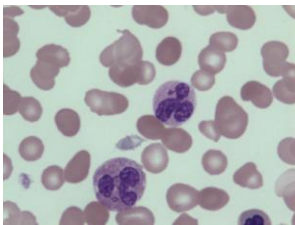
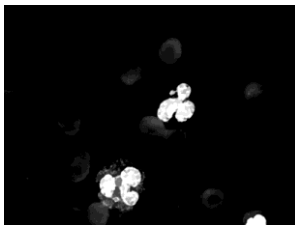
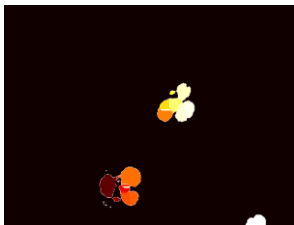
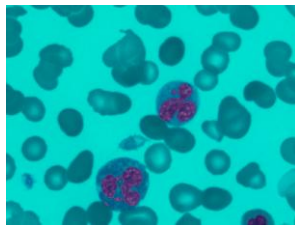
Nama File (*bmp)	Citra Asli	Pre – Processing	Citra Segmentasi Sel Darah Putih	Hasil Watershed
Chronic Myeloid Leukemia				
1				
2				
3				
4				

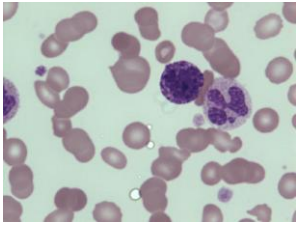
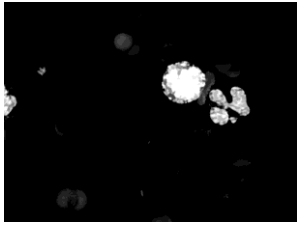
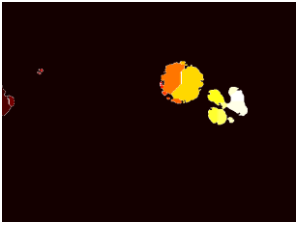
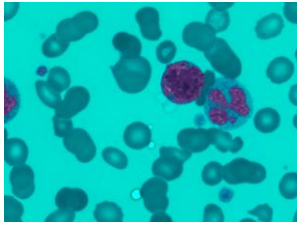
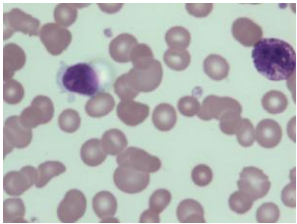
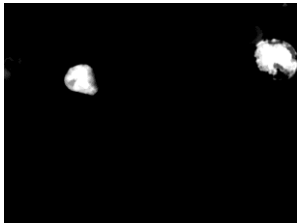
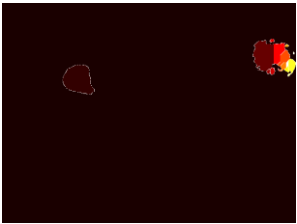
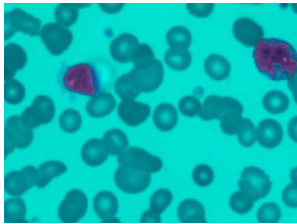
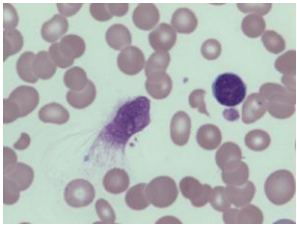
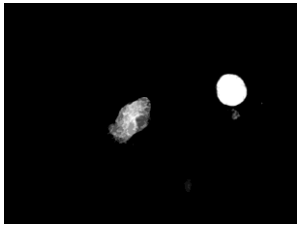
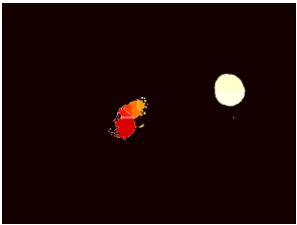
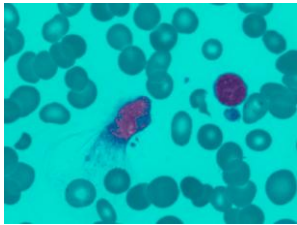
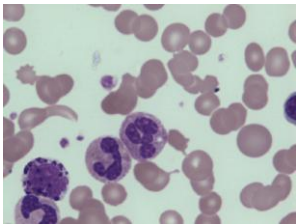
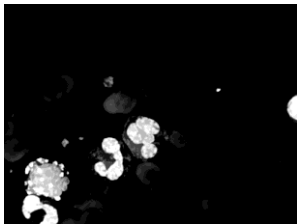
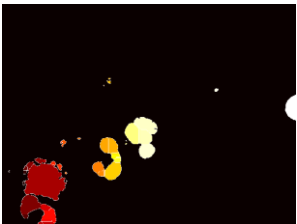
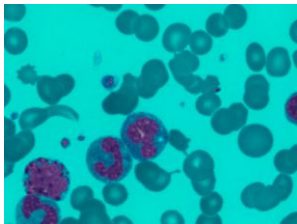
5				
6				
7				
8				

