

Results

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We have used 3 root finding methods to encrypt, and decrypt our data with different length and the secant method was the fastest. Bisection method was the slowest. The results are shown in the following image.

	Encryption Algorithm	File Size	Key Size & Polynomial Degree	Encryption Time	Dencryption Time	Total Time
0	AES	5000	128	0.080950	0.117319	0.198269
1	Optimized Binew	5000	2D	0.040277	0.006995	0.047272
2	AES	10000	128	0.097446	0.236881	0.334327
3	Optimized Binew	10000	3D	0.076170	0.011992	0.088162
4	AES	15000	128	0.167414	0.349761	0.517175
5	Optimized Binew	15000	4D	0.120417	0.028982	0.149400
6	AES	20000	128	0.229104	0.499358	0.728462
7	Optimized Binew	20000	5D	0.189489	0.024984	0.214473
8	AES	25000	128	0.254041	0.596532	0.850573
9	Optimized Binew	25000	6D	0.304142	0.033985	0.338127

Figure 1: Results Dataframe

Encryption time for each algorithm is shown in the following image.

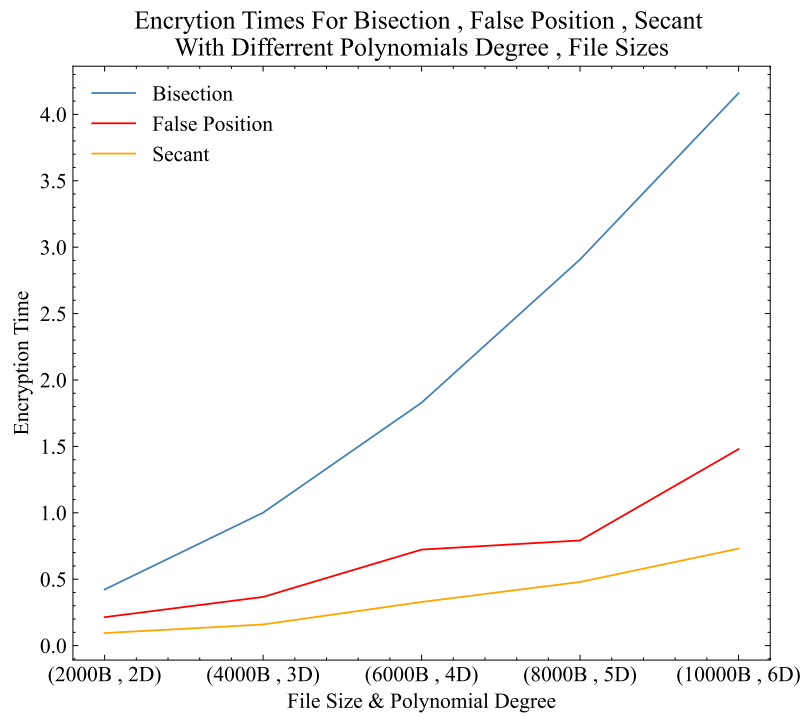


Figure 2: Encryption time

Decryption time for each algorithm is shown in the following image.

