```
R version 4.4.0 (2024-04-24) -- "Puppy Cup"
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Platform: aarch64-apple-darwin20

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  Natural language support but running in an English locale

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'help.start()' for an HTML browser interface to help.
Type 'q()' to quit R.

[R.app GUI 1.80 (8376) aarch64-apple-darwin20]

[History restored from /Users/alperkaragol/.Rapp.history]

> setwd("/Users/alperkaragol/Desktop/Genomics/Glutamate_isoformsData/TajimaD/EAA5")
>
> # Function to read alignment from a text file
> read_alignment <- function(file) {
+     # Read the file line by line
+     lines <- readLines(file)
+
+     # Split each line into individual characters to form the alignment matrix
+     alignment <- do.call(rbind, strsplit(lines, ""))
+
+     return(alignment)
+ }
>
> # Function to compute site frequency spectrum (SFS)
> compute_SFS <- function(alignment) {
+     # Number of sequences
+     num_sequences <- nrow(alignment)
+
+     # Initialize an empty vector to store counts for each frequency
+     sfs <- numeric(num_sequences - 1)
+
+     # Loop through each column in the alignment
+     for (i in 1:ncol(alignment)) {
+         # Count the number of unique characters in the column
+         counts <- table(alignment[, i])
+
+         # Remove gaps "-" from the counts
+         counts <- counts[!names(counts) %in% "-"]
+
+         # Increment the count for each frequency in the SFS
+         for (count in counts) {
+             if (count > 1 && count <= num_sequences) {
+                 sfs[count - 1] <- sfs[count - 1] + 1
+             }
+         }
+     }
+
+     return(sfs)
+ }
>
> # Path to the alignment file
> file <- "alignment.txt"
>
> # Read the alignment from the file
> alignment <- read_alignment(file)
> print(alignment)
     [,1] [,2] [,3] [,4] [,5] [,6] [,7] [,8] [,9] [,10] [,11] [,12] [,13] [,14] [,15] [,16] [,17] [,18] [,19] [,20]
[1,] "-"  "-"  "-"  "-"  "-"  "-"  "-"  "-"  "-"  "-"   "-"   "-"   "-"   "-"   "-"   "-"   "-"   "-"   "-"   "-"
[2,] "-"  "-"  "-"  "-"  "-"  "-"  "-"  "-"  "-"  "-"   "-"   "-"   "-"   "-"   "-"   "-"   "-"   "-"   "-"   "-"
[3,] "-"  "-"  "-"  "-"  "-"  "-"  "-"  "-"  "-"  "-"   "-"   "-"   "-"   "-"   "-"   "-"   "-"   "-"   "-"   "-"
[4,] "-"  "-"  "-"  "-"  "-"  "-"  "-"  "-"  "-"  "-"   "-"   "-"   "-"   "-"   "-"   "-"   "-"   "-"   "-"   "-"
[5,] "C"  "C"  "T"  "A"  "A"  "T"  "C"  "T"  "G"  "C"   "T"   "C"   "C"   "C"   "A"   "G"   "C"   "T"   "C"   "C"
[6,] "-"  "-"  "-"  "-"  "-"  "-"  "-"  "-"  "-"  "-"   "-"   "-"   "-"   "-"   "-"   "-"   "-"   "-"   "-"   "-"
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      [,21] [,22] [,23] [,24] [,25] [,26] [,27] [,28] [,29] [,30] [,31] [,32] [,33] [,34] [,35] [,36] [,37] [,38]
[1,]  "-"   "-"   "-"   "-"   "-"   "-"   "-"   "-"   "-"   "-"   "-"   "-"   "-"   "G"   "G"   "T"   "A"   "A"
[2,]  "-"   "-"   "-"   "-"   "-"   "-"   "-"   "-"   "-"   "-"   "-"   "-"   "-"   "-"   "-"   "-"   "-"   "-"
[3,]  "-"   "-"   "-"   "-"   "-"   "-"   "-"   "-"   "-"   "-"   "-"   "-"   "-"   "-"   "-"   "-"   "-"   "-"
[4,]  "-"   "-"   "-"   "-"   "-"   "-"   "-"   "-"   "-"   "-"   "-"   "-"   "-"   "-"   "-"   "-"   "-"   "-"
[5,]  "T"   "A"   "A"   "T"   "G"   "A"   "T"   "G"   "C"   "A"   "G"   "C"   "T"   "G"   "G"   "T"   "A"   "A"
[6,]  "-"   "-"   "-"   "-"   "-"   "-"   "-"   "-"   "-"   "-"   "-"   "-"   "-"   "-"   "-"   "-"   "-"   "-"

      [,39] [,40] [,41] [,42] [,43] [,44] [,45] [,46] [,47] [,48] [,49] [,50] [,51] [,52] [,53] [,54] [,55] [,56]
[1,]  "T"   "A"   "G"   "G"   "A"   "T"   "T"   "G"   "T"   "G"   "G"   "C"   "T"   "T"   "C"   "C"   "C"   "T"
[2,]  "-"   "-"   "-"   "-"   "-"   "-"   "-"   "-"   "-"   "-"   "-"   "-"   "-"   "-"   "-"   "-"   "-"   "-"
[3,]  "-"   "A"   "G"   "G"   "A"   "T"   "T"   "G"   "T"   "G"   "G"   "C"   "T"   "T"   "C"   "C"   "C"   "T"
[4,]  "-"   "A"   "G"   "G"   "A"   "T"   "T"   "G"   "T"   "G"   "G"   "C"   "T"   "T"   "C"   "C"   "C"   "T"
[5,]  "T"   "A"   "G"   "G"   "A"   "T"   "T"   "G"   "T"   "G"   "G"   "C"   "T"   "T"   "C"   "C"   "C"   "T"
[6,]  "-"   "-"   "-"   "-"   "-"   "-"   "-"   "-"   "-"   "-"   "-"   "-"   "-"   "-"   "-"   "-"   "-"   "-"

      [,57] [,58] [,59] [,60] [,61] [,62] [,63] [,64] [,65] [,66] [,67] [,68] [,69] [,70] [,71] [,72] [,73] [,74]
[1,]  "C"   "T"   "A"   "A"   "G"   "G"   "C"   "G"   "G"   "C"   "C"   "A"   "C"   "A"   "C"   "G"   "G"   "G"
[2,]  "-"   "-"   "-"   "-"   "-"   "-"   "-"   "-"   "-"   "-"   "-"   "-"   "-"   "-"   "-"   "-"   "-"   "-"
[3,]  "C"   "T"   "A"   "A"   "G"   "G"   "C"   "G"   "G"   "C"   "C"   "A"   "C"   "A"   "C"   "G"   "G"   "G"
[4,]  "C"   "T"   "A"   "A"   "G"   "G"   "C"   "G"   "G"   "C"   "C"   "A"   "C"   "A"   "C"   "A"   "G"   "G"
[5,]  "C"   "T"   "A"   "A"   "G"   "G"   "C"   "G"   "G"   "C"   "C"   "A"   "C"   "A"   "C"   "A"   "G"   "G"
[6,]  "-"   "-"   "-"   "-"   "-"   "-"   "-"   "-"   "-"   "-"   "-"   "-"   "-"   "-"   "-"   "-"   "-"   "-"

      [,75] [,76] [,77] [,78] [,79] [,80] [,81] [,82] [,83] [,84] [,85] [,86] [,87] [,88] [,89] [,90] [,91] [,92]
[1,]  "C"   "A"   "T"   "G"   "G"   "C"   "C"   "G"   "T"   "G"   "G"   "G"   "G"   "C"   "T"   "G"   "G"   "C"
[2,]  "-"   "-"   "-"   "-"   "-"   "-"   "-"   "-"   "-"   "-"   "-"   "-"   "-"   "-"   "-"   "-"   "-"   "-"
[3,]  "C"   "A"   "T"   "G"   "G"   "C"   "C"   "G"   "T"   "G"   "G"   "G"   "G"   "C"   "T"   "G"   "G"   "C"
[4,]  "C"   "A"   "T"   "G"   "G"   "C"   "C"   "G"   "T"   "G"   "G"   "G"   "G"   "C"   "T"   "G"   "G"   "C"
[5,]  "C"   "A"   "T"   "G"   "G"   "C"   "C"   "G"   "T"   "G"   "G"   "G"   "G"   "C"   "T"   "G"   "G"   "C"
[6,]  "-"   "-"   "-"   "-"   "-"   "-"   "-"   "-"   "-"   "-"   "-"   "-"   "-"   "-"   "-"   "-"   "-"   "-"

      [,93] [,94] [,95] [,96] [,97] [,98] [,99] [,100] [,101] [,102] [,103] [,104] [,105] [,106] [,107] [,108]
[1,]  "G"   "A"   "C"   "T"   "G"   "G"   "T"   "G"    "T"    "T"    "T"    "A"    "G"    "C"    "A"    "A"
[2,]  "-"   "-"   "-"   "-"   "-"   "-"   "-"   "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"
[3,]  "G"   "A"   "C"   "T"   "G"   "G"   "T"   "G"    "T"    "T"    "T"    "A"    "G"    "C"    "A"    "A"
[4,]  "G"   "A"   "C"   "T"   "G"   "G"   "T"   "G"    "T"    "T"    "T"    "G"    "G"    "C"    "A"    "A"
[5,]  "G"   "A"   "C"   "T"   "G"   "G"   "T"   "G"    "T"    "T"    "T"    "G"    "G"    "C"    "A"    "A"
[6,]  "-"   "-"   "-"   "-"   "-"   "-"   "-"   "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"

      [,109] [,110] [,111] [,112] [,113] [,114] [,115] [,116] [,117] [,118] [,119] [,120] [,121] [,122] [,123]
[1,]  "C"    "T"    "C"    "C"    "G"    "A"    "C"    "C"    "A"    "C"    "C"    "T"    "G"    "C"    "C"
[2,]  "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"
[3,]  "C"    "T"    "C"    "C"    "G"    "A"    "C"    "C"    "A"    "C"    "C"    "T"    "G"    "C"    "C"
[4,]  "C"    "T"    "C"    "C"    "A"    "A"    "C"    "C"    "A"    "C"    "C"    "T"    "G"    "C"    "C"
[5,]  "C"    "T"    "C"    "C"    "A"    "A"    "C"    "C"    "A"    "C"    "C"    "T"    "G"    "C"    "C"
[6,]  "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"

      [,124] [,125] [,126] [,127] [,128] [,129] [,130] [,131] [,132] [,133] [,134] [,135] [,136] [,137] [,138]
[1,]  "T"    "G"    "C"    "T"    "G"    "A"    "G"    "G"    "G"    "G"    "C"    "T"    "A"    "G"    "A"
[2,]  "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"
[3,]  "T"    "G"    "C"    "T"    "G"    "A"    "G"    "G"    "G"    "G"    "C"    "T"    "A"    "G"    "A"
[4,]  "T"    "G"    "C"    "T"    "G"    "A"    "G"    "G"    "G"    "G"    "C"    "T"    "A"    "G"    "A"
[5,]  "T"    "G"    "C"    "T"    "G"    "A"    "G"    "G"    "G"    "G"    "C"    "T"    "A"    "G"    "A"
[6,]  "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"

      [,139] [,140] [,141] [,142] [,143] [,144] [,145] [,146] [,147] [,148] [,149] [,150] [,151] [,152] [,153]
[1,]  "G"    "C"    "C"    "C"    "T"    "C"    "A"    "G"    "C"    "C"    "C"    "A"    "G"    "A"    "C"
[2,]  "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"
[3,]  "G"    "C"    "C"    "C"    "T"    "C"    "A"    "G"    "C"    "C"    "C"    "A"    "G"    "A"    "C"
[4,]  "G"    "C"    "C"    "C"    "T"    "C"    "A"    "G"    "C"    "C"    "C"    "A"    "G"    "A"    "C"
[5,]  "G"    "C"    "C"    "C"    "T"    "C"    "A"    "G"    "C"    "C"    "C"    "A"    "G"    "A"    "C"
[6,]  "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"

      [,154] [,155] [,156] [,157] [,158] [,159] [,160] [,161] [,162] [,163] [,164] [,165] [,166] [,167] [,168]
[1,]  "C"    "C"    "T"    "G"    "T"    "G"    "C"    "C"    "C"    "C"    "C"    "G"    "G"    "C"    "C"
[2,]  "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"
[3,]  "C"    "C"    "T"    "G"    "T"    "G"    "C"    "C"    "C"    "C"    "C"    "G"    "G"    "C"    "C"
[4,]  "C"    "C"    "T"    "G"    "T"    "G"    "C"    "C"    "C"    "C"    "C"    "G"    "G"    "C"    "C"
[5,]  "C"    "C"    "T"    "G"    "T"    "G"    "C"    "C"    "C"    "C"    "C"    "G"    "G"    "C"    "C"
[6,]  "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"

      [,169] [,170] [,171] [,172] [,173] [,174] [,175] [,176] [,177] [,178] [,179] [,180] [,181] [,182] [,183]
[1,]  "G"    "G"    "G"    "C"    "T"    "C"    "T"    "C"    "A"    "T"    "G"    "C"    "G"    "T"    "G"
[2,]  "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"
[3,]  "G"    "G"    "G"    "C"    "T"    "C"    "T"    "C"    "A"    "T"    "G"    "C"    "G"    "T"    "G"
[4,]  "G"    "G"    "G"    "C"    "T"    "C"    "T"    "C"    "G"    "T"    "G"    "C"    "G"    "T"    "G"
[5,]  "G"    "G"    "G"    "C"    "T"    "C"    "T"    "C"    "G"    "T"    "G"    "C"    "G"    "T"    "G"
[6,]  "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"

      [,184] [,185] [,186] [,187] [,188] [,189] [,190] [,191] [,192] [,193] [,194] [,195] [,196] [,197] [,198]
[1,]  "G"    "A"    "A"    "T"    "G"    "G"    "T"    "G"    "C"    "T"    "G"    "T"    "G"    "C"    "C"
[2,]  "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"
[3,]  "G"    "A"    "A"    "T"    "G"    "G"    "T"    "G"    "C"    "T"    "G"    "T"    "G"    "C"    "C"
[4,]  "G"    "A"    "A"    "T"    "G"    "G"    "T"    "G"    "C"    "T"    "G"    "T"    "G"    "C"    "C"
[5,]  "G"    "A"    "A"    "T"    "G"    "G"    "T"    "G"    "C"    "T"    "G"    "T"    "G"    "C"    "C"
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[6,] "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"
     [,199] [,200] [,201] [,202] [,203] [,204] [,205] [,206] [,207] [,208] [,209] [,210] [,211] [,212] [,213]
[1,] "C"     "C"     "T"     "T"     "G"     "C"     "C"     "A"     "G"     "C"     "A"     "G"     "G"     "C"     "C"
[2,] "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"
[3,] "C"     "C"     "T"     "T"     "G"     "C"     "C"     "A"     "G"     "C"     "A"     "G"     "G"     "C"     "C"
[4,] "C"     "C"     "T"     "T"     "G"     "C"     "C"     "A"     "G"     "C"     "A"     "G"     "G"     "C"     "C"
[5,] "C"     "C"     "T"     "T"     "G"     "C"     "C"     "A"     "G"     "C"     "A"     "G"     "G"     "C"     "C"
[6,] "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"
     [,214] [,215] [,216] [,217] [,218] [,219] [,220] [,221] [,222] [,223] [,224] [,225] [,226] [,227] [,228]
[1,] "A"     "G"     "G"     "C"     "T"     "C"     "A"     "C"     "C"     "A"     "T"     "G"     "G"     "T"     "G"
