**P4 Analysis**

**Results of implementing the StringStrand interface:**

dna length = 4,639,221

cutting at enzyme gaattc

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Class splicee recomb time appends

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StringStra: 256 4,800,471 0.636 1290

StringStra: 512 4,965,591 0.660 1290

StringStra: 1,024 5,295,831 0.686 1290

StringStra: 2,048 5,956,311 0.762 1290

StringStra: 4,096 7,277,271 0.985 1290

StringStra: 8,192 9,919,191 1.502 1290

StringStra: 16,384 15,203,031 2.477 1290

StringStra: 32,768 25,770,711 4.147 1290

StringStra: 65,536 46,906,071 8.274 1290

StringStra: 131,072 89,176,791 14.911 1290

StringStra: 262,144 173,718,231 27.920 1290

StringStra: 524,288 342,801,111 54.912 1290

StringStra: 1,048,576 680,966,871 113.309 1290

Exception in thread "main" java.lang.OutOfMemoryError: Java heap space

at java.base/jdk.internal.misc.Unsafe.allocateUninitializedArray(Unsafe.java:1403)

at java.base/java.lang.StringConcatHelper.newArray(StringConcatHelper.java:494)

at java.base/java.lang.StringConcatHelper.simpleConcat(StringConcatHelper.java:421)

at java.base/java.lang.invoke.DirectMethodHandle$Holder.invokeStatic(DirectMethodHandle$Holder)

at java.base/java.lang.invoke.DelegatingMethodHandle$Holder.reinvoke\_L(DelegatingMethodHandle$Holder)

at java.base/java.lang.invoke.Invokers$Holder.linkToTargetMethod(Invokers$Holder)

at StringStrand.append(StringStrand.java:70)

at IDnaStrand.cutAndSplice(IDnaStrand.java:42)

at DNABenchmark.strandSpliceBenchmark(DNABenchmark.java:72)

at DNABenchmark.standardBenchmark(DNABenchmark.java:116)

at DNABenchmark.main(DNABenchmark.java:163)

**Results of implementing the StringBuilderStrand interface:**

dna length = 4,639,221

cutting at enzyme gaattc

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Class splicee recomb time appends

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StringBuil: 256 4,800,471 0.030 1290

StringBuil: 512 4,965,591 0.023 1290

StringBuil: 1,024 5,295,831 0.006 1290

StringBuil: 2,048 5,956,311 0.008 1290

StringBuil: 4,096 7,277,271 0.006 1290

StringBuil: 8,192 9,919,191 0.007 1290

StringBuil: 16,384 15,203,031 0.011 1290

StringBuil: 32,768 25,770,711 0.016 1290

StringBuil: 65,536 46,906,071 0.029 1290

StringBuil: 131,072 89,176,791 0.074 1290

StringBuil: 262,144 173,718,231 0.232 1290

StringBuil: 524,288 342,801,111 0.489 1290

Exception in thread "main" java.lang.OutOfMemoryError: Java heap space

at java.base/java.util.Arrays.copyOf(Arrays.java:3536)

at java.base/java.lang.AbstractStringBuilder.ensureCapacityInternal(AbstractStringBuilder.java:228)

at java.base/java.lang.AbstractStringBuilder.append(AbstractStringBuilder.java:582)

at java.base/java.lang.StringBuilder.append(StringBuilder.java:175)

at StringBuilderStrand.append(StringBuilderStrand.java:70)

at IDnaStrand.cutAndSplice(IDnaStrand.java:42)

at DNABenchmark.lambda$strandSpliceBenchmark$0(DNABenchmark.java:81)

at DNABenchmark$$Lambda$166/0x0000000800d41708.run(Unknown Source)

at java.base/java.lang.Thread.run(Thread.java:831)

at DNABenchmark.strandSpliceBenchmark(DNABenchmark.java:84)

at DNABenchmark.standardBenchmark(DNABenchmark.java:116)

at DNABenchmark.main(DNABenchmark.java:163)