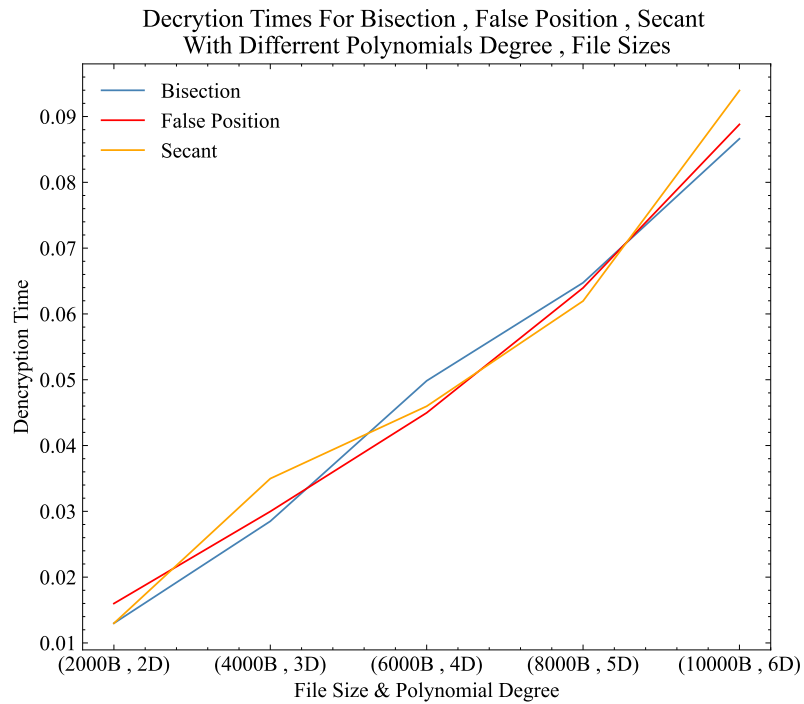


Figure 3: Decryption time

Total time for each algorithm is shown in the following image.

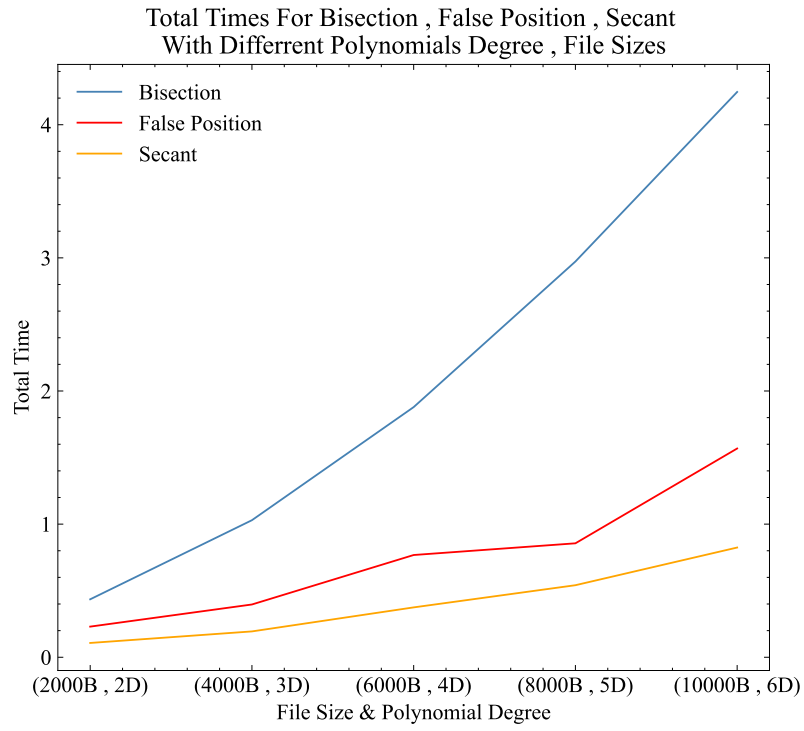


Figure 4: Total time

AES vs Encryption Algorithm Secant Method

The following image shows the comparison between AES and the Secant method.

	Encryption Algorithm	File Size	Key Size & Polynomial Degree	Encryption Time	Decryption Time	Total Time
0	AES	5000	128	0.080950	0.117319	0.198269
1	Optimized Binew	5000	2D	0.040277	0.006995	0.047272
2	AES	10000	128	0.097446	0.236881	0.334327
3	Optimized Binew	10000	3D	0.076170	0.011992	0.088162
4	AES	15000	128	0.167414	0.349761	0.517175
5	Optimized Binew	15000	4D	0.120417	0.028982	0.149400
6	AES	20000	128	0.229104	0.499358	0.728462
7	Optimized Binew	20000	5D	0.189489	0.024984	0.214473
8	AES	25000	128	0.254041	0.596532	0.850573
9	Optimized Binew	25000	6D	0.304142	0.033985	0.338127