[2,] "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "A"     "T"     "G"     "G"     "T"     "G"
[3,] "A"     "G"     "G"     "C"     "T"     "C"     "G"     "C"     "C"     "A"     "T"     "G"     "G"     "T"     "G"
[4,] "A"     "G"     "G"     "C"     "T"     "C"     "G"     "C"     "C"     "A"     "T"     "G"     "G"     "T"     "G"
[5,] "A"     "G"     "G"     "C"     "T"     "C"     "G"     "C"     "C"     "A"     "T"     "G"     "G"     "T"     "G"
[6,] "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "A"     "T"     "G"     "G"     "T"     "G"
     [,229] [,230] [,231] [,232] [,233] [,234] [,235] [,236] [,237] [,238] [,239] [,240] [,241] [,242] [,243]
[1,] "C"     "C"     "G"     "C"     "A"     "T"     "G"     "C"     "C"     "A"     "T"     "C"     "T"     "T"     "G"
[2,] "C"     "C"     "G"     "C"     "A"     "T"     "G"     "C"     "C"     "A"     "T"     "C"     "T"     "T"     "G"
[3,] "C"     "C"     "A"     "C"     "A"     "T"     "G"     "C"     "C"     "A"     "T"     "C"     "T"     "T"     "G"
[4,] "C"     "C"     "G"     "C"     "A"     "T"     "G"     "C"     "C"     "A"     "T"     "C"     "T"     "T"     "G"
[5,] "C"     "C"     "G"     "C"     "A"     "T"     "G"     "C"     "C"     "A"     "T"     "C"     "T"     "T"     "G"
[6,] "C"     "C"     "G"     "C"     "A"     "T"     "G"     "C"     "C"     "A"     "T"     "C"     "T"     "T"     "G"
     [,244] [,245] [,246] [,247] [,248] [,249] [,250] [,251] [,252] [,253] [,254] [,255] [,256] [,257] [,258]
[1,] "G"     "C"     "A"     "C"     "G"     "G"     "G"     "G"     "G"     "A"     "G"     "G"     "G"     "A"     "C"
[2,] "G"     "C"     "A"     "C"     "G"     "G"     "G"     "G"     "G"     "A"     "G"     "G"     "G"     "A"     "C"
[3,] "G"     "C"     "A"     "C"     "G"     "G"     "G"     "G"     "G"     "A"     "G"     "G"     "G"     "A"     "C"
[4,] "G"     "C"     "A"     "C"     "G"     "G"     "G"     "G"     "G"     "A"     "G"     "G"     "G"     "A"     "C"
[5,] "G"     "C"     "A"     "C"     "G"     "G"     "G"     "G"     "G"     "A"     "G"     "G"     "G"     "A"     "C"
[6,] "G"     "C"     "A"     "C"     "G"     "G"     "G"     "G"     "G"     "A"     "G"     "A"     "G"     "A"     "C"
     [,259] [,260] [,261] [,262] [,263] [,264] [,265] [,266] [,267] [,268] [,269] [,270] [,271] [,272] [,273]
[1,] "G"     "T"     "G"     "T"     "G"     "C"     "A"     "G"     "G"     "C"     "G"     "G"     "A"     "A"     "T"
[2,] "G"     "T"     "G"     "T"     "G"     "C"     "A"     "G"     "G"     "C"     "G"     "G"     "A"     "A"     "T"
[3,] "G"     "T"     "G"     "T"     "G"     "C"     "A"     "G"     "G"     "C"     "G"     "G"     "A"     "A"     "T"
[4,] "G"     "T"     "G"     "T"     "G"     "C"     "A"     "G"     "G"     "C"     "G"     "G"     "A"     "A"     "T"
[5,] "G"     "T"     "G"     "T"     "G"     "C"     "A"     "G"     "G"     "C"     "G"     "G"     "A"     "A"     "T"
[6,] "G"     "T"     "G"     "T"     "G"     "C"     "A"     "G"     "G"     "C"     "G"     "G"     "A"     "A"     "T"
     [,274] [,275] [,276] [,277] [,278] [,279] [,280] [,281] [,282] [,283] [,284] [,285] [,286] [,287] [,288]
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[2,] "G"     "G"     "A"     "C"     "T"     "A"     "C"     "T"     "C"     "A"     "T"     "C"     "C"     "T"     "G"
[3,] "G"     "G"     "A"     "C"     "T"     "A"     "C"     "T"     "C"     "A"     "T"     "C"     "C"     "T"     "G"
[4,] "G"     "G"     "A"     "C"     "T"     "A"     "C"     "T"     "C"     "A"     "T"     "C"     "C"     "T"     "G"
[5,] "G"     "G"     "A"     "C"     "T"     "A"     "C"     "T"     "C"     "A"     "T"     "C"     "C"     "T"     "G"
[6,] "G"     "G"     "A"     "C"     "T"     "A"     "C"     "T"     "C"     "A"     "T"     "C"     "C"     "T"     "G"
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[3,] "T"     "C"     "T"     "G"     "T"     "G"     "C"     "T"     "G"     "T"     "C"     "T"     "G"     "T"     "C"
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[6,] "T"     "C"     "T"     "G"     "T"     "G"     "C"     "T"     "G"     "T"     "C"     "T"     "G"     "T"     "C"
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[3,] "A"     "T"     "C"     "G"     "T"     "G"     "G"     "G"     "C"     "T"     "G"     "C"     "C"     "T"     "C"
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      [5,] "G"     "C"     "C"     "T"     "C"     "C"     "C"     "T"     "G"     "G"     "A"     "T"     "G"     "C"     "C"
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[4,]	"T"	"G"	"G"	"A"	"C"	"C"	"A"	"C"	"C"	"T"	"T"	"C"	"A"	"T"	"G"
[5,]	"T"	"G"	"G"	"A"	"C"	"C"	"A"	"C"	"C"	"T"	"T"	"C"	"A"	"T"	"G"
[6,]	"T"	"G"	"G"	"A"	"C"	"C"	"A"	"C"	"C"	"T"	"T"	"C"	"A"	"T"	"G"
[1,]	"G"	"C"	"T"	"G"	"T"	"C"	"A"	"T"	"C"	"G"	"T"	"G"	"G"	"G"	"C"
[2,]	"G"	"C"	"T"	"G"	"T"	"C"	"A"	"T"	"C"	"G"	"T"	"G"	"G"	"G"	"C"
[3,]	"G"	"C"	"T"	"G"	"T"	"C"	"A"	"T"	"C"	"G"	"T"	"G"	"G"	"G"	"C"
[4,]	"G"	"C"	"T"	"G"	"T"	"C"	"A"	"T"	"C"	"G"	"T"	"G"	"G"	"G"	"C"
[5,]	"G"	"C"	"T"	"G"	"T"	"C"	"A"	"T"	"C"	"G"	"T"	"G"	"G"	"G"	"C"
[6,]	"G"	"C"	"T"	"G"	"T"	"C"	"A"	"T"	"C"	"G"	"T"	"G"	"G"	"G"	"C"

	[,544]	[,545]	[,546]	[,547]	[,548]	[,549]	[,550]	[,551]	[,552]	[,553]	[,554]	[,555]	[,556]	[,557]	[,558]
[1,]	"A"	"T"	"C"	"T"	"T"	"C"	"A"	"T"	"G"	"G"	"T"	"C"	"T"	"C"	"C"
[2,]	"A"	"T"	"C"	"T"	"T"	"C"	"A"	"T"	"G"	"G"	"T"	"C"	"T"	"C"	"C"
[3,]	"A"	"T"	"C"	"T"	"T"	"T"	"A"	"T"	"G"	"G"	"T"	"C"	"T"	"G"	"C"
[4,]	"A"	"T"	"C"	"T"	"T"	"C"	"A"	"T"	"G"	"G"	"T"	"C"	"T"	"C"	"C"
[5,]	"A"	"T"	"C"	"T"	"T"	"C"	"A"	"T"	"G"	"G"	"T"	"C"	"T"	"C"	"C"
[6,]	"A"	"T"	"C"	"T"	"T"	"C"	"A"	"T"	"G"	"G"	"T"	"C"	"T"	"C"	"C"

	[,559]	[,560]	[,561]	[,562]	[,563]	[,564]	[,565]	[,566]	[,567]	[,568]	[,569]	[,570]	[,571]	[,572]	[,573]
[1,]	"A"	"T"	"C"	"A"	"T"	"C"	"C"	"A"	"C"	"C"	"C"	"A"	"G"	"G"	"C"
[2,]	"A"	"T"	"C"	"A"	"T"	"C"	"C"	"A"	"C"	"C"	"C"	"A"	"G"	"G"	"C"
[3,]	"A"	"T"	"C"	"A"	"T"	"C"	"C"	"A"	"C"	"C"	"C"	"A"	"G"	"G"	"C"
[4,]	"A"	"T"	"C"	"A"	"T"	"C"	"C"	"A"	"C"	"C"	"C"	"A"	"G"	"G"	"C"
[5,]	"A"	"T"	"C"	"A"	"T"	"C"	"C"	"A"	"C"	"C"	"C"	"A"	"G"	"G"	"C"
[6,]	"A"	"T"	"C"	"A"	"T"	"C"	"C"	"A"	"C"	"C"	"C"	"A"	"G"	"G"	"C"

	[,574]	[,575]	[,576]	[,577]	[,578]	[,579]	[,580]	[,581]	[,582]	[,583]	[,584]	[,585]	[,586]	[,587]	[,588]
[1,]	"A"	"G"	"C"	"G"	"C"	"G"	"G"	"C"	"C"	"C"	"A"	"G"	"A"	"A"	"G"
[2,]	"A"	"G"	"C"	"G"	"C"	"G"	"G"	"C"	"C"	"C"	"A"	"G"	"A"	"A"	"G"
[3,]	"A"	"G"	"T"	"G"	"C"	"G"	"G"	"C"	"C"	"C"	"A"	"G"	"A"	"A"	"G"
[4,]	"A"	"G"	"C"	"G"	"C"	"G"	"G"	"C"	"C"	"C"	"A"	"G"	"A"	"A"	"G"
[5,]	"A"	"G"	"C"	"G"	"C"	"G"	"G"	"C"	"C"	"C"	"A"	"G"	"A"	"A"	"G"
[6,]	"A"	"G"	"C"	"G"	"C"	"G"	"G"	"C"	"C"	"C"	"A"	"G"	"A"	"A"	"G"

	[,589]	[,590]	[,591]	[,592]	[,593]	[,594]	[,595]	[,596]	[,597]	[,598]	[,599]	[,600]	[,601]	[,602]	[,603]
[1,]	"G"	"A"	"G"	"A"	"C"	"C"	"A"	"C"	"G"	"G"	"A"	"G"	"C"	"A"	"G"
[2,]	"G"	"A"	"G"	"A"	"C"	"C"	"A"	"C"	"G"	"G"	"A"	"G"	"C"	"A"	"G"
[3,]	"G"	"A"	"G"	"A"	"C"	"C"	"A"	"C"	"G"	"G"	"A"	"G"	"C"	"A"	"G"
[4,]	"G"	"A"	"G"	"A"	"C"	"C"	"A"	"C"	"G"	"G"	"A"	"G"	"C"	"A"	"G"
[5,]	"G"	"A"	"G"	"A"	"C"	"C"	"A"	"C"	"G"	"G"	"A"	"G"	"C"	"A"	"G"
[6,]	"G"	"A"	"G"	"A"	"C"	"C"	"A"	"C"	"G"	"G"	"A"	"G"	"C"	"A"	"G"

	[,604]	[,605]	[,606]	[,607]	[,608]	[,609]	[,610]	[,611]	[,612]	[,613]	[,614]	[,615]	[,616]	[,617]	[,618]
[1,]	"A"	"G"	"T"	"G"	"G"	"G"	"A"	"A"	"G"	"C"	"C"	"C"	"A"	"T"	"C"
[2,]	"A"	"G"	"T"	"G"	"G"	"G"	"A"	"A"	"G"	"C"	"C"	"C"	"A"	"T"	"C"
[3,]	"A"	"G"	"T"	"G"	"G"	"G"	"A"	"A"	"G"	"C"	"C"	"C"	"A"	"T"	"C"
[4,]	"A"	"G"	"T"	"G"	"G"	"G"	"A"	"A"	"G"	"C"	"C"	"C"	"A"	"T"	"C"
[5,]	"A"	"G"	"T"	"G"	"G"	"G"	"A"	"A"	"G"	"C"	"C"	"C"	"A"	"T"	"C"
[6,]	"A"	"G"	"T"	"G"	"G"	"G"	"A"	"A"	"G"	"C"	"C"	"C"	"A"	"T"	"C"

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[1,]	"A"	"T"	"G"	"A"	"G"	"C"	"T"	"C"	"A"	"G"	"C"	"C"	"G"	"A"	"T"
[2,]	"A"	"T"	"G"	"A"	"G"	"C"	"T"	"C"	"A"	"G"	"C"	"T"	"G"	"A"	"T"
[3,]	"A"	"T"	"G"	"A"	"G"	"C"	"T"	"C"	"A"	"G"	"C"	"C"	"G"	"A"	"T"
[4,]	"A"	"T"	"G"	"A"	"G"	"C"	"T"	"C"	"A"	"G"	"C"	"C"	"G"	"A"	"T"
[5,]	"A"	"T"	"G"	"A"	"G"	"C"	"T"	"C"	"A"	"G"	"C"	"C"	"G"	"A"	"T"
[6,]	"A"	"T"	"G"	"A"	"G"	"C"	"T"	"C"	"A"	"G"	"C"	"C"	"G"	"A"	"T"

	[,634]	[,635]	[,636]	[,637]	[,638]	[,639]	[,640]	[,641]	[,642]	[,643]	[,644]	[,645]	[,646]	[,647]	[,648]
[1,]	"G"	"C"	"C"	"C"	"T"	"G"	"T"	"T"	"G"	"G"	"A"	"C"	"C"	"T"	"C"
[2,]	"G"	"C"	"C"	"C"	"T"	"G"	"T"	"T"	"G"	"G"	"A"	"C"	"C"	"T"	"C"
[3,]	"G"	"C"	"C"	"C"	"T"	"G"	"T"	"T"	"G"	"G"	"A"	"C"	"C"	"T"	"C"
[4,]	"G"	"C"	"C"	"C"	"T"	"G"	"T"	"T"	"G"	"G"	"A"	"C"	"C"	"T"	"C"
[5,]	"G"	"C"	"C"	"C"	"T"	"G"	"T"	"T"	"G"	"G"	"A"	"C"	"C"	"T"	"C"
[6,]	"G"	"C"	"C"	"C"	"T"	"G"	"T"	"T"	"G"	"G"	"A"	"C"	"C"	"T"	"C"

	[,649]	[,650]	[,651]	[,652]	[,653]	[,654]	[,655]	[,656]	[,657]	[,658]	[,659]	[,660]	[,661]	[,662]	[,663]
[1,]	"A"	"T"	"C"	"C"	"G"	"G"	"A"	"A"	"C"	"A"	"T"	"G"	"T"	"T"	"C"
[2,]	"A"	"T"	"C"	"C"	"G"	"G"	"A"	"A"	"C"	"A"	"T"	"G"	"T"	"T"	"C"
[3,]	"A"	"T"	"C"	"C"	"G"	"G"	"A"	"A"	"C"	"A"	"T"	"G"	"T"	"T"	"C"
[4,]	"A"	"T"	"C"	"C"	"G"	"G"	"A"	"A"	"C"	"A"	"T"	"G"	"T"	"T"	"C"
[5,]	"A"	"T"	"C"	"C"	"G"	"G"	"A"	"A"	"C"	"A"	"T"	"G"	"T"	"T"	"C"
[6,]	"A"	"T"	"C"	"C"	"G"	"G"	"A"	"A"	"C"	"A"	"T"	"G"	"T"	"T"	"C"

	[,664]	[,665]	[,666]	[,667]	[,668]	[,669]	[,670]	[,671]	[,672]	[,673]	[,674]	[,675]	[,676]	[,677]	[,678]
[1,]	"C"	"C"	"A"	"G"	"C"	"C"	"A"	"A"	"C"	"C"	"T"	"A"	"G"	"T"	"A"
[2,]	"C"	"C"	"A"	"G"	"C"	"C"	"A"	"A"	"C"	"C"	"T"	"A"	"G"	"T"	"A"
[3,]	"C"	"C"	"A"	"G"	"C"	"C"	"A"	"A"	"C"	"C"	"T"	"A"	"G"	"T"	"A"
[4,]	"C"	"C"	"A"	"G"	"C"	"C"	"A"	"A"	"C"	"C"	"T"	"A"	"G"	"T"	"A"
[5,]	"C"	"C"	"A"	"G"	"C"	"C"	"A"	"A"	"C"	"C"	"T"	"A"	"G"	"T"	"A"
[6,]	"C"	"C"	"A"	"G"	"C"	"C"	"A"	"A"	"C"	"C"	"T"	"A"	"G"	"T"	"A"

	[,679]	[,680]	[,681]	[,682]	[,683]	[,684]	[,685]	[,686]	[,687]	[,688]	[,689]	[,690]	[,691]	[,692]	[,693]
[1,]	"G"	"A"	"A"	"G"	"C"	"C"	"A"	"C"	"A"	"T"	"T"	"C"	"A"	"A"	"A"
[2,]	"G"	"A"	"A"	"G"	"C"	"C"	"A"	"C"	"A"	"T"	"T"	"C"	"A"	"A"	"A"

```
     [3,] "G"    "A"    "A"    "G"    "C"    "C"    "A"    "C"    "A"    "T"    "T"    "C"    "A"    "A"    "A"
     [4,] "G"    "A"    "A"    "G"    "C"    "C"    "A"    "C"    "A"    "T"    "T"    "C"    "A"    "A"    "A"
     [5,] "G"    "A"    "A"    "G"    "C"    "C"    "A"    "C"    "A"    "T"    "T"    "C"    "A"    "A"    "A"
     [6,] "G"    "A"    "A"    "G"    "C"    "C"    "A"    "C"    "A"    "T"    "T"    "C"    "A"    "A"    "A"
          [,694] [,695] [,696] [,697] [,698] [,699] [,700] [,701] [,702] [,703] [,704] [,705] [,706] [,707] [,708]
     [1,] "C"    "A"    "G"    "T"    "A"    "C"    "C"    "G"    "C"    "A"    "C"    "C"    "A"    "A"    "G"
     [2,] "C"    "A"    "G"    "T"    "A"    "C"    "C"    "G"    "C"    "A"    "C"    "C"    "A"    "A"    "G"
     [3,] "C"    "A"    "G"    "T"    "A"    "C"    "C"    "G"    "C"    "A"    "C"    "C"    "A"    "A"    "G"
     [4,] "C"    "A"    "G"    "T"    "A"    "C"    "C"    "G"    "C"    "A"    "C"    "C"    "A"    "A"    "G"
     [5,] "C"    "A"    "G"    "T"    "A"    "C"    "C"    "G"    "C"    "A"    "C"    "C"    "A"    "A"    "G"
     [6,] "C"    "A"    "G"    "T"    "A"    "C"    "C"    "G"    "C"    "A"    "C"    "C"    "A"    "A"    "G"
          [,709] [,710] [,711] [,712] [,713] [,714] [,715] [,716] [,717] [,718] [,719] [,720] [,721] [,722] [,723]
     [1,] "A"    "C"    "C"    "A"    "C"    "C"    "C"    "C"    "A"    "G"    "T"    "T"    "G"    "T"    "C"
     [2,] "A"    "C"    "C"    "A"    "C"    "C"    "C"    "C"    "A"    "G"    "T"    "T"    "G"    "T"    "C"
     [3,] "A"    "C"    "C"    "A"    "C"    "C"    "C"    "C"    "A"    "G"    "T"    "T"    "G"    "T"    "C"
     [4,] "A"    "C"    "C"    "A"    "C"    "C"    "C"    "C"    "A"    "G"    "T"    "T"    "G"    "T"    "C"