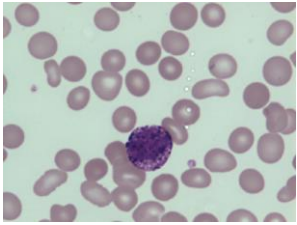
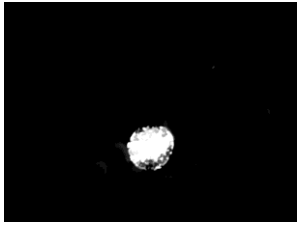
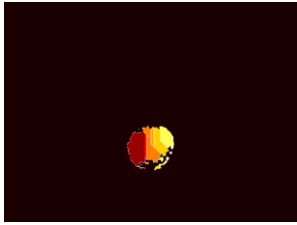
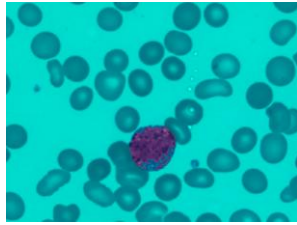
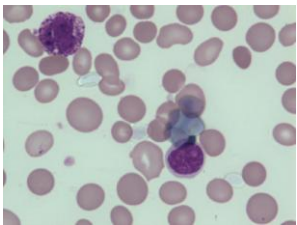
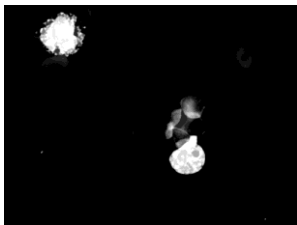
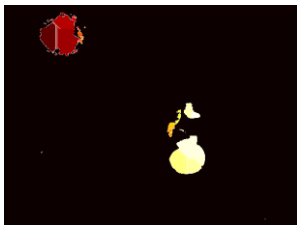
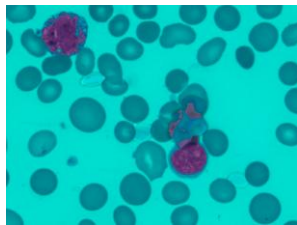
9				
10				
11				
12				

13				
14				
15				
16				

17				
18				
19				
20				

21				
Acute Myeloid Leukemia				
22				
23				
24				

25				
26				
27				
28				

29				
30				

LAMPIRAN III
DATA EKSTRAKSI FITUR GLCM

1. Data Ekstraksi Fitur GLCM, Jarak = 50

Pixel Distance = 50																						Time Execute
Gambar *bmp	Contrats					Correlation					Energy					Homogeneity						
	0	45	90	135	Average	0	45	90	135	Average	0	45	90	135	Average	0	45	90	135	Average		
Chronic Lymphoblastic Leukemia																						
1	9,317	12,618	9,141	12,736	10,95	0,560	0,408	0,571	0,403	0,485	0,131	0,112	0,131	0,109	0,121	0,642	0,583	0,640	0,586	0,613	0,006	
2	9,037	12,162	8,804	12,866	10,72	0,539	0,379	0,549	0,344	0,453	0,178	0,158	0,182	0,146	0,166	0,675	0,623	0,677	0,593	0,642	0,006	
3	7,727	10,975	7,527	10,149	9,09	0,649	0,506	0,661	0,543	0,590	0,153	0,134	0,159	0,139	0,146	0,680	0,628	0,685	0,627	0,655	0,005	
4	8,328	12,406	10,028	12,814	10,89	0,618	0,435	0,543	0,416	0,503	1,829	0,153	0,170	0,145	0,163	0,707	0,639	0,680	0,625	0,663	0,007	
5	8,131	11,399	7,347	10,498	9,34	0,578	0,412	0,619	0,458	0,516	0,220	0,192	0,232	0,196	0,210	0,704	0,651	0,724	0,661	0,685	0,005	
6	9,263	14,111	10,913	14,868	12,29	0,610	0,410	0,544	0,379	0,486	0,176	0,141	0,158	0,136	0,153	0,685	0,610	0,652	0,586	0,633	0,005	
7	9,263	14,111	10,913	14,868	12,29	0,610	0,410	0,544	0,379	0,486	0,176	0,141	0,158	0,136	0,153	0,685	0,610	0,652	0,586	0,633	0,007	
8	5,976	9,278	7,381	9,912	8,14	0,695	0,530	0,623	0,497	0,586	0,147	0,128	0,134	0,116	0,131	0,705	0,657	0,688	0,628	0,669	0,007	
9	6,013	9,382	6,860	8,998	7,81	0,622	0,412	0,568	0,436	0,509	0,151	0,125	0,139	0,119	0,134	0,689	0,618	0,664	0,616	0,647	0,006	
10	7,243	11,325	8,057	9,807	9,11	0,642	0,441	0,601	0,516	0,550	0,168	0,135	0,162	0,147	0,153	0,712	0,627	0,690	0,664	0,673	0,007	
11	11,705	18,091	12,317	15,160	14,32	0,552	0,306	0,525	0,419	0,451	0,112	0,083	0,107	0,096	0,099	0,630	0,538	0,628	0,586	0,596	0,006	
12	9,377	12,702	9,516	13,207	11,20	0,555	0,397	0,549	0,373	0,469	0,154	0,131	0,150	0,127	0,141	0,671	0,614	0,660	0,597	0,635	0,005	
13	8,353	13,218	10,245	12,995	11,20	0,625	0,412	0,544	0,421	0,500	0,160	0,129	0,143	0,130	0,141	0,687	0,611	0,656	0,615	0,642	0,008	