Figure 5: Title

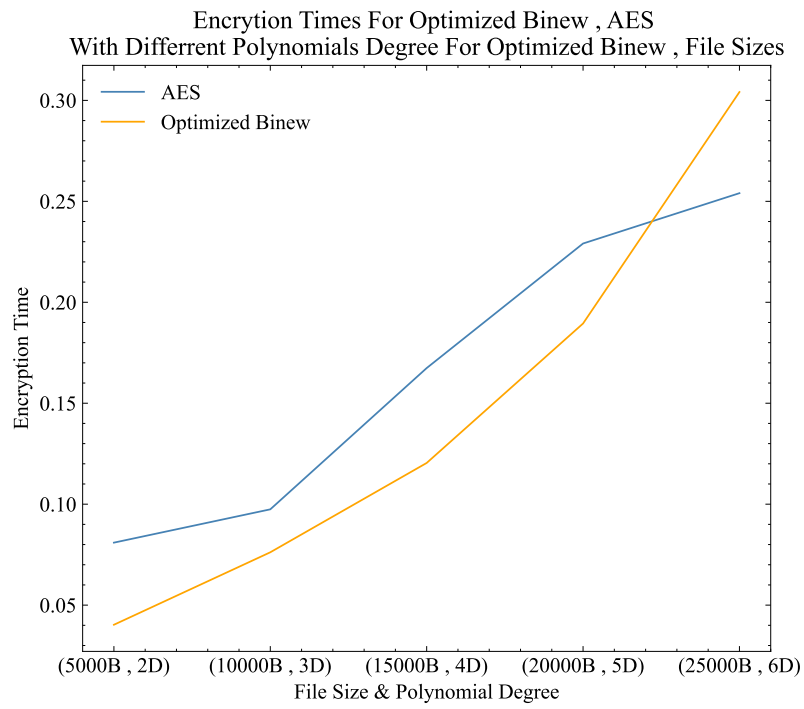


Figure 6: Title

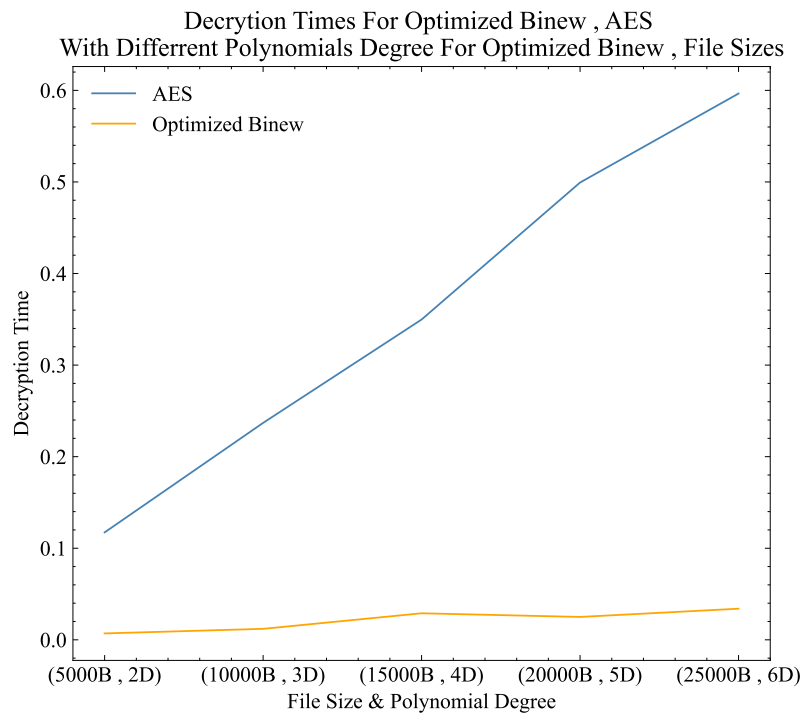


Figure 7: Title

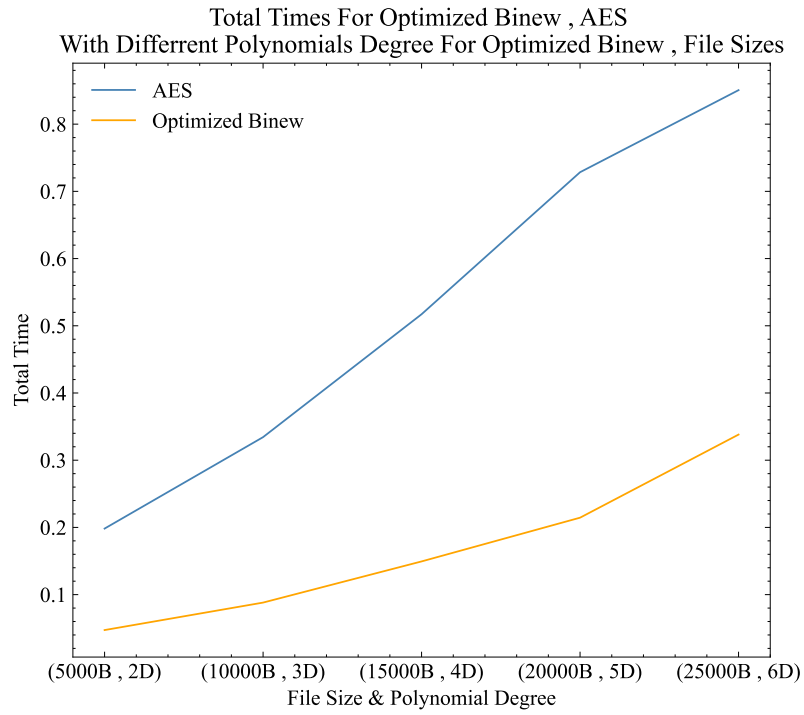


Figure 8: Title

Different File Size With The Same Polynomial Degree

The following image shows the comparison between different file sizes with the same polynomial degree.

	Encryption Algorithm	File Size	Key Size & Polynomial Degree	Encryption Time	Decryption Time	Total Time
0	AES	5000	128	0.140923	0.299820	0.440742
1	Optimized Binew	5000	4D	0.172813	0.015990	0.188803
2	AES	10000	128	0.233275	0.597393	0.830668
3	Optimized Binew	10000	4D	0.267852	0.029980	0.297832
4	AES	15000	128	0.343792	0.876013	1.219804
5	Optimized Binew	15000	4D	0.402596	0.047483	0.450079
6	AES	20000	128	0.457496	1.236999	1.694495
7	Optimized Binew	20000	4D	0.533459	0.062968	0.596427
8	AES	25000	128	0.631025	1.444472	2.075497
9	Optimized Binew	25000	4D	0.670522	0.076950	0.747472
10	AES	30000	128	0.688065	1.750066	2.438132
11	Optimized Binew	30000	4D	0.776407	0.090950	0.867357
12	AES	35000	128	0.808693	2.113180	2.919873
13	Optimized Binew	35000	4D	0.978149	0.119150	1.097299
14	AES	40000	128	0.923356	2.303686	3.227042
15	Optimized Binew	40000	4D	1.085960	0.120966	1.206926
16	AES	45000	128	1.064134	2.829155	3.893288
17	Optimized Binew	45000	4D	1.160464	0.144933	1.305397
18	AES	50000	128	1.147822	2.910782	4.058604
19	Optimized Binew	50000	4D	1.488665	0.147914	1.636579
20	AES	100000	128	2.445958	5.865862	8.311820
21	Optimized Binew	100000	4D	2.559911	0.305848	2.865759
22	AES	200000	128	4.850306	13.086151	17.936457
23	Optimized Binew	200000	4D	5.138029	0.602714	5.740743
24	AES	300000	128	7.568408	19.054448	26.622856
25	Optimized Binew	300000	4D	7.979702	0.914095	8.893797