     [5,] "A"    "C"    "C"    "A"    "C"    "C"    "C"    "C"    "A"    "G"    "T"    "T"    "G"    "T"    "C"
     [6,] "A"    "C"    "C"    "A"    "C"    "C"    "C"    "C"    "A"    "G"    "T"    "T"    "G"    "T"    "C"
          [,724] [,725] [,726] [,727] [,728] [,729] [,730] [,731] [,732] [,733] [,734] [,735] [,736] [,737] [,738]
     [1,] "A"    "A"    "G"    "T"    "C"    "C"    "C"    "C"    "C"    "A"    "A"    "G"    "G"    "T"    "G"
     [2,] "A"    "A"    "G"    "T"    "C"    "C"    "C"    "C"    "C"    "A"    "A"    "G"    "G"    "T"    "G"
     [3,] "A"    "A"    "G"    "T"    "C"    "C"    "C"    "C"    "C"    "A"    "A"    "G"    "G"    "T"    "G"
     [4,] "A"    "A"    "G"    "T"    "C"    "C"    "C"    "C"    "C"    "A"    "A"    "G"    "G"    "T"    "G"
     [5,] "A"    "A"    "G"    "T"    "C"    "C"    "C"    "C"    "C"    "A"    "A"    "G"    "G"    "T"    "G"
     [6,] "A"    "A"    "G"    "T"    "C"    "C"    "C"    "C"    "C"    "A"    "A"    "G"    "G"    "T"    "G"
          [,739] [,740] [,741] [,742] [,743] [,744] [,745] [,746] [,747] [,748] [,749] [,750] [,751] [,752] [,753]
     [1,] "G"    "C"    "A"    "C"    "C"    "A"    "G"    "A"    "G"    "G"    "A"    "G"    "G"    "C"    "C"
     [2,] "G"    "C"    "A"    "C"    "C"    "A"    "G"    "A"    "G"    "G"    "A"    "G"    "G"    "C"    "C"
     [3,] "G"    "C"    "A"    "C"    "C"    "A"    "G"    "A"    "G"    "G"    "A"    "G"    "G"    "C"    "C"
     [4,] "G"    "C"    "A"    "C"    "C"    "A"    "G"    "A"    "G"    "G"    "A"    "G"    "G"    "C"    "C"
     [5,] "G"    "C"    "A"    "C"    "C"    "A"    "G"    "A"    "G"    "G"    "A"    "G"    "G"    "C"    "C"
     [6,] "G"    "C"    "A"    "C"    "C"    "A"    "G"    "A"    "G"    "G"    "A"    "G"    "G"    "C"    "C"
          [,754] [,755] [,756] [,757] [,758] [,759] [,760] [,761] [,762] [,763] [,764] [,765] [,766] [,767] [,768]
     [1,] "C"    "C"    "T"    "C"    "C"    "T"    "C"    "G"    "G"    "C"    "G"    "G"    "A"    "T"    "C"
     [2,] "C"    "C"    "T"    "C"    "C"    "T"    "C"    "G"    "G"    "C"    "G"    "G"    "A"    "T"    "C"
     [3,] "C"    "C"    "T"    "C"    "C"    "T"    "C"    "G"    "G"    "C"    "G"    "T"    "A"    "T"    "C"
     [4,] "C"    "C"    "T"    "C"    "C"    "T"    "C"    "G"    "G"    "C"    "G"    "G"    "A"    "T"    "C"
     [5,] "C"    "C"    "T"    "C"    "C"    "T"    "C"    "G"    "G"    "C"    "G"    "G"    "A"    "T"    "C"
     [6,] "C"    "C"    "T"    "C"    "C"    "T"    "C"    "G"    "G"    "C"    "G"    "G"    "A"    "T"    "C"
          [,769] [,770] [,771] [,772] [,773] [,774] [,775] [,776] [,777] [,778] [,779] [,780] [,781] [,782] [,783]
     [1,] "C"    "T"    "C"    "A"    "T"    "C"    "T"    "A"    "C"    "G"    "G"    "G"    "G"    "T"    "C"
     [2,] "C"    "T"    "C"    "A"    "T"    "C"    "T"    "A"    "C"    "G"    "G"    "G"    "G"    "T"    "C"
     [3,] "C"    "T"    "C"    "A"    "T"    "C"    "T"    "A"    "C"    "G"    "G"    "G"    "G"    "T"    "C"
     [4,] "C"    "T"    "C"    "A"    "T"    "C"    "T"    "A"    "C"    "G"    "G"    "G"    "G"    "T"    "C"
     [5,] "C"    "T"    "C"    "A"    "T"    "C"    "T"    "A"    "C"    "G"    "G"    "G"    "G"    "T"    "C"
     [6,] "C"    "T"    "C"    "A"    "T"    "C"    "T"    "A"    "C"    "G"    "G"    "G"    "G"    "T"    "C"
          [,784] [,785] [,786] [,787] [,788] [,789] [,790] [,791] [,792] [,793] [,794] [,795] [,796] [,797] [,798]
     [1,] "C"    "A"    "G"    "G"    "A"    "G"    "G"    "A"    "G"    "A"    "A"    "T"    "G"    "G"    "C"
     [2,] "C"    "A"    "G"    "G"    "A"    "G"    "G"    "A"    "G"    "A"    "A"    "T"    "G"    "G"    "C"
     [3,] "C"    "A"    "G"    "G"    "A"    "G"    "G"    "A"    "G"    "A"    "A"    "T"    "G"    "G"    "C"
     [4,] "C"    "A"    "G"    "G"    "A"    "G"    "G"    "A"    "G"    "A"    "A"    "T"    "G"    "G"    "C"
     [5,] "C"    "A"    "G"    "G"    "A"    "G"    "G"    "A"    "G"    "A"    "A"    "T"    "G"    "G"    "C"
     [6,] "C"    "A"    "G"    "G"    "A"    "G"    "G"    "A"    "G"    "A"    "A"    "T"    "G"    "G"    "C"
          [,799] [,800] [,801] [,802] [,803] [,804] [,805] [,806] [,807] [,808] [,809] [,810] [,811] [,812] [,813]
     [1,] "T"    "C"    "C"    "C"    "A"    "T"    "G"    "T"    "G"    "C"    "A"    "G"    "A"    "A"    "C"
     [2,] "T"    "C"    "C"    "C"    "A"    "T"    "G"    "T"    "G"    "C"    "A"    "G"    "A"    "A"    "C"
     [3,] "T"    "C"    "C"    "C"    "G"    "T"    "G"    "T"    "G"    "C"    "A"    "G"    "A"    "A"    "C"
     [4,] "T"    "C"    "C"    "C"    "A"    "T"    "G"    "T"    "G"    "C"    "A"    "G"    "A"    "A"    "C"
     [5,] "T"    "C"    "C"    "C"    "A"    "T"    "G"    "T"    "G"    "C"    "A"    "G"    "A"    "A"    "C"
     [6,] "T"    "C"    "C"    "C"    "A"    "T"    "G"    "T"    "G"    "C"    "A"    "G"    "A"    "A"    "C"
          [,814] [,815] [,816] [,817] [,818] [,819] [,820] [,821] [,822] [,823] [,824] [,825] [,826] [,827] [,828]
     [1,] "T"    "T"    "C"    "G"    "C"    "C"    "C"    "T"    "G"    "G"    "A"    "C"    "C"    "T"    "G"
     [2,] "T"    "T"    "C"    "G"    "C"    "C"    "C"    "T"    "G"    "G"    "A"    "C"    "A"    "T"    "G"
     [3,] "T"    "T"    "C"    "G"    "C"    "C"    "C"    "T"    "G"    "G"    "A"    "C"    "C"    "T"    "G"
     [4,] "T"    "T"    "C"    "G"    "C"    "C"    "C"    "T"    "G"    "G"    "A"    "C"    "C"    "T"    "G"
     [5,] "T"    "T"    "C"    "G"    "C"    "C"    "C"    "T"    "G"    "G"    "A"    "C"    "C"    "T"    "G"
     [6,] "T"    "T"    "C"    "G"    "C"    "C"    "C"    "T"    "G"    "G"    "A"    "C"    "C"    "T"    "G"
          [,829] [,830] [,831] [,832] [,833] [,834] [,835] [,836] [,837] [,838] [,839] [,840] [,841] [,842] [,843]
     [1,] "A"    "C"    "C"    "C"    "C"    "G"    "C"    "C"    "G"    "C"    "C"    "C"    "G"    "A"    "G"
     [2,] "A"    "C"    "C"    "C"    "C"    "G"    "C"    "C"    "G"    "C"    "C"    "C"    "G"    "A"    "G"
     [3,] "A"    "C"    "C"    "C"    "C"    "G"    "C"    "C"    "G"    "C"    "C"    "C"    "G"    "A"    "G"
     [4,] "A"    "C"    "C"    "C"    "C"    "G"    "C"    "C"    "G"    "C"    "C"    "C"    "G"    "A"    "G"
     [5,] "A"    "C"    "C"    "C"    "C"    "G"    "C"    "C"    "G"    "C"    "C"    "C"    "G"    "A"    "G"
     [6,] "A"    "C"    "C"    "C"    "C"    "G"    "C"    "C"    "G"    "C"    "C"    "C"    "G"    "A"    "G"
          [,844] [,845] [,846] [,847] [,848] [,849] [,850] [,851] [,852] [,853] [,854] [,855] [,856] [,857] [,858]
     [1,] "G"    "T"    "C"    "G"    "T"    "T"    "T"    "A"    "C"    "A"    "A"    "G"    "T"    "C"    "A"
```

[2,]	"G"	"T"	"C"	"G"	"T"	"T"	"T"	"A"	"C"	"A"	"A"	"G"	"T"	"C"	"A"
[3,]	"G"	"T"	"C"	"G"	"T"	"T"	"T"	"A"	"C"	"A"	"A"	"G"	"T"	"C"	"A"
[4,]	"G"	"T"	"C"	"G"	"T"	"T"	"T"	"A"	"C"	"A"	"A"	"G"	"T"	"C"	"A"
[5,]	"G"	"T"	"C"	"G"	"T"	"T"	"T"	"A"	"C"	"A"	"A"	"G"	"T"	"C"	"A"
[6,]	"G"	"T"	"C"	"G"	"T"	"T"	"T"	"A"	"C"	"A"	"A"	"G"	"T"	"C"	"A"

	[,859]	[,860]	[,861]	[,862]	[,863]	[,864]	[,865]	[,866]	[,867]	[,868]	[,869]	[,870]	[,871]	[,872]	[,873]
[1,]	"G"	"A"	"G"	"C"	"C"	"C"	"G"	"G"	"C"	"A"	"C"	"C"	"A"	"G"	"C"
[2,]	"G"	"A"	"G"	"C"	"C"	"G"	"G"	"G"	"C"	"A"	"C"	"C"	"A"	"G"	"C"
[3,]	"G"	"A"	"G"	"C"	"C"	"A"	"G"	"G"	"C"	"A"	"C"	"C"	"A"	"G"	"C"
[4,]	"G"	"A"	"G"	"C"	"C"	"G"	"G"	"G"	"C"	"A"	"C"	"C"	"A"	"G"	"C"
[5,]	"G"	"A"	"G"	"C"	"C"	"G"	"G"	"G"	"C"	"A"	"C"	"C"	"A"	"G"	"C"
[6,]	"G"	"A"	"G"	"C"	"C"	"G"	"G"	"G"	"C"	"A"	"C"	"C"	"A"	"G"	"C"

	[,874]	[,875]	[,876]	[,877]	[,878]	[,879]	[,880]	[,881]	[,882]	[,883]	[,884]	[,885]	[,886]	[,887]	[,888]
[1,]	"G"	"A"	"T"	"G"	"G"	"C"	"A"	"T"	"G"	"A"	"A"	"T"	"G"	"T"	"G"
[2,]	"G"	"A"	"T"	"G"	"G"	"C"	"A"	"T"	"G"	"A"	"A"	"T"	"G"	"T"	"G"
[3,]	"G"	"A"	"T"	"G"	"G"	"C"	"A"	"T"	"G"	"A"	"A"	"C"	"G"	"T"	"G"
[4,]	"G"	"A"	"T"	"G"	"G"	"C"	"A"	"T"	"G"	"A"	"A"	"T"	"G"	"T"	"G"
[5,]	"G"	"A"	"T"	"G"	"G"	"C"	"A"	"T"	"G"	"A"	"A"	"T"	"G"	"T"	"G"
[6,]	"G"	"A"	"T"	"G"	"G"	"C"	"A"	"T"	"G"	"A"	"A"	"C"	"G"	"T"	"G"

	[,889]	[,890]	[,891]	[,892]	[,893]	[,894]	[,895]	[,896]	[,897]	[,898]	[,899]	[,900]	[,901]	[,902]	[,903]
[1,]	"C"	"T"	"G"	"G"	"G"	"C"	"A"	"T"	"C"	"G"	"T"	"C"	"T"	"T"	"C"
[2,]	"C"	"T"	"G"	"G"	"G"	"C"	"A"	"T"	"C"	"G"	"T"	"C"	"T"	"T"	"C"
[3,]	"C"	"T"	"G"	"G"	"G"	"C"	"A"	"T"	"C"	"G"	"T"	"C"	"T"	"T"	"C"
[4,]	"C"	"T"	"G"	"G"	"G"	"C"	"A"	"T"	"C"	"G"	"T"	"C"	"T"	"T"	"C"
[5,]	"C"	"T"	"G"	"G"	"G"	"C"	"A"	"T"	"C"	"G"	"T"	"C"	"T"	"T"	"C"
[6,]	"C"	"T"	"G"	"G"	"G"	"C"	"A"	"T"	"C"	"G"	"T"	"C"	"T"	"T"	"C"

	[,904]	[,905]	[,906]	[,907]	[,908]	[,909]	[,910]	[,911]	[,912]	[,913]	[,914]	[,915]	[,916]	[,917]	[,918]
[1,]	"T"	"T"	"C"	"T"	"C"	"T"	"G"	"C"	"C"	"A"	"C"	"C"	"A"	"T"	"G"
[2,]	"T"	"T"	"C"	"T"	"C"	"T"	"G"	"C"	"C"	"A"	"C"	"C"	"A"	"T"	"G"
[3,]	"T"	"T"	"C"	"T"	"C"	"T"	"G"	"C"	"C"	"A"	"C"	"C"	"A"	"T"	"G"
[4,]	"T"	"T"	"C"	"T"	"C"	"T"	"G"	"C"	"C"	"A"	"C"	"C"	"A"	"T"	"G"
[5,]	"T"	"T"	"C"	"T"	"C"	"T"	"G"	"C"	"C"	"A"	"C"	"C"	"A"	"T"	"G"
[6,]	"T"	"T"	"C"	"T"	"C"	"T"	"G"	"C"	"C"	"A"	"C"	"C"	"A"	"T"	"G"

	[,919]	[,920]	[,921]	[,922]	[,923]	[,924]	[,925]	[,926]	[,927]	[,928]	[,929]	[,930]	[,931]	[,932]	[,933]
[1,]	"G"	"G"	"C"	"A"	"T"	"C"	"A"	"T"	"G"	"C"	"T"	"G"	"G"	"G"	"C"
[2,]	"G"	"G"	"C"	"A"	"T"	"C"	"A"	"T"	"G"	"C"	"T"	"G"	"G"	"G"	"C"
[3,]	"G"	"G"	"C"	"A"	"T"	"C"	"A"	"T"	"G"	"C"	"T"	"G"	"G"	"G"	"C"
[4,]	"G"	"G"	"C"	"A"	"T"	"C"	"A"	"T"	"G"	"C"	"T"	"G"	"G"	"G"	"C"
[5,]	"G"	"G"	"C"	"A"	"T"	"C"	"A"	"T"	"G"	"C"	"T"	"G"	"G"	"G"	"C"
[6,]	"G"	"G"	"C"	"A"	"T"	"C"	"A"	"T"	"G"	"C"	"T"	"G"	"G"	"G"	"C"

	[,934]	[,935]	[,936]	[,937]	[,938]	[,939]	[,940]	[,941]	[,942]	[,943]	[,944]	[,945]	[,946]	[,947]	[,948]
[1,]	"C"	"G"	"C"	"A"	"T"	"G"	"G"	"G"	"T"	"G"	"A"	"C"	"A"	"G"	"C"
[2,]	"C"	"G"	"C"	"A"	"T"	"G"	"G"	"G"	"T"	"G"	"A"	"C"	"A"	"G"	"C"
[3,]	"C"	"G"	"C"	"A"	"T"	"G"	"G"	"G"	"T"	"G"	"A"	"C"	"A"	"G"	"C"
[4,]	"C"	"G"	"C"	"A"	"T"	"G"	"G"	"G"	"T"	"G"	"A"	"C"	"A"	"G"	"C"
[5,]	"C"	"G"	"C"	"A"	"T"	"G"	"G"	"G"	"T"	"G"	"A"	"C"	"A"	"G"	"C"
[6,]	"C"	"G"	"C"	"A"	"T"	"G"	"G"	"G"	"T"	"G"	"A"	"C"	"A"	"G"	"C"

	[,949]	[,950]	[,951]	[,952]	[,953]	[,954]	[,955]	[,956]	[,957]	[,958]	[,959]	[,960]	[,961]	[,962]	[,963]
[1,]	"G"	"G"	"G"	"G"	"C"	"C"	"C"	"C"	"C"	"C"	"T"	"G"	"G"	"T"	"C"
[2,]	"G"	"G"	"G"	"G"	"C"	"C"	"C"	"C"	"C"	"C"	"T"	"G"	"G"	"T"	"C"
[3,]	"G"	"G"	"G"	"G"	"C"	"C"	"C"	"C"	"C"	"C"	"T"	"G"	"G"	"T"	"C"
[4,]	"G"	"G"	"G"	"G"	"C"	"C"	"C"	"C"	"C"	"C"	"T"	"G"	"G"	"T"	"C"
[5,]	"G"	"G"	"G"	"G"	"C"	"C"	"C"	"C"	"C"	"C"	"T"	"G"	"G"	"T"	"C"
[6,]	"G"	"G"	"G"	"G"	"C"	"C"	"C"	"C"	"C"	"C"	"T"	"G"	"G"	"T"	"C"

	[,964]	[,965]	[,966]	[,967]	[,968]	[,969]	[,970]	[,971]	[,972]	[,973]	[,974]	[,975]	[,976]	[,977]	[,978]
[1,]	"A"	"G"	"C"	"T"	"T"	"C"	"T"	"G"	"C"	"C"	"A"	"G"	"T"	"G"	"C"
[2,]	"A"	"G"	"C"	"T"	"T"	"C"	"T"	"G"	"C"	"C"	"A"	"G"	"T"	"G"	"C"
[3,]	"A"	"G"	"C"	"T"	"T"	"C"	"T"	"G"	"C"	"C"	"A"	"G"	"T"	"G"	"C"
[4,]	"A"	"G"	"C"	"T"	"T"	"C"	"T"	"G"	"C"	"C"	"A"	"G"	"T"	"G"	"C"
[5,]	"A"	"G"	"C"	"T"	"T"	"C"	"T"	"G"	"C"	"C"	"A"	"G"	"T"	"G"	"C"
[6,]	"A"	"G"	"C"	"T"	"T"	"C"	"T"	"G"	"C"	"C"	"A"	"G"	"T"	"G"	"C"

	[,979]	[,980]	[,981]	[,982]	[,983]	[,984]	[,985]	[,986]	[,987]	[,988]	[,989]	[,990]	[,991]	[,992]	[,993]
[1,]	"C"	"T"	"C"	"A"	"A"	"T"	"G"	"A"	"G"	"T"	"C"	"G"	"G"	"T"	"C"
[2,]	"C"	"T"	"C"	"A"	"A"	"T"	"G"	"A"	"G"	"T"	"C"	"G"	"G"	"T"	"C"
[3,]	"C"	"T"	"C"	"A"	"A"	"T"	"G"	"A"	"G"	"T"	"C"	"G"	"G"	"T"	"C"
[4,]	"C"	"T"	"C"	"A"	"A"	"T"	"G"	"A"	"G"	"T"	"C"	"G"	"G"	"T"	"C"
[5,]	"C"	"T"	"C"	"A"	"A"	"T"	"G"	"A"	"G"	"T"	"C"	"G"	"G"	"T"	"C"
[6,]	"C"	"T"	"C"	"A"	"A"	"T"	"G"	"A"	"G"	"T"	"C"	"A"	"G"	"T"	"C"

	[,994]	[,995]	[,996]	[,997]	[,998]	[,999]	[,1000]	[,1001]	[,1002]	[,1003]	[,1004]	[,1005]	[,1006]	[,1007]
