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|  | **Query file: Worst Case: (999As, 1B)** | | |
| **Sequence file:** | **Naive** | **KMP** | **Optimized KMP** |
| **1,000As** | Loops = 0  Time Taken = 0ns | Loops = 0  Time Taken = 0ns | Loops = 0  Time Taken = 0ns |
| **10,000As** | Loops = 9000000  Time Taken = 29015700ns / 29.0157ms | Loops = 20998  Time Taken = 993000ns / 0.993ms | Loops = 11997  Time Taken = 3001100ns / 3.0011ms |
| **100,000As** | Loops = 99000000  Time Taken = 244537900ns / 244.5379ms | Loops = 200998  Time Taken = 7012900ns / 7.0129ms | Loops = 101997  Time Taken = 13935500ns / 13.9355ms |
| **1,000,000As** | Loops = 999000000  Time Taken = 2415151900ns / 2.4151519s | Loops = 2000998  Time Taken = 13961600ns / 13.9616ms | Loops = 1001997  Time Taken = 30916200ns / 30.9162ms |
| **10,000,000As** | Loops = 9999000000  Time Taken = 28161334800ns / 28.1613s | Loops = 20000998  Time Taken = 61835100ns / 61.8351ms | Loops = 10001997  Time Taken = 132705900ns / 132.7059ms |
| **100,000,000As** | Loops = 99999000000  Time Taken = 273379306100ns / 4.5563mins | Loops = 200000998  Time Taken = 521604800ns / 521.6048ms | Loops = 100001997  Time Taken = 912056900ns / 912.0569ms |
| **1,000,000,000As** | Loops = 999999000000  Time Taken = 3068731027100ns / 51.1455mins | Loops = 2000000998  Time Taken = 5177815900ns / 5.1778s | Loops = 1000001997  Time Taken = 8846126600ns / 8.8461s |

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|  | **Query file: Best Case: (1B)** | | |
| **Sequence file:** | **Naive** | **KMP** | **Optimized KMP** |
| **1,000As** | Loops = 999  Time Taken = 0ns | Loops = 1,000  Time Taken = 0ns | Loops = 1,000  Time Taken = 0ns |
| **10,000As** | Loops = 9,999  Time Taken = 0ns | Loops = 10,000  Time Taken = 0ns | Loops = 10,000  Time Taken = 1027600ns / 1.0276ms |
| **100,000As** | Loops = 99,999  Time Taken = 6981200ns / 6.9812ms | Loops = 100,000  Time Taken = 4986700ns / 4.9867ms | Loops = 100,000  Time Taken = 3980300ns / 3.9803ms |
| **1,000,000As** | Loops = 999,999  Time Taken = 19945800ns / 19.9458ms | Loops = 1,000,000  Time Taken = 10076900ns / 10.0769ms | Loops = 1,000,000  Time Taken = 9002100ns / 9.0021ms |
| **10,000,000lAs** | Loops = 9,999,999  Time Taken = 33942000ns / 33.942ms | Loops = 10,000,000  Time Taken = 29885000ns / 29.885ms | Loops = 10,000,000  Time Taken = 29977000ns / 29.977ms |
| **100,000,000As** | Loops = 99,999,999  Time Taken = 245835700ns 245.8357ms | Loops = 100,000,000  Time Taken = 221921100ns / 221.9211ms | Loops = 100,000,000  Time Taken = 219718900ns / 219.7189ms |
| **1,000,000,000As** | Loops = 999,999,999  Time Taken = 2331911400ns / 2.3319114s | Loops = 1,000,000,000  Time Taken = 2187453700ns / 2.1874537s | Loops = 1,000,000,000  Time Taken = 2181200900ns / 2.1812009s |

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|  | **Sequence file: cds.fna (Length: 968458024)** | | |
| **Query file: 100 random chars** | **Naive** | **KMP** | **Optimized KMP** |
| **Case 1** | Loops = 1226896182  Time Taken = 5534689600ns / 5.535s | Loops = 1141068771  Time Taken = 4924138900ns / 4.9241s | Loops = 968458144  Time Taken = 5423966400ns / 5.4240s |
| **Case 2** | Loops = 1357604744  Time Taken = 7352527500ns / 7.3525s | Loops = 1250176385  Time Taken = 6374073800ns / 6.3741s | Loops = 968458143  Time Taken = 7237059300ns / 7.2371s |

**Cases where Optimized KMP is faster than KMP**

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| **Query file:** | **Sequence file: cds.fna (Length: 968458024)** | | |
|  | **Naive** | **KMP** | **Optimized KMP** |
| **A single ‘B’** | Loops = 968458023  Time Taken = 2998986900ns / 2.9990s | Loops = 968458024  Time Taken = 2427090500ns / 2.4271s | Loops = 968458024  Time Taken = 2312799600ns / 2.3128s |
| **55 Cs, 5 Ds and 9 Cs** | Loops = 1172334391  Time Taken = 4641859700ns / 4.6419s | Loops = 1141068773  Time Taken = 4160643400ns / 4.1606s | Loops = 968458146  Time Taken = 4067143200ns / 4.0671s |
| **100 Random characters of Ds and Es** | Loops = 968457971  Time Taken = 2731895900ns / 2.7319s | Loops =  968458211  Time Taken = 2258672000ns / 2.2587s | Loops = 968458164  Time Taken = 2144828700ns / 2.1448s |