14	7,480	10,275	6,850	10,289	8,72	0,634	0,499	0,665	0,498	0,574	0,149	0,127	0,164	0,129	0,142	0,694	0,629	0,712	0,644	0,670	0,008	
15	6,928	11,536	8,771	11,638	9,72	0,676	0,464	0,594	0,461	0,549	0,200	0,163	0,179	0,162	0,176	0,725	0,640	0,682	0,640	0,672	0,008	
16	10,667	14,907	11,809	16,124	13,38	0,549	0,379	0,503	0,328	0,440	0,158	0,136	0,157	0,129	0,145	0,656	0,588	0,636	0,577	0,614	0,005	
17	8,031	11,224	8,631	11,146	9,76	0,569	0,398	0,536	0,401	0,476	0,162	0,137	0,151	0,136	0,147	0,695	0,627	0,673	0,624	0,655	0,005	
18	7,730	10,826	8,413	11,595	9,64	0,589	0,419	0,545	0,379	0,483	0,187	0,161	0,186	0,150	0,171	0,698	0,637	0,685	0,619	0,660	0,005	
19	6,429	11,210	7,913	8,953	8,63	0,609	0,324	0,519	0,460	0,478	0,145	0,107	0,132	0,128	0,128	0,679	0,571	0,643	0,627	0,630	0,006	
20	7,351	11,658	9,312	12,390	10,18	0,651	0,450	0,562	0,414	0,519	0,096	0,076	0,081	0,075	0,082	0,671	0,593	0,628	0,586	0,620	0,005	
21	7,157	11,120	8,906	10,719	9,48	0,651	0,459	0,565	0,478	0,538	0,135	0,110	0,122	0,112	0,120	0,691	0,602	0,650	0,618	0,640	0,006	
Mean	8,17	12,12	9,03	11,99	10,33 ± 1,70	0,61	0,42	0,57	0,43	0,51 ± 0,04	0,24	0,13	0,15	0,13	0,14 ± 0,03	0,68	0,61	0,67	0,61	0,65 ± 0,02	0,006	
Acute Lymphoblastic Leukemia																						
22	7,140	10,678	7,964	8,620	8,601	0,538	0,313	0,490	0,446	0,447	0,047	0,036	0,042	0,036	0,041	0,563	0,490	0,543	0,506	0,526	0,005	
23	7,050	8,439	6,911	9,446	7,962	0,542	0,462	0,554	0,398	0,489	0,056	0,052	0,057	0,046	0,053	0,565	0,531	0,572	0,509	0,544	0,006	
24	7,556	9,151	7,522	10,638	8,717	0,436	0,315	0,431	0,204	0,346	0,093	0,084	0,093	0,073	0,086	0,587	0,536	0,582	0,505	0,552	0,004	
25	7,823	9,952	7,296	9,374	8,611	0,433	0,293	0,480	0,333	0,385	0,151	0,128	0,156	0,127	0,140	0,618	0,572	0,631	0,569	0,598	0,006	
26	6,329	8,982	6,996	8,003	7,577	0,435	0,207	0,386	0,293	0,330	0,121	0,095	0,107	0,096	0,105	0,611	0,548	0,589	0,548	0,574	0,006	
27	6,554	8,299	6,424	8,158	7,359	0,388	0,233	0,404	0,246	0,318	0,104	0,085	0,104	0,086	0,095	0,606	0,550	0,610	0,559	0,581	0,005	
28	8,546	10,700	8,001	10,670	9,479	0,471	0,342	0,507	0,344	0,416	0,102	0,082	0,098	0,085	0,092	0,594	0,539	0,597	0,539	0,567	0,006	
29	6,405	6,923	6,510	8,729	7,142	0,432	0,395	0,425	0,236	0,372	0,123	0,115	0,123	0,099	0,115	0,605	0,582	0,601	0,539	0,582	0,005	
30	6,697	7,743	6,064	8,533	7,260	0,458	0,383	0,510	0,319	0,417	0,101	0,091	0,107	0,086	0,096	0,589	0,551	0,607	0,540	0,572	0,005	
Mean	7,122	8,985	7,077	9,130	8,709 ± 0,811	0,459	0,327	0,465	0,313	0,391 ± 0,056	0,100	0,086	0,099	0,082	0,091 ± 0,03	0,593	0,544	0,592	0,535	0,56 ± 0,02	0,005	