[1,]	"A"	"T"	"G"	"A"	"A"	"G"	"A"	"T"	"C"	"G"	"T"	"G"	"G"	"C"
[2,]	"A"	"T"	"G"	"A"	"A"	"G"	"A"	"T"	"C"	"G"	"T"	"G"	"G"	"C"
[3,]	"A"	"T"	"G"	"A"	"A"	"A"	"A"	"T"	"C"	"G"	"T"	"G"	"G"	"C"
[4,]	"A"	"T"	"G"	"A"	"A"	"G"	"A"	"T"	"C"	"G"	"T"	"G"	"G"	"C"
[5,]	"A"	"T"	"G"	"A"	"A"	"G"	"A"	"T"	"C"	"G"	"T"	"G"	"G"	"C"
[6,]	"A"	"T"	"G"	"A"	"A"	"G"	"A"	"T"	"C"	"G"	"T"	"G"	"G"	"C"

	[,1008]	[,1009]	[,1010]	[,1011]	[,1012]	[,1013]	[,1014]	[,1015]	[,1016]	[,1017]	[,1018]	[,1019]	[,1020]

```
      [1,] "G"     "G"     "T"     "G"     "G"     "C"     "T"     "G"     "T"     "G"     "T"     "G"     "G"
      [2,] "A"     "G"     "T"     "G"     "G"     "C"     "T"     "G"     "T"     "G"     "T"     "G"     "G"
      [3,] "G"     "G"     "T"     "G"     "G"     "C"     "T"     "G"     "T"     "G"     "T"     "G"     "G"
      [4,] "G"     "G"     "T"     "G"     "G"     "C"     "T"     "G"     "T"     "G"     "T"     "G"     "G"
      [5,] "G"     "G"     "T"     "G"     "G"     "C"     "T"     "G"     "T"     "G"     "T"     "G"     "G"
      [6,] "A"     "G"     "T"     "G"     "G"     "C"     "T"     "G"     "T"     "G"     "T"     "G"     "G"
           [,1021] [,1022] [,1023] [,1024] [,1025] [,1026] [,1027] [,1028] [,1029] [,1030] [,1031] [,1032] [,1033]
      [1,] "T"     "A"     "T"     "T"     "T"     "C"     "C"     "C"     "C"     "T"     "T"     "C"     "G"
      [2,] "T"     "A"     "T"     "T"     "T"     "C"     "C"     "C"     "C"     "T"     "T"     "C"     "G"
      [3,] "T"     "A"     "T"     "T"     "T"     "C"     "C"     "C"     "C"     "T"     "T"     "C"     "G"
      [4,] "T"     "A"     "T"     "T"     "T"     "C"     "C"     "C"     "C"     "T"     "T"     "C"     "G"
      [5,] "T"     "A"     "T"     "T"     "T"     "C"     "C"     "C"     "C"     "T"     "T"     "C"     "G"
      [6,] "T"     "A"     "T"     "T"     "T"     "C"     "C"     "C"     "C"     "T"     "T"     "C"     "G"
           [,1034] [,1035] [,1036] [,1037] [,1038] [,1039] [,1040] [,1041] [,1042] [,1043] [,1044] [,1045] [,1046]
      [1,] "G"     "C"     "A"     "T"     "T"     "G"     "T"     "G"     "T"     "T"     "C"     "C"     "T"
      [2,] "G"     "C"     "A"     "T"     "T"     "G"     "T"     "G"     "T"     "T"     "C"     "C"     "T"
      [3,] "G"     "C"     "A"     "T"     "T"     "G"     "T"     "G"     "T"     "T"     "C"     "C"     "T"
      [4,] "G"     "C"     "A"     "T"     "T"     "G"     "T"     "G"     "T"     "T"     "C"     "C"     "T"
      [5,] "G"     "C"     "A"     "T"     "T"     "G"     "T"     "G"     "T"     "T"     "C"     "C"     "T"
      [6,] "G"     "C"     "A"     "T"     "T"     "G"     "T"     "G"     "T"     "T"     "C"     "C"     "T"
           [,1047] [,1048] [,1049] [,1050] [,1051] [,1052] [,1053] [,1054] [,1055] [,1056] [,1057] [,1058] [,1059]
      [1,] "C"     "A"     "T"     "T"     "G"     "C"     "G"     "G"     "G"     "T"     "A"     "A"     "G"
      [2,] "C"     "A"     "T"     "C"     "G"     "C"     "G"     "G"     "G"     "T"     "A"     "A"     "G"
      [3,] "C"     "A"     "T"     "C"     "G"     "C"     "C"     "G"     "G"     "C"     "A"     "A"     "G"
      [4,] "C"     "A"     "T"     "C"     "G"     "C"     "G"     "G"     "G"     "T"     "A"     "A"     "G"
      [5,] "C"     "A"     "T"     "C"     "G"     "C"     "G"     "G"     "G"     "T"     "A"     "A"     "G"
      [6,] "C"     "A"     "T"     "C"     "G"     "C"     "G"     "G"     "G"     "C"     "A"     "A"     "G"
           [,1060] [,1061] [,1062] [,1063] [,1064] [,1065] [,1066] [,1067] [,1068] [,1069] [,1070] [,1071] [,1072]
      [1,] "A"     "T"     "C"     "C"     "T"     "G"     "G"     "A"     "G"     "A"     "T"     "G"     "G"
      [2,] "A"     "T"     "C"     "C"     "T"     "G"     "G"     "A"     "G"     "A"     "T"     "G"     "G"
      [3,] "A"     "T"     "C"     "C"     "T"     "G"     "G"     "A"     "G"     "A"     "T"     "G"     "G"
      [4,] "A"     "T"     "C"     "C"     "T"     "G"     "G"     "A"     "G"     "A"     "T"     "G"     "G"
      [5,] "A"     "T"     "C"     "C"     "T"     "G"     "G"     "A"     "G"     "A"     "T"     "G"     "G"
      [6,] "A"     "T"     "C"     "C"     "T"     "G"     "G"     "A"     "G"     "A"     "T"     "G"     "G"
           [,1073] [,1074] [,1075] [,1076] [,1077] [,1078] [,1079] [,1080] [,1081] [,1082] [,1083] [,1084] [,1085]
      [1,] "A"     "C"     "G"     "A"     "C"     "C"     "C"     "C"     "A"     "G"     "G"     "G"     "C"
      [2,] "A"     "T"     "G"     "A"     "C"     "C"     "C"     "C"     "A"     "G"     "G"     "G"     "C"
      [3,] "A"     "C"     "G"     "A"     "C"     "C"     "C"     "C"     "A"     "G"     "G"     "G"     "C"
      [4,] "A"     "C"     "G"     "A"     "C"     "C"     "C"     "C"     "A"     "G"     "G"     "G"     "C"
      [5,] "A"     "C"     "G"     "A"     "C"     "C"     "C"     "C"     "A"     "G"     "G"     "G"     "C"
      [6,] "A"     "C"     "G"     "A"     "C"     "C"     "C"     "G"     "A"     "G"     "G"     "G"     "C"
           [,1086] [,1087] [,1088] [,1089] [,1090] [,1091] [,1092] [,1093] [,1094] [,1095] [,1096] [,1097] [,1098]
      [1,] "C"     "G"     "T"     "C"     "G"     "G"     "C"     "A"     "A"     "G"     "A"     "A"     "G"
      [2,] "C"     "G"     "T"     "C"     "G"     "G"     "C"     "A"     "A"     "G"     "A"     "A"     "G"
      [3,] "C"     "G"     "T"     "C"     "G"     "G"     "C"     "A"     "A"     "G"     "A"     "A"     "G"
      [4,] "C"     "G"     "T"     "C"     "G"     "G"     "C"     "A"     "A"     "G"     "A"     "A"     "G"
      [5,] "C"     "G"     "T"     "C"     "G"     "G"     "C"     "A"     "A"     "G"     "A"     "A"     "G"
      [6,] "C"     "G"     "T"     "C"     "G"     "G"     "C"     "A"     "A"     "G"     "A"     "A"     "G"
           [,1099] [,1100] [,1101] [,1102] [,1103] [,1104] [,1105] [,1106] [,1107] [,1108] [,1109] [,1110] [,1111]
      [1,] "C"     "T"     "G"     "G"     "G"     "C"     "T"     "T"     "C"     "T"     "A"     "C"     "T"
      [2,] "C"     "T"     "G"     "G"     "G"     "C"     "T"     "T"     "C"     "T"     "A"     "C"     "T"
      [3,] "C"     "T"     "G"     "G"     "G"     "C"     "T"     "T"     "C"     "T"     "A"     "C"     "T"
      [4,] "C"     "T"     "G"     "G"     "G"     "C"     "T"     "T"     "C"     "T"     "A"     "C"     "T"
      [5,] "C"     "T"     "G"     "G"     "G"     "C"     "T"     "T"     "C"     "T"     "A"     "C"     "T"
      [6,] "C"     "T"     "G"     "G"     "G"     "C"     "T"     "T"     "C"     "T"     "A"     "C"     "T"
           [,1112] [,1113] [,1114] [,1115] [,1116] [,1117] [,1118] [,1119] [,1120] [,1121] [,1122] [,1123] [,1124]
      [1,] "C"     "A"     "G"     "T"     "C"     "A"     "C"     "C"     "G"     "T"     "G"     "G"     "T"
      [2,] "C"     "G"     "G"     "T"     "C"     "A"     "C"     "C"     "G"     "T"     "G"     "G"     "T"
      [3,] "C"     "G"     "G"     "T"     "C"     "A"     "C"     "C"     "G"     "T"     "G"     "G"     "T"
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      [5,] "C"     "G"     "G"     "T"     "C"     "A"     "C"     "C"     "G"     "T"     "G"     "G"     "T"
      [6,] "C"     "G"     "G"     "T"     "C"     "A"     "C"     "C"     "G"     "T"     "G"     "G"     "T"
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      [2,] "G"     "T"     "G"     "C"     "G"     "G"     "G"     "C"     "T"     "G"     "G"     "T"     "G"
      [3,] "G"     "T"     "G"     "C"     "G"     "G"     "G"     "C"     "T"     "G"     "G"     "T"     "G"
      [4,] "G"     "T"     "G"     "C"     "G"     "G"     "G"     "C"     "T"     "G"     "G"     "T"     "G"
      [5,] "G"     "T"     "G"     "C"     "G"     "G"     "G"     "C"     "T"     "G"     "G"     "T"     "G"
      [6,] "G"     "T"     "G"     "C"     "G"     "G"     "G"     "C"     "T"     "G"     "G"     "T"     "G"
           [,1138] [,1139] [,1140] [,1141] [,1142] [,1143] [,1144] [,1145] [,1146] [,1147] [,1148] [,1149] [,1150]
      [1,] "C"     "T"     "C"     "C"     "A"     "C"     "G"     "G"     "G"     "C"     "T"     "C"     "T"
      [2,] "C"     "T"     "C"     "C"     "A"     "C"     "G"     "G"     "G"     "C"     "T"     "C"     "T"
      [3,] "C"     "T"     "C"     "C"     "A"     "T"     "G"     "G"     "G"     "C"     "T"     "C"     "T"
      [4,] "C"     "T"     "C"     "C"     "A"     "C"     "G"     "G"     "A"     "C"     "T"     "C"     "T"
      [5,] "C"     "T"     "C"     "C"     "A"     "C"     "G"     "G"     "A"     "C"     "T"     "C"     "T"
      [6,] "C"     "T"     "C"     "C"     "A"     "C"     "G"     "G"     "G"     "C"     "T"     "C"     "T"
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[1,]  "T"     "T"     "A"     "T"     "C"     "C"     "T"     "G"     "C"     "C"     "C"     "C"     "T"
[2,]  "T"     "T"     "A"     "T"     "C"     "C"     "T"     "G"     "C"     "C"     "C"     "C"     "T"
[3,]  "T"     "C"     "A"     "T"     "C"     "C"     "T"     "G"     "C"     "C"     "C"     "C"     "T"
[4,]  "T"     "T"     "A"     "T"     "C"     "C"     "T"     "G"     "C"     "C"     "C"     "C"     "T"
[5,]  "T"     "T"     "A"     "T"     "C"     "C"     "T"     "G"     "C"     "C"     "C"     "C"     "T"
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      [,1164] [,1165] [,1166] [,1167] [,1168] [,1169] [,1170] [,1171] [,1172] [,1173] [,1174] [,1175] [,1176]
[1,]  "G"     "C"     "T"     "C"     "T"     "A"     "C"     "T"     "T"     "C"     "T"     "T"     "C"
[2,]  "G"     "C"     "T"     "C"     "T"     "A"     "C"     "T"     "T"     "C"     "T"     "T"     "C"
[3,]  "G"     "C"     "T"     "C"     "T"     "A"     "C"     "T"     "T"     "C"     "T"     "T"     "C"
[4,]  "G"     "C"     "T"     "C"     "T"     "A"     "C"     "T"     "T"     "C"     "T"     "T"     "C"
[5,]  "G"     "C"     "T"     "C"     "T"     "A"     "C"     "T"     "T"     "C"     "T"     "T"     "C"
[6,]  "G"     "C"     "T"     "C"     "T"     "A"     "C"     "T"     "T"     "C"     "T"     "T"     "T"
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[2,]  "A"     "T"     "C"     "A"     "C"     "C"     "A"     "A"     "G"     "A"     "A"     "G"     "A"
[3,]  "A"     "T"     "C"     "A"     "C"     "C"     "A"     "A"     "G"     "A"     "A"     "G"     "A"
[4,]  "A"     "T"     "C"     "A"     "C"     "C"     "A"     "A"     "G"     "A"     "A"     "G"     "A"
[5,]  "A"     "T"     "C"     "A"     "C"     "C"     "A"     "A"     "G"     "A"     "A"     "G"     "A"
[6,]  "A"     "T"     "C"     "A"     "C"     "C"     "A"     "A"     "G"     "A"     "A"     "G"     "A"
      [,1190] [,1191] [,1192] [,1193] [,1194] [,1195] [,1196] [,1197] [,1198] [,1199] [,1200] [,1201] [,1202]
[1,]  "A"     "T"     "C"     "C"     "C"     "A"     "T"     "C"     "G"     "T"     "C"     "T"     "T"
[2,]  "A"     "T"     "C"     "C"     "C"     "A"     "T"     "C"     "G"     "T"     "C"     "T"     "T"
[3,]  "A"     "C"     "C"     "C"     "C"     "A"     "T"     "C"     "G"     "T"     "C"     "T"     "T"
[4,]  "A"     "T"     "C"     "C"     "C"     "A"     "T"     "C"     "G"     "T"     "C"     "T"     "T"
[5,]  "A"     "T"     "C"     "C"     "C"     "A"     "T"     "C"     "G"     "T"     "C"     "T"     "T"
[6,]  "A"     "T"     "C"     "C"     "C"     "A"     "T"     "C"     "G"     "T"     "C"     "T"     "T"
      [,1203] [,1204] [,1205] [,1206] [,1207] [,1208] [,1209] [,1210] [,1211] [,1212] [,1213] [,1214] [,1215]
[1,]  "C"     "A"     "T"     "C"     "C"     "G"     "T"     "G"     "G"     "C"     "A"     "T"     "C"