Figure 9: Title

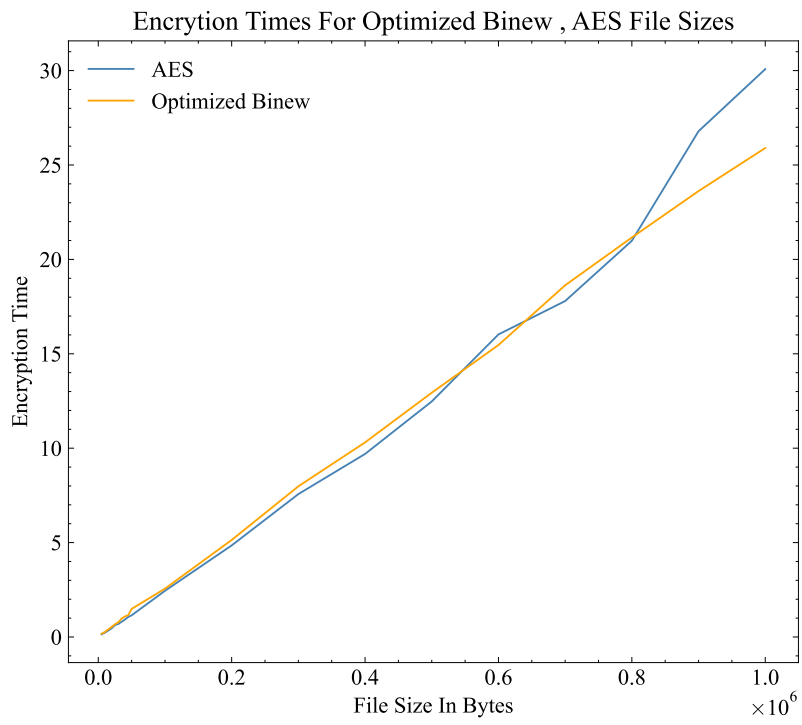


Figure 10: Title

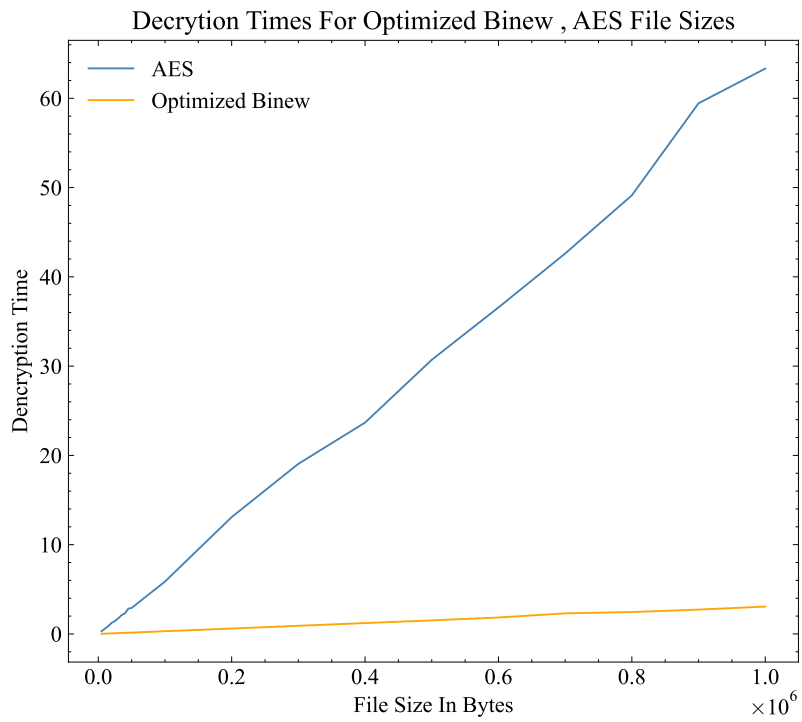


Figure 11: Title

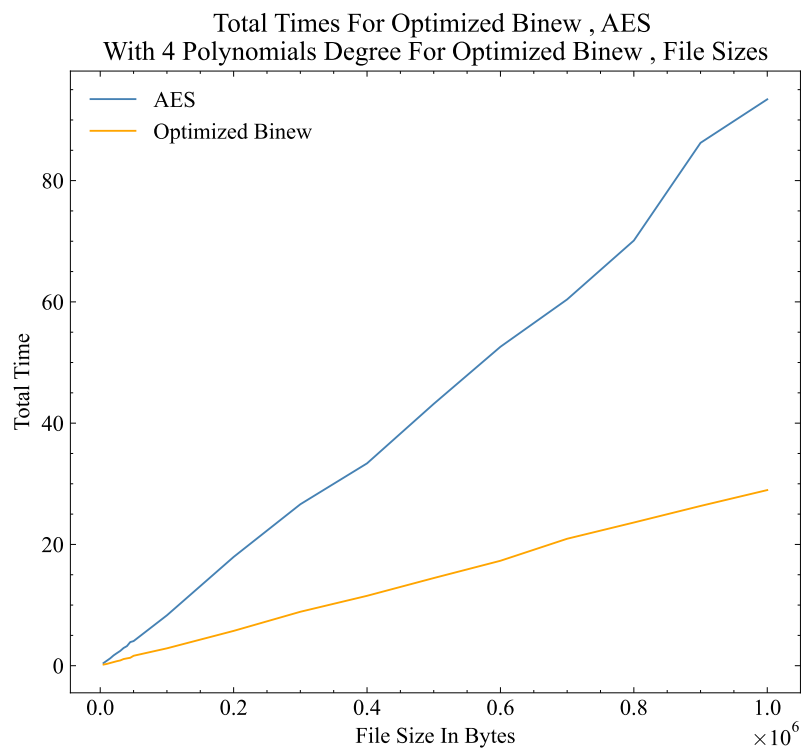


Figure 12: Title