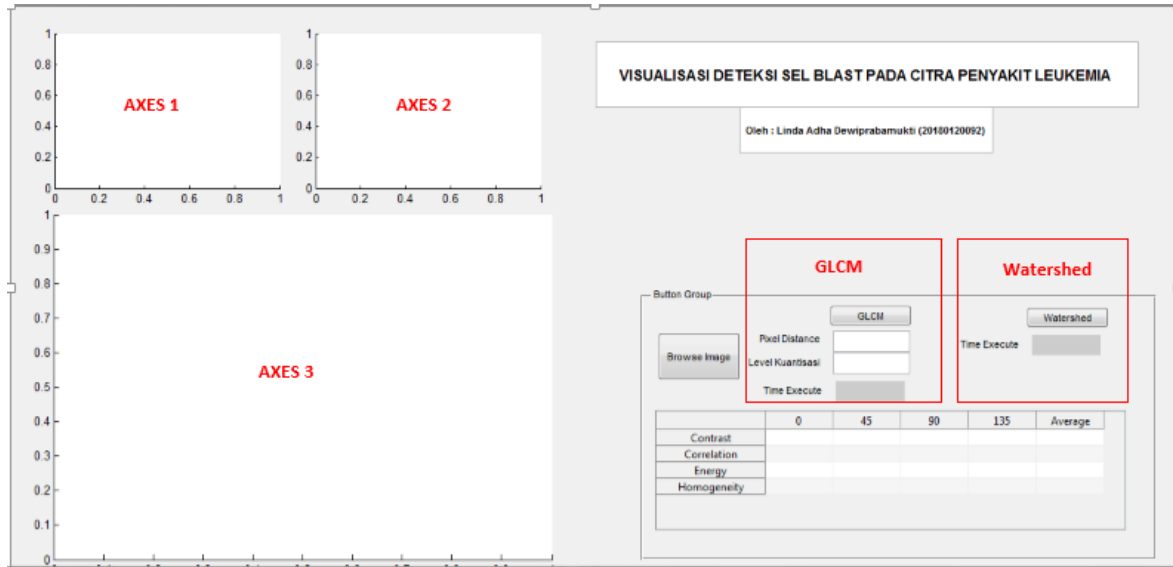
2. Data Ekstrasi Fitur GLCM, Jarak = 60

Pixel Distance = 60																					Time Execute
Gambar *bmp	Contrats					Correlation					Energy					Homogeneity					
	0	45	90	135	Average	0	45	90	135	Average	0	45	90	135	Average	0	45	90	135	Average	
Chronic Lymphoblastic Leukemia																					
1	11,096	14,362	10,835	14,999	12,823	0,476	0,327	0,492	0,298	0,399	0,120	0,103	0,120	0,097	0,110	0,612	0,555	0,610	0,552	0,583	0,006
2	10,940	14,293	10,616	15,105	12,739	0,443	0,272	0,456	0,231	0,351	0,163	0,144	0,167	0,131	0,151	0,640	0,587	0,643	0,552	0,606	0,006
3	9,295	13,179	9,067	11,666	10,802	0,577	0,407	0,592	0,475	0,513	0,141	0,122	0,148	0,129	0,135	0,649	0,591	0,657	0,597	0,623	0,006
4	9,931	14,471	12,066	15,046	12,879	0,544	0,342	0,452	0,316	0,413	0,169	0,139	0,155	0,131	0,148	0,678	0,605	0,646	0,586	0,629	0,006
5	9,874	13,404	8,900	12,438	11,154	0,488	0,311	0,539	0,359	0,424	0,202	0,174	0,215	0,178	0,192	0,671	0,614	0,695	0,623	0,651	0,005
6	11,251	16,737	13,128	17,657	14,694	0,526	0,303	0,453	0,265	0,387	0,162	0,128	0,144	0,123	0,139	0,654	0,571	0,615	0,544	0,596	0,007
7	11,251	16,737	13,128	17,657	14,694	0,526	0,303	0,453	0,265	0,387	0,162	0,128	0,144	0,123	0,139	0,654	0,571	0,615	0,544	0,596	0,006
8	7,184	10,831	8,922	11,791	9,682	0,634	0,453	0,545	0,403	0,509	0,139	0,119	0,123	0,104	0,121	0,680	0,628	0,658	0,593	0,640	0,006
9	7,283	11,134	8,354	10,802	9,393	0,542	0,303	0,474	0,323	0,410	0,139	0,114	0,126	0,106	0,121	0,660	0,581	0,632	0,576	0,612	0,006
10	8,706	13,326	9,686	11,408	10,782	0,571	0,343	0,520	0,438	0,468	0,155	0,122	0,149	0,135	0,140	0,684	0,588	0,658	0,635	0,641	0,005
11	13,981	21,097	14,746	17,712	16,884	0,466	0,191	0,430	0,321	0,352	0,101	0,074	0,096	0,086	0,089	0,596	0,499	0,592	0,551	0,560	0,005
12	11,231	14,937	11,441	15,342	13,238	0,467	0,291	0,459	0,272	0,372	0,141	0,120	0,137	0,116	0,129	0,639	0,577	0,626	0,559	0,600	0,006
13	10,047	15,385	12,239	15,164	13,209	0,549	0,316	0,455	0,325	0,411	0,149	0,118	0,131	0,117	0,129	0,660	0,579	0,624	0,580	0,611	0,006
14	9,050	12,083	8,272	12,257	10,415	0,557	0,412	0,596	0,402	0,492	0,136	0,115	0,152	0,115	0,129	0,661	0,591	0,684	0,604	0,635	0,006
15	8,246	13,661	10,602	13,824	11,583	0,614	0,366	0,510	0,360	0,463	0,188	0,149	0,165	0,148	0,163	0,701	0,606	0,651	0,605	0,641	0,006
16	12,689	17,042	14,265	18,879	15,719	0,464	0,293	0,401	0,217	0,344	0,145	0,124	0,144	0,117	0,132	0,625	0,555	0,601	0,542	0,581	0,006
17	9,512	13,025	10,307	12,790	11,408	0,490	0,300	0,445	0,312	0,387	0,152	0,125	0,137	0,126	0,135	0,666	0,590	0,639	0,591	0,622	0,007
18	9,233	12,529	10,099	13,736	11,399	0,510	0,327	0,451	0,263	0,388	0,172	0,148	0,171	0,134	0,156	0,669	0,603	0,652	0,577	0,625	0,006
19	7,731	13,171	9,469	10,210	10,145	0,530	0,207	0,426	0,385	0,387	0,133	0,097	0,121	0,119	0,117	0,650	0,532	0,611	0,600	0,598	0,006
20	8,849	13,803	11,347	14,467	12,117	0,579	0,349	0,467	0,316	0,428	0,091	0,070	0,074	0,068	0,076	0,647	0,560	0,595	0,552	0,588	0,005
21	8,584	12,910	10,748	12,436	11,170	0,582	0,374	0,476	0,397	0,457	0,125	0,102	0,111	0,103	0,110	0,664	0,567	0,613	0,585	0,607	0,006
Mean	9,808	14,196	10,868	14,066	12,235 ± 1,992	0,530	0,323	0,481	0,331	0,416 ± 0,050	0,147	0,121	0,139	0,119	0,132 ± 0,025	0,655	0,578	0,634	0,578	0,612 ± 0,024	0,006
Acute Lymphoblastic Leukemia																					
22	8,158	12,001	9,279	9,670	9,777	0,471	0,228	0,406	0,379	0,371	0,043	0,033	0,038	0,033	0,037	0,536	0,463	0,512	0,479	0,498	0,006
23	8,044	9,503	7,984	11,028	9,140	0,478	0,398	0,487	0,302	0,416	0,051	0,049	0,052	0,041	0,048	0,536	0,506	0,544	0,477	0,516	0,007
24	8,885	10,154	8,799	12,287	10,031	0,338	0,243	0,335	0,085	0,250	0,083	0,078	0,083	0,066	0,078	0,551	0,506	0,547	0,464	0,517	0,006
25	9,052	11,235	8,326	10,671	9,821	0,346	0,207	0,408	0,245	0,302	0,135	0,117	0,142	0,115	0,127	0,585	0,543	0,604	0,533	0,566	0,005
26	7,226	10,416	8,085	9,072	8,700	0,352	0,079	0,293	0,198	0,231	0,110	0,086	0,095	0,088	0,095	0,586	0,511	0,557	0,512	0,541	0,006
27	7,487	9,313	7,386	9,333	8,380	0,302	0,143	0,316	0,141	0,226	0,094	0,078	0,093	0,077	0,085	0,575	0,518	0,579	0,522	0,549	0,005
28	9,835	12,077	9,191	12,086	10,797	0,393	0,260	0,435	0,259	0,337	0,093	0,074	0,089	0,078	0,084	0,565	0,507	0,567	0,507	0,537	0,005
29	7,130	7,669	7,298	9,772	7,967	0,370	0,333	0,357	0,150	0,302	0,113	0,108	0,113	0,091	0,106	0,581	0,557	0,576	0,508	0,556	0,005
30	7,723	8,787	6,855	9,583	8,237	0,377	0,302	0,447	0,238	0,341	0,091	0,083	0,099	0,079	0,088	0,558	0,518	0,580	0,513	0,542	0,007
Mean	8,171	10,128	8,134	10,389	9,206 ± 0,957	0,434	0,244	0,387	0,222	0,308 ± 0,065	0,090	0,079	0,089	0,074	0,083 ± 0,028	0,564	0,515	0,563	0,502	0,536 ± 0,022	0,006