[2,]  "C"     "A"     "T"     "C"     "C"     "G"     "C"     "G"     "G"     "C"     "A"     "T"     "C"
[3,]  "C"     "A"     "T"     "C"     "C"     "G"     "C"     "G"     "G"     "C"     "A"     "T"     "C"
[4,]  "C"     "A"     "T"     "C"     "C"     "G"     "C"     "G"     "G"     "C"     "A"     "T"     "C"
[5,]  "C"     "A"     "T"     "C"     "C"     "G"     "C"     "G"     "G"     "C"     "A"     "T"     "C"
[6,]  "C"     "A"     "T"     "C"     "C"     "G"     "C"     "G"     "G"     "C"     "A"     "T"     "C"
      [,1216] [,1217] [,1218] [,1219] [,1220] [,1221] [,1222] [,1223] [,1224] [,1225] [,1226] [,1227] [,1228]
[1,]  "C"     "T"     "G"     "C"     "A"     "G"     "G"     "C"     "T"     "C"     "T"     "G"     "C"
[2,]  "C"     "T"     "G"     "C"     "A"     "G"     "G"     "C"     "T"     "C"     "T"     "G"     "C"
[3,]  "C"     "T"     "G"     "C"     "A"     "G"     "G"     "C"     "C"     "C"     "T"     "G"     "C"
[4,]  "C"     "T"     "G"     "C"     "A"     "G"     "G"     "C"     "T"     "C"     "T"     "G"     "C"
[5,]  "C"     "T"     "G"     "C"     "A"     "G"     "G"     "C"     "T"     "C"     "T"     "G"     "C"
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      [,1229] [,1230] [,1231] [,1232] [,1233] [,1234] [,1235] [,1236] [,1237] [,1238] [,1239] [,1240] [,1241]
[1,]  "T"     "C"     "A"     "T"     "C"     "G"     "C"     "G"     "C"     "T"     "G"     "G"     "C"
[2,]  "T"     "C"     "A"     "T"     "C"     "G"     "C"     "G"     "C"     "T"     "G"     "G"     "C"
[3,]  "T"     "C"     "A"     "T"     "C"     "G"     "C"     "G"     "C"     "T"     "G"     "G"     "C"
[4,]  "T"     "C"     "A"     "T"     "C"     "G"     "C"     "G"     "C"     "T"     "G"     "G"     "C"
[5,]  "T"     "C"     "A"     "T"     "C"     "G"     "C"     "G"     "T"     "T"     "G"     "G"     "C"
[6,]  "T"     "C"     "A"     "T"     "C"     "G"     "C"     "G"     "C"     "T"     "G"     "G"     "C"
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[1,]  "C"     "A"     "C"     "C"     "T"     "C"     "C"     "T"     "C"     "C"     "-"     "-"     "-"
[2,]  "C"     "A"     "C"     "C"     "T"     "C"     "C"     "T"     "C"     "C"     "A"     "G"     "G"
[3,]  "C"     "A"     "C"     "C"     "T"     "C"     "C"     "T"     "C"     "C"     "A"     "G"     "G"
[4,]  "C"     "A"     "C"     "C"     "T"     "C"     "C"     "T"     "C"     "C"     "A"     "G"     "G"
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[6,]  "C"     "A"     "C"     "C"     "T"     "C"     "C"     "T"     "C"     "C"     "A"     "G"     "G"
      [,1255] [,1256] [,1257] [,1258] [,1259] [,1260] [,1261] [,1262] [,1263] [,1264] [,1265] [,1266] [,1267]
[1,]  "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"
[2,]  "A"     "A"     "G"     "A"     "A"     "C"     "C"     "A"     "A"     "G"     "T"     "G"     "A"
[3,]  "A"     "A"     "G"     "A"     "A"     "C"     "C"     "A"     "A"     "G"     "T"     "G"     "A"
[4,]  "A"     "A"     "G"     "A"     "A"     "C"     "C"     "A"     "A"     "G"     "T"     "G"     "A"
[5,]  "A"     "A"     "G"     "A"     "A"     "C"     "C"     "A"     "A"     "G"     "T"     "G"     "A"
[6,]  "A"     "A"     "G"     "A"     "A"     "C"     "C"     "A"     "A"     "G"     "T"     "G"     "A"
      [,1268] [,1269] [,1270] [,1271] [,1272] [,1273] [,1274] [,1275] [,1276] [,1277] [,1278] [,1279] [,1280]
[1,]  "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"
[2,]  "G"     "A"     "G"     "C"     "A"     "C"     "T"     "G"     "C"     "A"     "G"     "T"     "G"
[3,]  "G"     "A"     "G"     "C"     "A"     "C"     "T"     "G"     "C"     "A"     "G"     "T"     "G"
[4,]  "G"     "A"     "G"     "C"     "A"     "C"     "T"     "G"     "C"     "A"     "G"     "T"     "G"
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      [,1281] [,1282] [,1283] [,1284] [,1285] [,1286] [,1287] [,1288] [,1289] [,1290] [,1291] [,1292] [,1293]
[1,]  "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"
[2,]  "C"     "C"     "C"     "G"     "C"     "G"     "G"     "T"     "C"     "C"     "T"     "T"     "A"
[3,]  "C"     "C"     "C"     "G"     "C"     "A"     "G"     "T"     "C"     "C"     "T"     "T"     "C"
[4,]  "C"     "C"     "C"     "G"     "C"     "G"     "G"     "T"     "C"     "C"     "T"     "T"     "A"
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[6,] "C"      "C"      "C"      "G"      "T"      "G"      "G"      "T"      "C"      "C"      "T"      "T"      "C"
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[1,] "-"      "-"      "-"      "-"      "-"      "-"      "-"      "-"      "-"      "-"      "-"      "-"      "-"
[2,] "C"      "C"      "T"      "C"      "C"      "T"      "G"      "C"      "T"      "G"      "G"      "A"      "G"
[3,] "C"      "C"      "T"      "C"      "C"      "T"      "G"      "C"      "T"      "G"      "G"      "G"      "G"
[4,] "C"      "C"      "T"      "C"      "C"      "T"      "G"      "C"      "C"      "G"      "G"      "A"      "G"
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       [2,] "G"     "G"     "C"     "T"     "G"     "T"     "G"     "G"     "C"     "C"     "G"     "C"     "C"
       [3,] "G"     "G"     "C"     "C"     "G"     "T"     "G"     "G"     "C"     "C"     "G"     "C"     "C"
       [4,] "G"     "G"     "C"     "T"     "G"     "T"     "G"     "G"     "C"     "C"     "G"     "C"     "C"
       [5,] "G"     "G"     "C"     "T"     "G"     "T"     "G"     "G"     "C"     "C"     "G"     "C"     "C"
       [6,] "G"     "G"     "C"     "C"     "G"     "T"     "G"     "G"     "C"     "C"     "G"     "C"     "C"
            [,1567] [,1568] [,1569] [,1570] [,1571] [,1572] [,1573] [,1574] [,1575] [,1576] [,1577] [,1578] [,1579]
       [1,] "A"     "T"     "C"     "T"     "T"     "C"     "A"     "T"     "C"     "G"     "C"     "C"     "C"
       [2,] "A"     "T"     "C"     "T"     "T"     "C"     "A"     "T"     "C"     "G"     "C"     "C"     "C"
       [3,] "A"     "T"     "C"     "T"     "T"     "C"     "A"     "T"     "C"     "G"     "C"     "T"     "C"
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      [,1580] [,1581] [,1582] [,1583] [,1584] [,1585] [,1586] [,1587] [,1588] [,1589] [,1590] [,1591] [,1592]
[4,]  "A"     "T"     "C"     "T"     "T"     "C"     "A"     "T"     "C"     "G"     "C"     "C"     "C"
[5,]  "A"     "T"     "C"     "T"     "T"     "C"     "A"     "T"     "C"     "G"     "C"     "C"     "C"
[6,]  "A"     "T"     "C"     "T"     "T"     "C"     "A"     "T"     "C"     "G"     "C"     "C"     "C"
      [,1580] [,1581] [,1582] [,1583] [,1584] [,1585] [,1586] [,1587] [,1588] [,1589] [,1590] [,1591] [,1592]
[1,]  "A"     "G"     "G"     "T"     "C"     "A"     "A"     "C"     "A"     "A"     "C"     "T"     "A"
[2,]  "A"     "G"     "G"     "T"     "C"     "A"     "A"     "C"     "A"     "A"     "C"     "T"     "A"
[3,]  "A"     "G"     "G"     "T"     "C"     "A"     "A"     "C"     "A"     "A"     "C"     "T"     "A"
[4,]  "A"     "G"     "G"     "T"     "C"     "A"     "A"     "C"     "A"     "A"     "C"     "T"     "A"
[5,]  "A"     "G"     "G"     "T"     "C"     "A"     "A"     "C"     "A"     "A"     "C"     "T"     "A"
[6,]  "A"     "G"     "G"     "T"     "C"     "A"     "A"     "C"     "A"     "A"     "C"     "T"     "A"
      [,1593] [,1594] [,1595] [,1596] [,1597] [,1598] [,1599] [,1600] [,1601] [,1602] [,1603] [,1604] [,1605]
[1,]  "C"     "G"     "A"     "G"     "C"     "T"     "G"     "G"     "A"     "C"     "T"     "T"     "T"
[2,]  "C"     "G"     "A"     "G"     "C"     "T"     "G"     "G"     "A"     "C"     "T"     "T"     "T"
[3,]  "C"     "G"     "A"     "G"     "C"     "T"     "G"     "G"     "A"     "C"     "T"     "T"     "T"
[4,]  "C"     "G"     "A"     "G"     "C"     "T"     "G"     "G"     "A"     "C"     "T"     "T"     "T"
[5,]  "C"     "G"     "A"     "G"     "C"     "T"     "G"     "G"     "A"     "C"     "T"     "T"     "T"
[6,]  "C"     "G"     "A"     "G"     "C"     "T"     "G"     "G"     "A"     "C"     "T"     "T"     "T"
      [,1606] [,1607] [,1608] [,1609] [,1610] [,1611] [,1612] [,1613] [,1614] [,1615] [,1616] [,1617] [,1618]
[1,]  "G"     "G"     "C"     "C"     "A"     "G"     "A"     "T"     "C"     "A"     "T"     "C"     "A"
[2,]  "G"     "G"     "C"     "C"     "A"     "G"     "A"     "T"     "C"     "A"     "T"     "C"     "A"
[3,]  "G"     "G"     "C"     "C"     "A"     "G"     "A"     "T"     "C"     "A"     "T"     "C"     "A"
[4,]  "G"     "G"     "C"     "C"     "A"     "G"     "A"     "T"     "C"     "A"     "T"     "C"     "A"
[5,]  "G"     "G"     "C"     "C"     "A"     "G"     "A"     "T"     "C"     "A"     "T"     "C"     "A"
[6,]  "G"     "G"     "C"     "C"     "A"     "G"     "A"     "T"     "C"     "A"     "T"     "C"     "A"
      [,1619] [,1620] [,1621] [,1622] [,1623] [,1624] [,1625] [,1626] [,1627] [,1628] [,1629] [,1630] [,1631]
[1,]  "C"     "C"     "A"     "T"     "C"     "A"     "G"     "T"     "A"     "T"     "C"     "A"     "C"
[2,]  "C"     "C"     "A"     "T"     "C"     "A"     "G"     "T"     "A"     "T"     "C"     "A"     "C"
[3,]  "C"     "C"     "A"     "T"     "C"     "A"     "G"     "T"     "A"     "T"     "C"     "A"     "C"
[4,]  "C"     "C"     "A"     "T"     "C"     "A"     "G"     "T"     "A"     "T"     "C"     "A"     "C"
[5,]  "C"     "C"     "A"     "T"     "C"     "A"     "G"     "T"     "A"     "T"     "C"     "A"     "C"
[6,]  "C"     "C"     "A"     "T"     "C"     "A"     "G"     "T"     "A"     "T"     "C"     "A"     "C"
      [,1632] [,1633] [,1634] [,1635] [,1636] [,1637] [,1638] [,1639] [,1640] [,1641] [,1642] [,1643] [,1644]
[1,]  "A"     "G"     "C"     "C"     "A"     "C"     "T"     "G"     "C"     "A"     "G"     "C"     "C"
[2,]  "A"     "G"     "C"     "C"     "A"     "C"     "T"     "G"     "C"     "A"     "G"     "C"     "C"
[3,]  "A"     "G"     "C"     "C"     "A"     "C"     "T"     "G"     "C"     "A"     "G"     "C"     "C"
[4,]  "A"     "G"     "C"     "C"     "A"     "C"     "T"     "G"     "C"     "A"     "G"     "C"     "C"
[5,]  "A"     "G"     "C"     "C"     "A"     "C"     "T"     "G"     "C"     "A"     "G"     "C"     "C"
[6,]  "A"     "G"     "C"     "C"     "A"     "C"     "T"     "G"     "C"     "A"     "G"     "C"     "C"
      [,1645] [,1646] [,1647] [,1648] [,1649] [,1650] [,1651] [,1652] [,1653] [,1654] [,1655] [,1656] [,1657]
[1,]  "A"     "G"     "C"     "A"     "T"     "T"     "G"     "G"     "G"     "G"     "C"     "A"     "G"
[2,]  "A"     "G"     "C"     "A"     "T"     "T"     "G"     "G"     "G"     "G"     "C"     "A"     "G"
[3,]  "A"     "G"     "C"     "A"     "T"     "T"     "G"     "G"     "G"     "G"     "C"     "A"     "G"
[4,]  "A"     "G"     "C"     "A"     "T"     "T"     "G"     "G"     "G"     "G"     "C"     "A"     "G"
[5,]  "A"     "G"     "C"     "A"     "T"     "T"     "G"     "G"     "G"     "G"     "C"     "A"     "G"
[6,]  "A"     "G"     "C"     "A"     "T"     "T"     "G"     "G"     "G"     "G"     "C"     "A"     "G"
      [,1658] [,1659] [,1660] [,1661] [,1662] [,1663] [,1664] [,1665] [,1666] [,1667] [,1668] [,1669] [,1670]
[1,]  "C"     "T"     "G"     "G"     "C"     "A"     "T"     "C"     "C"     "C"     "C"     "C"     "A"
[2,]  "C"     "T"     "G"     "G"     "C"     "A"     "T"     "C"     "C"     "C"     "C"     "C"     "A"
[3,]  "C"     "T"     "G"     "G"     "C"     "A"     "T"     "C"     "C"     "C"     "C"     "C"     "A"
[4,]  "C"     "T"     "G"     "G"     "C"     "A"     "T"     "C"     "C"     "C"     "C"     "C"     "A"
[5,]  "C"     "T"     "G"     "G"     "C"     "A"     "T"     "C"     "C"     "C"     "C"     "C"     "A"
[6,]  "C"     "T"     "G"     "G"     "C"     "A"     "T"     "C"     "C"     "C"     "C"     "C"     "A"
      [,1671] [,1672] [,1673] [,1674] [,1675] [,1676] [,1677] [,1678] [,1679] [,1680] [,1681] [,1682] [,1683]
[1,]  "G"     "G"     "C"     "C"     "G"     "G"     "C"     "C"     "T"     "C"     "G"     "T"     "C"
[2,]  "G"     "G"     "C"     "C"     "G"     "G"     "C"     "C"     "T"     "C"     "G"     "T"     "C"
[3,]  "G"     "G"     "C"     "C"     "G"     "G"     "C"     "C"     "T"     "C"     "G"     "T"     "C"
[4,]  "G"     "G"     "C"     "C"     "G"     "G"     "C"     "C"     "T"     "C"     "G"     "T"     "C"
[5,]  "G"     "G"     "C"     "C"     "G"     "G"     "A"     "C"     "T"     "C"     "G"     "T"     "C"
[6,]  "G"     "G"     "C"     "C"     "G"     "G"     "C"     "C"     "T"     "C"     "G"     "T"     "C"
      [,1684] [,1685] [,1686] [,1687] [,1688] [,1689] [,1690] [,1691] [,1692] [,1693] [,1694] [,1695] [,1696]
[1,]  "A"     "C"     "C"     "A"     "T"     "G"     "G"     "T"     "C"     "A"     "T"     "C"     "G"
[2,]  "A"     "C"     "C"     "A"     "T"     "G"     "G"     "T"     "C"     "A"     "T"     "C"     "G"
[3,]  "A"     "C"     "C"     "A"     "T"     "G"     "G"     "T"     "C"     "A"     "T"     "C"     "G"
[4,]  "A"     "C"     "C"     "A"     "T"     "G"     "G"     "T"     "C"     "A"     "T"     "C"     "G"
[5,]  "A"     "C"     "C"     "A"     "T"     "G"     "G"     "T"     "C"     "A"     "T"     "C"     "G"
[6,]  "A"     "C"     "C"     "A"     "T"     "G"     "G"     "T"     "C"     "A"     "T"     "C"     "G"
      [,1697] [,1698] [,1699] [,1700] [,1701] [,1702] [,1703] [,1704] [,1705] [,1706] [,1707] [,1708] [,1709]
[1,]  "T"     "G"     "C"     "T"     "C"     "A"     "C"     "C"     "T"     "C"     "C"     "G"     "C"
[2,]  "T"     "G"     "C"     "T"     "C"     "A"     "C"     "C"     "T"     "C"     "C"     "G"     "T"
[3,]  "T"     "G"     "C"     "T"     "C"     "A"     "C"     "C"     "T"     "C"     "C"     "G"     "T"
[4,]  "T"     "G"     "C"     "T"     "C"     "A"     "C"     "C"     "T"     "C"     "C"     "G"     "T"
[5,]  "T"     "G"     "C"     "T"     "C"     "A"     "C"     "C"     "T"     "C"     "C"     "G"     "T"
[6,]  "T"     "G"     "C"     "T"     "C"     "A"     "C"     "C"     "T"     "C"     "C"     "G"     "T"
      [,1710] [,1711] [,1712] [,1713] [,1714] [,1715] [,1716] [,1717] [,1718] [,1719] [,1720] [,1721] [,1722]
[1,]  "G"     "G"     "G"     "A"     "C"     "T"     "G"     "C"     "C"     "C"     "A"     "C"     "C"
[2,]  "G"     "G"     "G"     "A"     "C"     "T"     "G"     "C"     "C"     "C"     "A"     "C"     "C"
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       [,1723] [,1724] [,1725] [,1726] [,1727] [,1728] [,1729] [,1730] [,1731] [,1732] [,1733] [,1734] [,1735]
[3,]   "G"     "G"     "G"     "A"     "C"     "T"     "G"     "C"     "C"     "C"     "A"     "C"     "C"
[4,]   "G"     "G"     "G"     "A"     "C"     "T"     "G"     "C"     "C"     "C"     "A"     "C"     "C"
[5,]   "G"     "G"     "G"     "A"     "C"     "T"     "G"     "C"     "C"     "C"     "A"     "C"     "C"
[6,]   "G"     "G"     "G"     "A"     "C"     "T"     "G"     "C"     "C"     "C"     "A"     "C"     "C"
       [,1723] [,1724] [,1725] [,1726] [,1727] [,1728] [,1729] [,1730] [,1731] [,1732] [,1733] [,1734] [,1735]
[1,]   "G"     "A"     "T"     "G"     "A"     "C"     "A"     "T"     "C"     "A"     "C"     "C"     "C"
[2,]   "G"     "A"     "T"     "G"     "A"     "C"     "A"     "T"     "C"     "A"     "C"     "C"     "C"
[3,]   "G"     "A"     "T"     "G"     "A"     "C"     "A"     "T"     "C"     "A"     "C"     "T"     "C"
[4,]   "G"     "A"     "T"     "G"     "A"     "C"     "A"     "T"     "C"     "A"     "C"     "C"     "C"
[5,]   "G"     "A"     "T"     "G"     "A"     "C"     "A"     "T"     "C"     "A"     "C"     "C"     "C"
[6,]   "G"     "A"     "T"     "G"     "A"     "C"     "A"     "T"     "C"     "A"     "C"     "C"     "C"
       [,1736] [,1737] [,1738] [,1739] [,1740] [,1741] [,1742] [,1743] [,1744] [,1745] [,1746] [,1747] [,1748]
[1,]   "T"     "C"     "A"     "T"     "C"     "A"     "T"     "T"     "G"     "C"     "C"     "G"     "T"
[2,]   "T"     "C"     "A"     "T"     "C"     "A"     "T"     "T"     "G"     "C"     "T"     "G"     "T"
[3,]   "T"     "C"     "A"     "T"     "C"     "A"     "T"     "T"     "G"     "C"     "C"     "G"     "T"
[4,]   "T"     "C"     "A"     "T"     "C"     "A"     "T"     "T"     "G"     "C"     "C"     "G"     "T"
[5,]   "T"     "C"     "A"     "T"     "C"     "A"     "T"     "T"     "G"     "C"     "C"     "G"     "T"
[6,]   "T"     "C"     "A"     "T"     "C"     "A"     "T"     "T"     "G"     "C"     "C"     "G"     "T"
       [,1749] [,1750] [,1751] [,1752] [,1753] [,1754] [,1755] [,1756] [,1757] [,1758] [,1759] [,1760] [,1761]
[1,]   "T"     "G"     "A"     "C"     "T"     "G"     "G"     "G"     "C"     "T"     "C"     "T"     "G"
[2,]   "T"     "G"     "A"     "C"     "T"     "G"     "G"     "G"     "C"     "T"     "C"     "T"     "G"
[3,]   "T"     "G"     "A"     "C"     "T"     "G"     "G"     "G"     "C"     "T"     "C"     "T"     "G"
[4,]   "T"     "G"     "A"     "C"     "T"     "G"     "G"     "G"     "C"     "T"     "C"     "T"     "G"
[5,]   "T"     "G"     "A"     "C"     "T"     "G"     "G"     "G"     "C"     "T"     "C"     "T"     "G"
[6,]   "T"     "G"     "A"     "C"     "T"     "G"     "G"     "G"     "C"     "T"     "C"     "T"     "G"
       [,1762] [,1763] [,1764] [,1765] [,1766] [,1767] [,1768] [,1769] [,1770] [,1771] [,1772] [,1773] [,1774]
[1,]   "G"     "A"     "C"     "C"     "G"     "T"     "T"     "T"     "C"     "C"     "G"     "C"     "A"
[2,]   "G"     "A"     "C"     "C"     "G"     "T"     "T"     "T"     "C"     "C"     "G"     "C"     "A"
[3,]   "G"     "A"     "C"     "C"     "G"     "T"     "T"     "T"     "C"     "C"     "G"     "C"     "A"
[4,]   "G"     "A"     "C"     "C"     "G"     "T"     "T"     "T"     "C"     "C"     "G"     "C"     "A"
[5,]   "G"     "A"     "C"     "C"     "G"     "T"     "T"     "T"     "C"     "C"     "G"     "C"     "A"
[6,]   "G"     "A"     "C"     "C"     "G"     "T"     "T"     "T"     "C"     "C"     "G"     "C"     "A"
       [,1775] [,1776] [,1777] [,1778] [,1779] [,1780] [,1781] [,1782] [,1783] [,1784] [,1785] [,1786] [,1787]
[1,]   "C"     "C"     "A"     "T"     "G"     "A"     "T"     "T"     "A"     "A"     "C"     "G"     "T"
[2,]   "C"     "C"     "A"     "T"     "G"     "A"     "T"     "T"     "A"     "A"     "C"     "G"     "T"
[3,]   "C"     "C"     "A"     "T"     "G"     "A"     "T"     "T"     "A"     "A"     "C"     "G"     "T"
[4,]   "C"     "C"     "A"     "T"     "G"     "A"     "T"     "T"     "A"     "A"     "C"     "G"     "T"
[5,]   "C"     "C"     "A"     "T"     "G"     "A"     "T"     "T"     "A"     "A"     "T"     "G"     "T"
[6,]   "C"     "C"     "A"     "T"     "G"     "A"     "T"     "T"     "A"     "A"     "C"     "G"     "T"
       [,1788] [,1789] [,1790] [,1791] [,1792] [,1793] [,1794] [,1795] [,1796] [,1797] [,1798] [,1799] [,1800]
[1,]   "G"     "C"     "T"     "G"     "G"     "G"     "T"     "G"     "A"     "T"     "G"     "C"     "G"
[2,]   "G"     "C"     "T"     "G"     "G"     "G"     "T"     "G"     "A"     "T"     "G"     "C"     "G"
[3,]   "G"     "C"     "T"     "G"     "G"     "G"     "T"     "G"     "A"     "T"     "G"     "C"     "G"
[4,]   "G"     "C"     "T"     "G"     "G"     "G"     "T"     "G"     "A"     "T"     "G"     "C"     "G"
[5,]   "G"     "C"     "T"     "G"     "G"     "G"     "T"     "G"     "A"     "T"     "G"     "C"     "G"
[6,]   "G"     "C"     "T"     "G"     "G"     "G"     "T"     "G"     "A"     "T"     "G"     "C"     "G"
       [,1801] [,1802] [,1803] [,1804] [,1805] [,1806] [,1807] [,1808] [,1809] [,1810] [,1811] [,1812] [,1813]
[1,]   "C"     "T"     "G"     "G"     "C"     "A"     "G"     "C"     "G"     "G"     "G"     "G"     "A"
[2,]   "C"     "T"     "G"     "G"     "C"     "A"     "G"     "C"     "G"     "G"     "G"     "G"     "A"
[3,]   "C"     "T"     "G"     "G"     "C"     "A"     "G"     "C"     "G"     "G"     "G"     "G"     "A"
[4,]   "C"     "T"     "G"     "G"     "C"     "A"     "G"     "C"     "G"     "G"     "G"     "G"     "A"
[5,]   "C"     "T"     "G"     "G"     "C"     "A"     "G"     "C"     "G"     "G"     "G"     "G"     "A"
[6,]   "C"     "T"     "G"     "G"     "C"     "A"     "G"     "C"     "G"     "G"     "G"     "G"     "A"
       [,1814] [,1815] [,1816] [,1817] [,1818] [,1819] [,1820] [,1821] [,1822] [,1823] [,1824] [,1825] [,1826]
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[2,]   "T"     "C"     "A"     "T"     "G"     "G"     "C"     "C"     "C"     "A"     "T"     "A"     "T"
[3,]   "T"     "C"     "A"     "T"     "G"     "G"     "C"     "C"     "C"     "A"     "T"     "A"     "T"
[4,]   "T"     "C"     "A"     "T"     "G"     "G"     "C"     "C"     "C"     "A"     "T"     "A"     "T"
[5,]   "T"     "C"     "A"     "T"     "G"     "G"     "C"     "C"     "C"     "A"     "T"     "A"     "T"
[6,]   "T"     "C"     "A"     "T"     "G"     "G"     "C"     "C"     "C"     "A"     "T"     "A"     "T"
       [,1827] [,1828] [,1829] [,1830] [,1831] [,1832] [,1833] [,1834] [,1835] [,1836] [,1837] [,1838] [,1839]
[1,]   "A"     "T"     "G"     "T"     "C"     "G"     "G"     "A"     "A"     "G"     "G"     "A"     "T"
[2,]   "A"     "T"     "G"     "T"     "C"     "G"     "G"     "A"     "A"     "G"     "G"     "A"     "T"
[3,]   "A"     "T"     "G"     "T"     "C"     "G"     "G"     "A"     "A"     "G"     "G"     "A"     "T"
[4,]   "A"     "T"     "G"     "T"     "C"     "G"     "G"     "A"     "A"     "G"     "G"     "A"     "T"
[5,]   "A"     "T"     "G"     "T"     "C"     "G"     "G"     "A"     "A"     "G"     "G"     "A"     "T"
[6,]   "A"     "T"     "G"     "T"     "C"     "G"     "G"     "A"     "A"     "G"     "G"     "A"     "T"
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[2,]   "T"     "T"     "T"     "G"     "C"     "C"     "C"     "G"     "G"     "G"     "A"     "C"     "A"
[3,]   "T"     "T"     "T"     "G"     "C"     "T"     "C"     "G"     "G"     "G"     "A"     "C"     "A"
[4,]   "T"     "T"     "T"     "G"     "C"     "C"     "C"     "G"     "G"     "G"     "A"     "C"     "A"
[5,]   "T"     "T"     "T"     "G"     "C"     "C"     "C"     "G"     "G"     "G"     "A"     "C"     "A"
[6,]   "T"     "T"     "T"     "G"     "C"     "T"     "C"     "G"     "G"     "G"     "A"     "C"     "A"
       [,1853] [,1854] [,1855] [,1856] [,1857] [,1858] [,1859] [,1860] [,1861] [,1862] [,1863] [,1864] [,1865]
[1,]   "C"     "A"     "G"     "G"     "C"     "A"     "C"     "C"     "G"     "A"     "G"     "A"     "A"
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[2,] "C"     "G"     "G"     "G"     "C"     "A"     "C"     "C"     "G"     "A"     "G"     "A"     "A"
[3,] "C"     "A"     "G"     "G"     "C"     "A"     "C"     "C"     "G"     "A"     "G"     "A"     "A"
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[5,] "C"     "A"     "G"     "G"     "C"     "A"     "C"     "C"     "G"     "A"     "G"     "A"     "A"
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[2,] "G"     "A"     "T"     "C"     "G"     "T"     "G"     "G"     "C"     "A"     "G"     "C"     "C"
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[1,] "C"     "A"     "G"     "C"     "A"     "G"     "A"     "A"     "T"     "G"     "G"     "C"     "T"