3. Data Ekstraksi Fitur GLCM, Jarak = 70

Pixel Distance = 70																					Time Execute
Gambar *bmp	Contrats					Correlation					Energy					Homogeneity					
	0	45	90	135	Average	0	45	90	135	Average	0	45	90	135	Average	0	45	90	135	Average	
Chronic Lymphoblastic Leukemia																					
1	12,728	15,763	12,375	17,098	14,491	0,400	0,264	0,421	0,202	0,322	0,110	0,096	0,111	0,087	0,101	0,586	0,532	0,584	0,520	0,556	0,005
2	12,750	16,094	12,309	16,979	14,533	0,351	0,183	0,371	0,138	0,261	0,149	0,133	0,155	0,120	0,139	0,607	0,559	0,613	0,517	0,574	0,006
3	10,801	15,237	10,544	12,972	12,389	0,508	0,314	0,526	0,416	0,441	0,130	0,112	0,139	0,121	0,126	0,621	0,558	0,629	0,572	0,595	0,006
4	11,413	16,337	13,975	17,018	14,686	0,475	0,258	0,366	0,227	0,332	0,156	0,128	0,142	0,121	0,137	0,649	0,575	0,613	0,554	0,598	0,005
5	11,540	15,117	10,401	14,227	12,821	0,402	0,225	0,462	0,270	0,340	0,186	0,159	0,200	0,162	0,177	0,638	0,581	0,667	0,589	0,619	0,006
6	13,128	19,136	15,188	20,085	16,884	0,448	0,206	0,369	0,167	0,297	0,150	0,118	0,132	0,114	0,128	0,626	0,536	0,582	0,508	0,563	0,005
7	13,128	19,136	15,188	20,085	16,884	0,448	0,206	0,369	0,167	0,297	0,150	0,118	0,132	0,114	0,128	0,626	0,536	0,582	0,508	0,563	0,006
8	8,284	12,212	10,344	13,445	11,071	0,579	0,385	0,472	0,321	0,439	0,132	0,110	0,114	0,095	0,113	0,658	0,602	0,632	0,562	0,614	0,008
9	8,503	12,684	9,788	12,481	10,864	0,465	0,207	0,384	0,218	0,318	0,129	0,105	0,116	0,097	0,112	0,633	0,548	0,601	0,541	0,581	0,007
10	10,064	15,139	11,226	12,811	12,310	0,504	0,254	0,444	0,369	0,393	0,144	0,111	0,138	0,125	0,129	0,657	0,553	0,628	0,610	0,612	0,005
11	16,049	23,565	16,976	19,724	19,078	0,387	0,096	0,344	0,244	0,268	0,093	0,069	0,087	0,079	0,082	0,565	0,468	0,561	0,523	0,529	0,006
12	12,994	16,835	13,227	17,042	15,024	0,383	0,201	0,375	0,191	0,288	0,129	0,112	0,127	0,108	0,119	0,610	0,547	0,595	0,527	0,570	0,006
13	11,577	17,032	14,093	16,989	14,923	0,480	0,243	0,373	0,243	0,335	0,139	0,110	0,120	0,108	0,119	0,635	0,552	0,595	0,550	0,583	0,005
14	10,579	13,683	9,587	14,040	11,972	0,483	0,335	0,532	0,316	0,417	0,124	0,105	0,142	0,103	0,119	0,631	0,558	0,658	0,569	0,604	0,012
15	9,493	15,680	12,375	15,909	13,364	0,556	0,273	0,429	0,264	0,381	0,177	0,138	0,154	0,137	0,152	0,679	0,572	0,622	0,572	0,611	0,007
16	14,575	18,647	16,569	21,032	17,706	0,385	0,229	0,307	0,131	0,263	0,134	0,115	0,132	0,106	0,122	0,597	0,528	0,570	0,513	0,552	0,006
17	10,858	14,617	11,881	14,214	12,893	0,419	0,213	0,358	0,234	0,306	0,143	0,116	0,126	0,119	0,126	0,641	0,557	0,608	0,562	0,592	0,006
18	10,606	13,985	11,681	15,698	12,992	0,438	0,247	0,363	0,156	0,301	0,159	0,138	0,159	0,123	0,145	0,642	0,574	0,621	0,539	0,594	0,005
19	8,944	14,782	10,858	11,161	11,436	0,457	0,112	0,343	0,330	0,310	0,123	0,090	0,112	0,113	0,109	0,622	0,499	0,582	0,579	0,571	0,006
20	10,273	15,728	13,271	16,188	13,865	0,511	0,259	0,378	0,236	0,346	0,086	0,066	0,068	0,063	0,071	0,625	0,531	0,564	0,523	0,561	0,006
21	9,893	14,424	12,479	13,847	12,661	0,519	0,302	0,393	0,330	0,386	0,117	0,096	0,102	0,096	0,103	0,640	0,539	0,580	0,558	0,579	0,005
Mean	11,342	15,992	12,587	15,859	13,945 ± 2,229	0,457	0,239	0,399	0,246	0,335 ± 0,054	0,136	0,112	0,129	0,110	0,122 ± 0,022	0,628	0,548	0,604	0,547	0,582 ± 0,023	0,006
Acute Lymphoblastic Leukemia																					
22	9,094	13,087	10,513	10,512	10,802	0,409	0,157	0,329	0,324	0,305	0,040	0,031	0,034	0,030	0,034	0,512	0,443	0,484	0,459	0,475	0,006
23	8,971	10,402	9,020	12,477	10,217	0,419	0,345	0,422	0,215	0,351	0,047	0,046	0,048	0,038	0,045	0,512	0,488	0,519	0,449	0,492	0,005
24	10,096	10,836	9,958	13,718	11,152	0,250	0,195	0,249	-0,018	0,169	0,075	0,075	0,076	0,062	0,072	0,520	0,488	0,515	0,431	0,488	0,004
25	10,159	12,393	9,320	11,713	10,896	0,268	0,131	0,339	0,176	0,228	0,123	0,109	0,131	0,107	0,117	0,554	0,516	0,578	0,505	0,538	0,006
26	8,096	11,582	9,109	9,924	9,678	0,272	-0,024	0,205	0,121	0,143	0,102	0,081	0,087	0,084	0,088	0,560	0,482	0,529	0,486	0,514	0,006
27	8,332	10,174	8,310	10,271	9,272	0,224	0,068	0,233	0,059	0,146	0,086	0,074	0,085	0,072	0,079	0,548	0,494	0,549	0,497	0,522	0,005
28	11,015	13,198	10,268	13,181	11,916	0,322	0,193	0,368	0,194	0,269	0,086	0,069	0,081	0,073	0,078	0,540	0,483	0,539	0,482	0,511	0,008
29	7,809	8,273	8,079	10,618	8,694	0,311	0,284	0,291	0,081	0,242	0,105	0,103	0,105	0,087	0,100	0,558	0,539	0,552	0,485	0,534	0,006
30	8,692	9,670	7,560	10,328	9,063	0,300	0,234	0,390	0,181	0,277	0,084	0,078	0,092	0,075	0,082	0,529	0,493	0,556	0,495	0,518	0,005
Mean	9,140	11,068	9,126	11,416	10,188 ± 1,083	0,308	0,176	0,314	0,148	0,237 ± 0,068	0,083	0,074	0,082	0,070	0,077 ± 0,024	0,537	0,492	0,536	0,477	0,510 ± 0,020	0,006