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[2,] "G"     "T"     "G"     "T"     "G"     "A"     "A"     "G"     "A"     "G"     "T"     "G"     "T"
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[2,] "G"     "A"     "G"     "C"     "T"     "C"     "A"     "C"     "C"     "C"     "T"     "G"     "G"
[3,] "G"     "A"     "G"     "C"     "T"     "C"     "A"     "C"     "C"     "C"     "T"     "G"     "G"
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     [,1983] [,1984] [,1985] [,1986] [,1987] [,1988] [,1989] [,1990] [,1991] [,1992] [,1993] [,1994] [,1995]
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[2,]  "G"    "T"    "T"    "C"    "A"    "A"    "G"    "T"    "G"    "G"    "A"    "G"    "C"
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[6,]  "C"    "C"    "A"    "T"    "C"    "C"    "A"    "G"    "A"    "T"    "C"    "A"    "G"
      [,2061] [,2062] [,2063] [,2064] [,2065] [,2066] [,2067] [,2068] [,2069] [,2070] [,2071] [,2072] [,2073]
[1,]  "T"    "G"    "A"    "G"    "C"    "T"    "G"    "G"    "A"    "G"    "A"    "C"    "C"
[2,]  "C"    "G"    "A"    "G"    "C"    "T"    "G"    "G"    "A"    "G"    "A"    "C"    "C"
[3,]  "C"    "G"    "A"    "G"    "C"    "T"    "G"    "G"    "A"    "G"    "A"    "C"    "C"
[4,]  "C"    "G"    "A"    "G"    "C"    "T"    "G"    "G"    "A"    "G"    "A"    "C"    "C"
[5,]  "T"    "G"    "A"    "G"    "C"    "T"    "G"    "G"    "A"    "G"    "A"    "C"    "C"
[6,]  "C"    "G"    "A"    "G"    "C"    "T"    "G"    "G"    "A"    "G"    "A"    "C"    "C"
      [,2074] [,2075] [,2076] [,2077] [,2078] [,2079] [,2080] [,2081] [,2082] [,2083] [,2084] [,2085] [,2086]
[1,]  "A"    "A"    "T"    "G"    "T"    "C"    "T"    "G"    "A"    "G"    "C"    "C"    "T"
[2,]  "A"    "A"    "T"    "G"    "T"    "C"    "T"    "G"    "A"    "-"    "-"    "-"    "-"
[3,]  "A"    "A"    "T"    "G"    "T"    "C"    "T"    "G"    "A"    "G"    "C"    "C"    "T"
[4,]  "A"    "A"    "T"    "G"    "T"    "C"    "T"    "G"    "A"    "G"    "C"    "C"    "T"
[5,]  "A"    "A"    "T"    "G"    "T"    "C"    "T"    "G"    "A"    "G"    "C"    "C"    "T"
[6,]  "A"    "A"    "T"    "G"    "T"    "C"    "T"    "G"    "A"    "-"    "-"    "-"    "-"
      [,2087] [,2088] [,2089] [,2090] [,2091] [,2092] [,2093] [,2094] [,2095] [,2096] [,2097] [,2098] [,2099]
[1,]  "G"    "C"    "G"    "G"    "A"    "G"    "C"    "T"    "G"    "C"    "A"    "G"    "G"
[2,]  "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"
[3,]  "G"    "C"    "G"    "G"    "A"    "G"    "C"    "T"    "G"    "C"    "A"    "G"    "G"
[4,]  "G"    "C"    "G"    "G"    "A"    "G"    "C"    "T"    "G"    "C"    "A"    "G"    "G"
[5,]  "G"    "C"    "G"    "G"    "A"    "G"    "C"    "T"    "G"    "C"    "A"    "G"    "G"
[6,]  "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"
      [,2100] [,2101] [,2102] [,2103] [,2104] [,2105] [,2106] [,2107] [,2108] [,2109] [,2110] [,2111] [,2112]
[1,]  "G"    "G"    "C"    "A"    "G"    "G"    "C"    "G"    "A"    "G"    "G"    "C"    "C"
[2,]  "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"
[3,]  "G"    "G"    "T"    "G"    "G"    "G"    "C"    "G"    "A"    "G"    "G"    "C"    "C"
[4,]  "G"    "G"    "C"    "A"    "G"    "G"    "C"    "G"    "A"    "G"    "G"    "C"    "C"
[5,]  "G"    "G"    "C"    "A"    "G"    "G"    "T"    "G"    "A"    "G"    "G"    "C"    "C"
[6,]  "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"
      [,2113] [,2114] [,2115] [,2116] [,2117] [,2118] [,2119] [,2120] [,2121] [,2122] [,2123] [,2124] [,2125]
[1,]  "T"    "C"    "C"    "A"    "G"    "G"    "G"    "G"    "C"    "A"    "G"    "G"    "G"
[2,]  "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"
[3,]  "T"    "C"    "C"    "A"    "G"    "G"    "G"    "G"    "C"    "A"    "G"    "G"    "G"
[4,]  "T"    "C"    "C"    "A"    "G"    "G"    "G"    "G"    "C"    "A"    "G"    "G"    "G"
[5,]  "T"    "C"    "C"    "A"    "G"    "G"    "G"    "G"    "C"    "A"    "G"    "G"    "G"
[6,]  "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"
      [,2126] [,2127] [,2128] [,2129] [,2130] [,2131] [,2132] [,2133] [,2134] [,2135] [,2136] [,2137] [,2138]
[1,]  "T"    "C"    "C"    "T"    "G"    "A"    "G"    "G"    "C"    "A"    "G"    "G"    "A"
[2,]  "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"
[3,]  "T"    "C"    "C"    "T"    "G"    "A"    "G"    "G"    "C"    "A"    "G"    "G"    "A"
[4,]  "T"    "C"    "C"    "T"    "G"    "A"    "G"    "G"    "C"    "A"    "G"    "G"    "A"
[5,]  "T"    "C"    "C"    "T"    "G"    "A"    "G"    "G"    "C"    "A"    "G"    "G"    "A"
[6,]  "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"
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          [,2139] [,2140] [,2141] [,2142] [,2143] [,2144] [,2145] [,2146] [,2147] [,2148] [,2149] [,2150] [,2151]
[1,]      "A"     "C"     "T"     "C"     "G"     "A"     "C"     "T"     "C"     "T"     "C"     "C"     "A"
[2,]      "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"
[3,]      "A"     "C"     "T"     "C"     "A"     "A"     "C"     "T"     "C"     "T"     "C"     "C"     "A"
[4,]      "A"     "C"     "T"     "C"     "G"     "A"     "C"     "T"     "C"     "T"     "C"     "C"     "A"
[5,]      "A"     "C"     "T"     "C"     "G"     "A"     "C"     "T"     "C"     "T"     "C"     "C"     "A"
[6,]      "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"
          [,2152] [,2153] [,2154] [,2155] [,2156] [,2157] [,2158] [,2159] [,2160] [,2161] [,2162] [,2163] [,2164]
[1,]      "A"     "C"     "C"     "C"     "T"     "C"     "C"     "T"     "G"     "A"     "G"     "C"     "A"
[2,]      "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"
[3,]      "A"     "C"     "C"     "C"     "T"     "C"     "C"     "T"     "G"     "A"     "G"     "C"     "A"
[4,]      "A"     "C"     "C"     "C"     "T"     "C"     "C"     "T"     "G"     "A"     "G"     "C"     "A"
[5,]      "A"     "C"     "C"     "C"     "T"     "C"     "C"     "T"     "G"     "A"     "G"     "C"     "A"
[6,]      "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"
          [,2165] [,2166] [,2167] [,2168] [,2169] [,2170] [,2171] [,2172] [,2173] [,2174] [,2175] [,2176] [,2177]
[1,]      "G"     "C"     "C"     "G"     "G"     "C"     "A"     "G"     "G"     "G"     "G"     "C"     "C"
[2,]      "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"
[3,]      "G"     "C"     "C"     "G"     "G"     "C"     "A"     "G"     "G"     "G"     "G"     "C"     "C"
[4,]      "G"     "C"     "C"     "C"     "G"     "C"     "A"     "G"     "G"     "G"     "G"     "C"     "C"
[5,]      "G"     "C"     "C"     "G"     "G"     "C"     "A"     "G"     "G"     "G"     "G"     "C"     "C"
[6,]      "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"
          [,2178] [,2179] [,2180] [,2181] [,2182] [,2183] [,2184] [,2185] [,2186] [,2187] [,2188] [,2189] [,2190]
[1,]      "A"     "G"     "G"     "A"     "T"     "C"     "A"     "C"     "A"     "C"     "A"     "T"     "T"
[2,]      "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"
[3,]      "A"     "G"     "G"     "A"     "T"     "C"     "A"     "C"     "T"     "C"     "A"     "T"     "T"
[4,]      "A"     "G"     "G"     "A"     "T"     "C"     "A"     "C"     "A"     "C"     "A"     "T"     "T"
[5,]      "A"     "G"     "G"     "A"     "T"     "C"     "A"     "C"     "A"     "C"     "A"     "T"     "T"
[6,]      "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"
          [,2191] [,2192] [,2193] [,2194] [,2195] [,2196] [,2197] [,2198] [,2199] [,2200] [,2201] [,2202] [,2203]
[1,]      "C"     "T"     "T"     "C"     "T"     "C"     "A"     "C"     "C"     "C"     "T"     "T"     "G"
[2,]      "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"
[3,]      "C"     "T"     "T"     "C"     "T"     "C"     "A"     "C"     "C"     "C"     "T"     "T"     "G"
[4,]      "C"     "T"     "T"     "C"     "T"     "C"     "A"     "C"     "C"     "C"     "T"     "T"     "G"
[5,]      "C"     "T"     "T"     "C"     "T"     "C"     "A"     "C"     "C"     "C"     "T"     "T"     "G"
[6,]      "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"
          [,2204] [,2205] [,2206] [,2207] [,2208] [,2209] [,2210] [,2211] [,2212] [,2213] [,2214] [,2215] [,2216]
[1,]      "A"     "G"     "A"     "G"     "G"     "C"     "T"     "G"     "G"     "A"     "A"     "T"     "T"
[2,]      "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"
[3,]      "A"     "G"     "A"     "G"     "G"     "C"     "T"     "G"     "G"     "A"     "A"     "T"     "T"
[4,]      "A"     "G"     "A"     "G"     "G"     "C"     "T"     "G"     "G"     "A"     "A"     "T"     "T"
[5,]      "A"     "G"     "A"     "G"     "G"     "C"     "T"     "G"     "G"     "A"     "A"     "T"     "T"
[6,]      "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"
          [,2217] [,2218] [,2219] [,2220] [,2221] [,2222] [,2223] [,2224] [,2225] [,2226] [,2227] [,2228] [,2229]
[1,]      "A"     "A"     "C"     "C"     "C"     "C"     "G"     "C"     "T"     "T"     "G"     "A"     "C"
[2,]      "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"
[3,]      "A"     "A"     "C"     "C"     "C"     "C"     "G"     "C"     "T"     "T"     "G"     "A"     "C"
[4,]      "A"     "A"     "C"     "C"     "C"     "C"     "G"     "C"     "T"     "T"     "G"     "A"     "T"
[5,]      "A"     "A"     "C"     "C"     "C"     "C"     "G"     "C"     "T"     "T"     "G"     "A"     "T"
[6,]      "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"
          [,2230] [,2231] [,2232] [,2233] [,2234] [,2235] [,2236] [,2237] [,2238] [,2239] [,2240] [,2241] [,2242]
[1,]      "G"     "G"     "A"     "A"     "A"     "A"     "T"     "G"     "T"     "A"     "T"     "C"     "T"
[2,]      "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"
[3,]      "G"     "G"     "A"     "A"     "A"     "A"     "T"     "G"     "G"     "A"     "T"     "C"     "T"
[4,]      "G"     "G"     "A"     "A"     "A"     "A"     "T"     "G"     "T"     "A"     "T"     "C"     "T"
[5,]      "G"     "G"     "A"     "A"     "A"     "A"     "T"     "G"     "T"     "A"     "T"     "C"     "T"
[6,]      "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"
          [,2243] [,2244] [,2245] [,2246] [,2247] [,2248] [,2249] [,2250] [,2251] [,2252] [,2253] [,2254] [,2255]
[1,]      "C"     "A"     "G"     "A"     "G"     "A"     "A"     "G"     "G"     "G"     "A"     "A"     "A"
[2,]      "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"
[3,]      "C"     "A"     "G"     "A"     "G"     "A"     "A"     "A"     "G"     "G"     "A"     "A"     "A"
[4,]      "C"     "A"     "G"     "A"     "G"     "A"     "A"     "G"     "G"     "G"     "A"     "A"     "A"
[5,]      "C"     "A"     "G"     "A"     "G"     "A"     "A"     "G"     "G"     "G"     "A"     "A"     "A"
[6,]      "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"
          [,2256] [,2257] [,2258] [,2259] [,2260] [,2261] [,2262] [,2263] [,2264] [,2265] [,2266] [,2267] [,2268]
[1,]      "G"     "G"     "C"     "T"     "G"     "C"     "A"     "T"     "G"     "G"     "G"     "G"     "G"
[2,]      "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"
[3,]      "G"     "G"     "C"     "T"     "G"     "C"     "A"     "T"     "G"     "G"     "G"     "G"     "G"
[4,]      "G"     "G"     "C"     "T"     "G"     "C"     "A"     "T"     "G"     "G"     "G"     "G"     "G"
[5,]      "G"     "G"     "C"     "T"     "G"     "C"     "A"     "T"     "G"     "G"     "G"     "G"     "G"
[6,]      "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"
          [,2269] [,2270] [,2271] [,2272] [,2273] [,2274] [,2275] [,2276] [,2277] [,2278] [,2279] [,2280] [,2281]