LAMPIRAN IV LISTING PROGRAM



Button Browse Image

```

% --- Executes on button press in pushbutton1.
function pushbutton1_Callback(hObject, eventdata, handles)
% hObject    handle to pushbutton1 (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)
[filename,pathname] = uigetfile({'*.*'});

if ~isequal(filename,0)
    info = iminfo(fullfile(pathname,filename));
    if info.BitDepth == 1
        msgbox('Citra masukan harus citra RGB atau Grayscale');
        return
    else
        Img = imread(fullfile(pathname,filename));
        axes(handles.axes1)
        cla('reset')
        imshow(Img)
        title('Original Image')
    end
else
    return
end

handles.Img = Img;
guidata(hObject,handles);

```

Button GLCM

```
% --- Executes on button press in pushbutton2.
function pushbutton2_Callback(hObject, eventdata, handles)
% hObject    handle to pushbutton2 (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)
    Img = handles.Img;
    Imge = rgb2gray(Img);
        axes(handles.axes2)
        cla('reset')
        imshow(Imge)
        title('Grayscale Image')
    pixel_dist = str2double(get(handles.edit1, 'string'));
    num_level = str2double(get(handles.edit3, 'string'));
    GLCM = graycomatrix(Imge, 'NumLevels', num_level, 'Offset', [0
    pixel_dist; -pixel_dist pixel_dist; -pixel_dist 0; -pixel_dist -
    pixel_dist]);
    stats =
    graycoprops(GLCM, {'Contrast', 'Correlation', 'Energy', 'Homogeneity'});
    tic;
    Contrast = stats.Contrast;
    Correlation = stats.Correlation;
    Energy = stats.Energy;
    Homogeneity = stats.Homogeneity;
    data = get(handles.uitable2, 'Data');
    data{1,1} = num2str(Contrast(1));
    data{1,2} = num2str(Contrast(2));
    data{1,3} = num2str(Contrast(3));
    data{1,4} = num2str(Contrast(4));
    data{1,5} = num2str(mean(Contrast));

    data{2,1} = num2str(Correlation(1));
    data{2,2} = num2str(Correlation(2));
    data{2,3} = num2str(Correlation(3));
    data{2,4} = num2str(Correlation(4));
    data{2,5} = num2str(mean(Correlation));

    data{3,1} = num2str(Energy(1));
    data{3,2} = num2str(Energy(2));
    data{3,3} = num2str(Energy(3));
    data{3,4} = num2str(Energy(4));
    data{3,5} = num2str(mean(Energy));

    data{4,1} = num2str(Homogeneity(1));
    data{4,2} = num2str(Homogeneity(2));
    data{4,3} = num2str(Homogeneity(3));
    data{4,4} = num2str(Homogeneity(4));
    data{4,5} = num2str(mean(Homogeneity));
    TimeElapsed = toc;
    set(handles.text6, 'string', TimeElapsed);
    set(handles.uitable2, 'Data', data, 'ForegroundColor', [0,0,0]);
    set(handles.pushbutton2, 'Visible', 'on');
```

Button Watershed

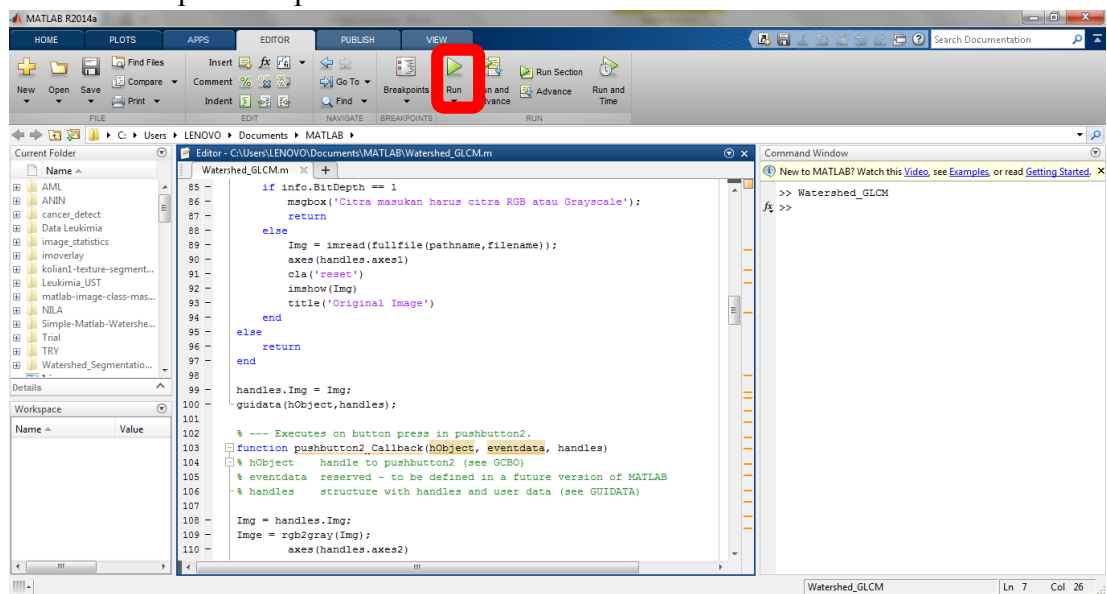
```
% --- Executes on button press in pushbutton3.
function pushbutton3_Callback(hObject, eventdata, handles)
% hObject    handle to pushbutton3 (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)
tic;
Img = handles.Img;
I = rgb2gray(Img);
se = strel('disk',10); %opening --
Ie = imerode(I,se);
Irec = imreconstruct(Ie,I);
Id = imdilate(Irec,se); %-- opening
Iobrcbr = imreconstruct(imcomplement(Id),Irec);
Iobrcbr = imcomplement(Iobrcbr);
fgm = imadjust(Iobrcbr); %autothresh
bw=im2bw(Iobrcbr,graythresh(Iobrcbr));
D =-bwdist(~bw); %distance transform
D(~bw)=-Inf;
DL = watershed(D);
Wi=label2rgb(DL,'hot','w');
im=Img;
im(DL==1) =0;
axes(handles.axes3)
cla('reset')
imshow(im)
title('Watershed Image')
elapsedTime = toc;
set(handles.text4,'string',elapsedTime);
```


LAMPIRAN V

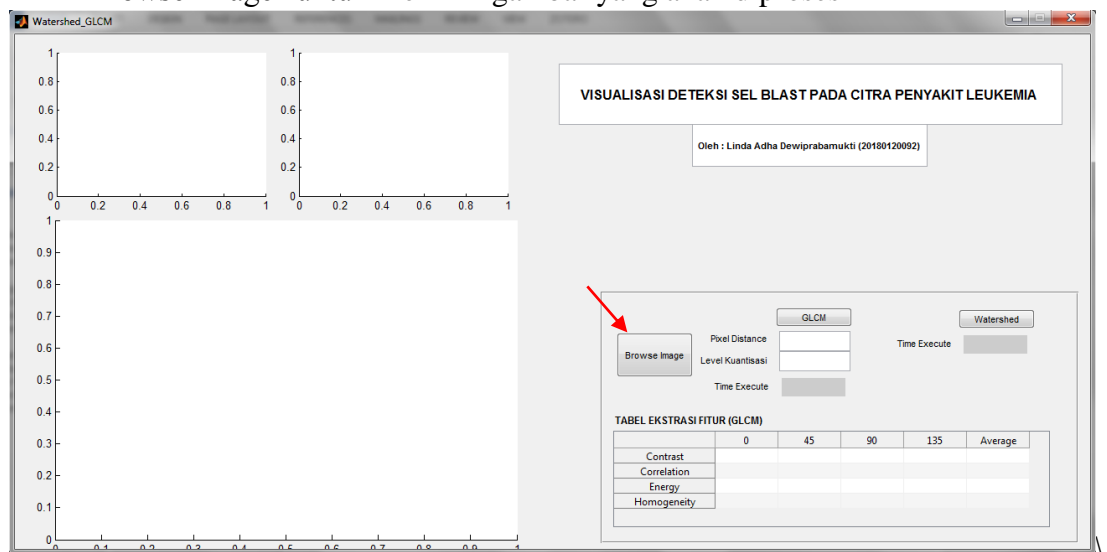
PANDUAN PENGGUNAAN GUI

Panduan ini dibuat untuk memudahkan user dalam penggunaan *Guide User Interface* (GUI) dalam menjalankan proses “Penerapan Metode Watershed dan Gray Level Co – Occurance Matrix pada Sel Leukemia”. Berikut adalah langkah – langkah penggunaan GUI

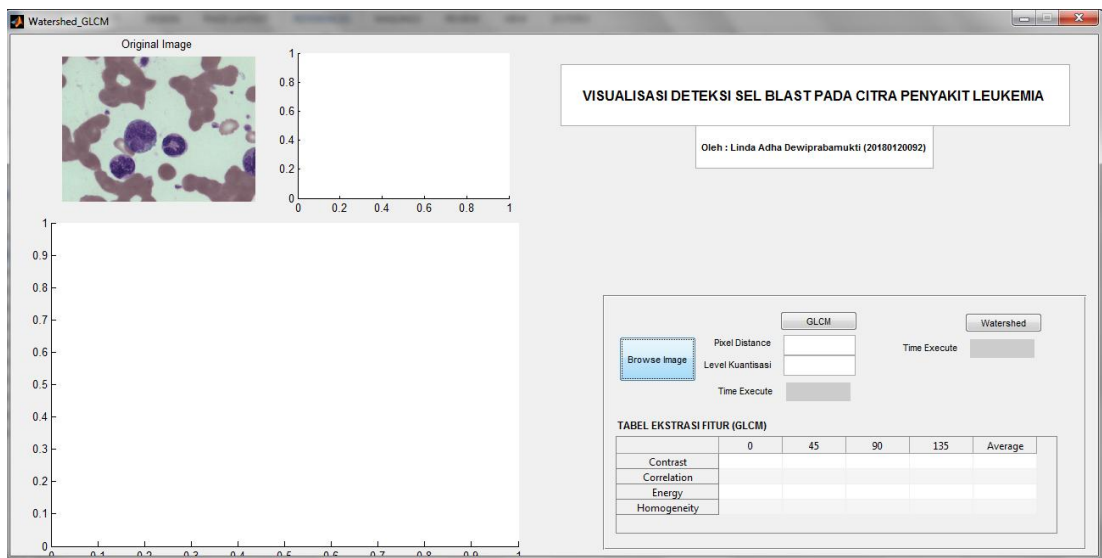
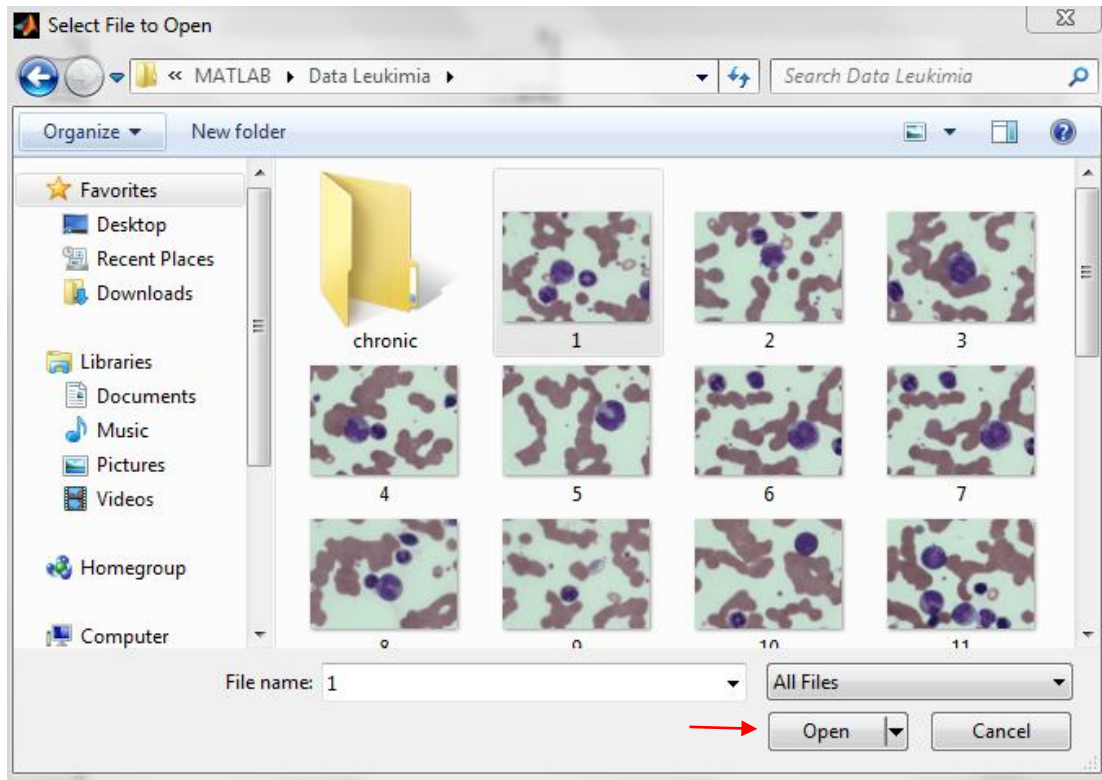
1. Klik “RUN” pada tampilan MatLab



2. Klik “Browse Image” untuk memilih gambar yang akan diproses



3. Pilih folder dan gambar yang akan diproses dan klik “Open”



4. Tentukan nilai Level Kuantisasi dan Jarak Pikel untuk proses pada GLCM dan Klik Button “GLCM” untuk menampilkan citra secara *Grayscale* dan mendapatkan hasil Data Ekstrasi Fitur. Pada penelitian ini *pixel distance* yang digunakan adalah 50, 60, dan 70 dengan level kuantisasi 16.

TABEL EKSTRASI FITUR (GLCM)

	0	45	90	135	Average
Contrast					
Correlation					
Energy					
Homogeneity					

5. Data hasil ekstrasi fitur dan Output citra grayscale tertampilkan serta waktu komputasi

VISUALISASI DETEKSI SEL BLAST PADA CITRA PENYAKIT LEUKEMIA
Oleh : Linda Adha Dewiprabamukti (20180120092)

TABEL EKSTRASI FITUR (GLCM)

	0	45	90	135	Average
Contrast	9.3167	12.6177	9.1407	12.7364	10.9529
Correlation	0.55984	0.40796	0.57095	0.4029	0.48541
Energy	0.1312	0.1121	0.13082	0.10905	0.12079
Homogeneity	0.64184	0.58271	0.63998	0.58646	0.61275

TABEL EKSTRASI FITUR (GLCM)

	0	45	90	135	Average
Contrast	9.3167	12.6177	9.1407	12.7364	10.9529
Correlation	0.55984	0.40796	0.57095	0.4029	0.48541
Energy	0.1312	0.1121	0.13082	0.10905	0.12079
Homogeneity	0.64184	0.58271	0.63998	0.58646	0.61275

6. Untuk mendapatkan hasil segmentasi citra dengan metode Watershed, klik button “watershed”

VISUALISASI DETEKSI SEL BLAST PADA CITRA PENYAKIT LEUKEMIA

Oleh : Linda Adha Dewiprabamukti (20180120092)

Pixel Distance: 50
Level Kuantisasi: 16
Time Execute: 0.0795833

TABEL EKSTRAKSI FITUR (GLCM)

	0	45	90	135	Average
Contrast	9.3167	12.6177	9.1407	12.7364	10.9529
Correlation	0.55984	0.40796	0.57095	0.4029	0.48541
Energy	0.1312	0.1121	0.13082	0.10905	0.12079
Homogeneity	0.64184	0.58271	0.63998	0.58846	0.61275

VISUALISASI DETEKSI SEL BLAST PADA CITRA PENYAKIT LEUKEMIA

Oleh : Linda Adha Dewiprabamukti (20180120092)

Pixel Distance: 50
Level Kuantisasi: 16
Time Execute: 1.99817

TABEL EKSTRAKSI FITUR (GLCM)

	0	45	90	135	Average
Contrast	9.3167	12.6177	9.1407	12.7364	10.9529
Correlation	0.55984	0.40796	0.57095	0.4029	0.48541
Energy	0.1312	0.1121	0.13082	0.10905	0.12079
Homogeneity	0.64184	0.58271	0.63998	0.58846	0.61275