[1,]      "A"     "G"     "C"     "C"     "C"     "C"     "A"     "T"     "C"     "T"     "A"     "G"     "G"
[2,]      "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"
[3,]      "A"     "G"     "C"     "C"     "C"     "C"     "A"     "A"     "C"     "C"     "A"     "G"     "G"
[4,]      "A"     "G"     "C"     "C"     "C"     "C"     "A"     "T"     "C"     "C"     "A"     "G"     "G"
[5,]      "A"     "G"     "C"     "C"     "C"     "C"     "A"     "T"     "C"     "C"     "A"     "G"     "G"
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[6,]  "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"
      [,2282] [,2283] [,2284] [,2285] [,2286] [,2287] [,2288] [,2289] [,2290] [,2291] [,2292] [,2293] [,2294]
[1,]  "G"    "A"    "G"    "T"    "G"    "A"    "T"    "G"    "G"    "G"    "C"    "C"    "C"
[2,]  "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"
[3,]  "G"    "A"    "G"    "T"    "G"    "A"    "T"    "G"    "G"    "G"    "C"    "C"    "C"
[4,]  "G"    "A"    "G"    "T"    "G"    "A"    "T"    "G"    "G"    "G"    "C"    "C"    "C"
[5,]  "G"    "A"    "G"    "T"    "G"    "A"    "T"    "G"    "G"    "G"    "C"    "C"    "C"
[6,]  "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"
      [,2295] [,2296] [,2297] [,2298] [,2299] [,2300] [,2301] [,2302] [,2303] [,2304] [,2305] [,2306] [,2307]
[1,]  "G"    "G"    "C"    "A"    "T"    "T"    "G"    "C"    "C"    "T"    "G"    "A"    "G"
[2,]  "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"
[3,]  "G"    "G"    "C"    "A"    "T"    "T"    "G"    "C"    "C"    "C"    "G"    "A"    "G"
[4,]  "G"    "G"    "C"    "A"    "T"    "T"    "G"    "C"    "C"    "T"    "G"    "A"    "G"
[5,]  "G"    "G"    "C"    "A"    "T"    "T"    "G"    "C"    "C"    "T"    "G"    "A"    "G"
[6,]  "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"
      [,2308] [,2309] [,2310] [,2311] [,2312] [,2313] [,2314] [,2315] [,2316] [,2317] [,2318] [,2319] [,2320]
[1,]  "G"    "C"    "C"    "C"    "C"    "G"    "C"    "T"    "G"    "T"    "G"    "A"    "C"
[2,]  "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"
[3,]  "G"    "C"    "C"    "C"    "T"    "G"    "C"    "T"    "G"    "T"    "G"    "A"    "C"
[4,]  "G"    "C"    "C"    "C"    "C"    "G"    "C"    "T"    "G"    "T"    "G"    "A"    "C"
[5,]  "G"    "C"    "C"    "C"    "C"    "G"    "C"    "T"    "G"    "T"    "G"    "A"    "C"
[6,]  "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"
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[1,]  "A"    "G"    "T"    "T"    "T"    "C"    "C"    "C"    "C"    "G"    "G"    "T"    "G"
[2,]  "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"
[3,]  "A"    "G"    "T"    "T"    "T"    "C"    "C"    "C"    "C"    "G"    "G"    "T"    "G"
[4,]  "A"    "G"    "T"    "T"    "T"    "C"    "C"    "C"    "C"    "G"    "G"    "T"    "G"
[5,]  "A"    "G"    "T"    "T"    "T"    "C"    "C"    "C"    "C"    "G"    "G"    "T"    "G"
[6,]  "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"
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[1,]  "T"    "G"    "A"    "G"    "C"    "C"    "C"    "G"    "G"    "T"    "G"    "A"    "G"
[2,]  "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"
[3,]  "T"    "G"    "A"    "G"    "C"    "C"    "C"    "G"    "G"    "T"    "G"    "A"    "G"
[4,]  "T"    "G"    "A"    "G"    "C"    "C"    "C"    "G"    "G"    "T"    "G"    "A"    "G"
[5,]  "T"    "G"    "A"    "G"    "C"    "C"    "C"    "G"    "G"    "T"    "G"    "A"    "G"
[6,]  "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"
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[1,]  "G"    "G"    "C"    "G"    "G"    "C"    "A"    "G"    "G"    "C"    "A"    "G"    "G"
[2,]  "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"
[3,]  "G"    "G"    "C"    "G"    "G"    "C"    "A"    "G"    "G"    "C"    "A"    "G"    "G"
[4,]  "G"    "G"    "C"    "G"    "G"    "C"    "A"    "G"    "G"    "C"    "A"    "G"    "G"
[5,]  "G"    "G"    "C"    "G"    "G"    "C"    "A"    "G"    "G"    "C"    "A"    "G"    "G"
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[1,]  "G"    "G"    "T"    "T"    "A"    "T"    "C"    "C"    "G"    "G"    "C"    "C"    "C"
[2,]  "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"
[3,]  "G"    "G"    "T"    "T"    "A"    "T"    "C"    "C"    "G"    "G"    "C"    "C"    "C"
[4,]  "G"    "G"    "T"    "T"    "A"    "T"    "C"    "C"    "G"    "G"    "C"    "C"    "C"
[5,]  "G"    "G"    "T"    "T"    "A"    "T"    "C"    "T"    "G"    "G"    "C"    "C"    "C"
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[1,]  "C"    "A"    "C"    "T"    "T"    "T"    "C"    "T"    "G"    "G"    "A"    "T"    "G"
[2,]  "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"
[3,]  "C"    "A"    "C"    "T"    "T"    "T"    "C"    "T"    "G"    "G"    "A"    "T"    "G"
[4,]  "C"    "A"    "C"    "T"    "T"    "T"    "C"    "T"    "G"    "G"    "A"    "T"    "G"
[5,]  "C"    "A"    "C"    "T"    "T"    "T"    "C"    "T"    "G"    "G"    "A"    "T"    "G"
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[1,]  "A"    "C"    "A"    "G"    "A"    "C"    "T"    "T"    "G"    "A"    "G"    "G"    "C"
[2,]  "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"
[3,]  "A"    "C"    "A"    "G"    "A"    "C"    "T"    "T"    "G"    "A"    "G"    "G"    "C"
[4,]  "A"    "C"    "A"    "G"    "A"    "C"    "T"    "T"    "G"    "A"    "G"    "G"    "C"
[5,]  "A"    "C"    "A"    "G"    "A"    "C"    "T"    "T"    "G"    "A"    "G"    "G"    "C"
[6,]  "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"
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[1,]  "T"    "C"    "T"    "G"    "A"    "G"    "A"    "G"    "C"    "T"    "G"    "A"    "A"
[2,]  "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"
[3,]  "C"    "C"    "T"    "G"    "A"    "G"    "A"    "G"    "C"    "T"    "G"    "A"    "A"
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[1,]  "A"    "A"    "C"    "A"    "C"    "T"    "T"    "G"    "T"    "C"    "C"    "A"    "A"
[2,]  "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"
[3,]  "A"    "A"    "C"    "A"    "C"    "T"    "T"    "G"    "T"    "C"    "C"    "A"    "A"
[4,]  "A"    "A"    "C"    "A"    "C"    "T"    "T"    "G"    "T"    "C"    "C"    "A"    "A"
```

```
[5,] "A"    "A"    "C"    "A"    "C"    "T"    "T"    "G"    "T"    "C"    "C"    "A"    "A"
[6,] "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"
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[1,] "G"    "G"    "T"    "C"    "T"    "C"    "A"    "C"    "G"    "T"    "T"    "A"    "A"
[2,] "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"
[3,] "G"    "G"    "T"    "C"    "T"    "C"    "A"    "C"    "G"    "T"    "T"    "A"    "A"
[4,] "G"    "G"    "T"    "C"    "T"    "C"    "A"    "C"    "G"    "T"    "T"    "A"    "A"
[5,] "G"    "G"    "T"    "C"    "T"    "C"    "A"    "C"    "G"    "T"    "T"    "A"    "A"
[6,] "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"
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[1,] "G"    "G"    "T"    "C"    "A"    "A"    "G"    "A"    "C"    "A"    "C"    "T"    "A"
[2,] "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"
[3,] "G"    "G"    "T"    "C"    "A"    "A"    "G"    "A"    "C"    "A"    "C"    "T"    "A"
[4,] "G"    "G"    "T"    "C"    "A"    "A"    "G"    "A"    "C"    "A"    "C"    "T"    "A"
[5,] "G"    "G"    "T"    "C"    "A"    "A"    "G"    "A"    "C"    "A"    "C"    "T"    "A"
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[1,] "A"    "C"    "T"    "C"    "A"    "A"    "A"    "T"    "C"    "T"    "T"    "T"    "C"
[2,] "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"
[3,] "A"    "C"    "T"    "C"    "A"    "A"    "A"    "T"    "C"    "T"    "T"    "T"    "C"
[4,] "A"    "C"    "T"    "C"    "A"    "A"    "A"    "T"    "C"    "T"    "T"    "T"    "C"
[5,] "A"    "C"    "T"    "C"    "A"    "A"    "A"    "T"    "C"    "T"    "T"    "T"    "C"
[6,] "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"
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[1,] "A"    "A"    "G"    "C"    "C"    "C"    "C"    "G"    "C"    "C"    "T"    "C"    "T"
[2,] "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"
[3,] "A"    "A"    "G"    "C"    "C"    "C"    "C"    "G"    "C"    "C"    "T"    "C"    "T"
[4,] "A"    "A"    "G"    "C"    "C"    "C"    "T"    "G"    "C"    "C"    "T"    "C"    "T"
[5,] "A"    "A"    "G"    "C"    "C"    "C"    "C"    "G"    "C"    "C"    "T"    "C"    "T"
[6,] "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"
     [,2477] [,2478] [,2479] [,2480] [,2481] [,2482] [,2483] [,2484] [,2485] [,2486] [,2487] [,2488] [,2489]
[1,] "C"    "C"    "T"    "C"    "T"    "T"    "G"    "G"    "A"    "G"    "G"    "A"    "C"
[2,] "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"
[3,] "C"    "C"    "A"    "C"    "T"    "T"    "G"    "G"    "A"    "G"    "G"    "A"    "C"
[4,] "C"    "C"    "T"    "C"    "T"    "T"    "G"    "G"    "A"    "G"    "G"    "A"    "C"
[5,] "C"    "C"    "T"    "C"    "T"    "T"    "G"    "G"    "A"    "G"    "G"    "A"    "C"
[6,] "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"
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[1,] "A"    "G"    "G"    "G"    "C"    "A"    "G"    "C"    "C"    "T"    "G"    "C"    "A"
[2,] "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"
[3,] "A"    "G"    "G"    "G"    "C"    "A"    "G"    "C"    "C"    "T"    "G"    "C"    "A"
[4,] "A"    "G"    "G"    "G"    "C"    "A"    "G"    "C"    "C"    "T"    "G"    "C"    "A"
[5,] "A"    "G"    "G"    "G"    "C"    "A"    "G"    "C"    "C"    "T"    "G"    "C"    "A"
[6,] "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"
     [,2503] [,2504] [,2505] [,2506] [,2507] [,2508] [,2509] [,2510] [,2511] [,2512] [,2513] [,2514] [,2515]
[1,] "G"    "C"    "T"    "G"    "T"    "G"    "T"    "C"    "C"    "A"    "G"    "G"    "C"
[2,] "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"
[3,] "G"    "C"    "T"    "G"    "T"    "G"    "T"    "C"    "C"    "A"    "G"    "G"    "C"
[4,] "G"    "C"    "T"    "G"    "T"    "G"    "T"    "C"    "C"    "A"    "G"    "G"    "C"
[5,] "G"    "C"    "T"    "G"    "T"    "G"    "T"    "C"    "C"    "A"    "G"    "G"    "C"
[6,] "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"
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[1,] "C"    "C"    "A"    "G"    "G"    "C"    "C"    "C"    "C"    "-"    "A"    "C"    "C"
[2,] "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"
[3,] "C"    "C"    "A"    "G"    "G"    "C"    "C"    "C"    "C"    "A"    "A"    "C"    "C"
[4,] "C"    "C"    "A"    "G"    "G"    "C"    "C"    "C"    "C"    "-"    "A"    "C"    "C"
[5,] "C"    "C"    "A"    "G"    "G"    "C"    "C"    "C"    "C"    "-"    "A"    "C"    "C"
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[1,] "C"    "C"    "A"    "T"    "A"    "A"    "C"    "A"    "G"    "G"    "T"    "G"    "G"
[2,] "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"
[3,] "C"    "C"    "A"    "T"    "A"    "A"    "C"    "A"    "G"    "G"    "T"    "G"    "G"
[4,] "C"    "C"    "A"    "T"    "A"    "A"    "C"    "A"    "G"    "G"    "T"    "G"    "G"
[5,] "C"    "C"    "A"    "T"    "A"    "A"    "C"    "A"    "G"    "G"    "T"    "G"    "G"
[6,] "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"
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[1,] "C"    "C"    "T"    "C"    "A"    "G"    "C"    "C"    "A"    "C"    "A"    "C"    "A"
[2,] "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"
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[4,] "C"    "C"    "T"    "C"    "A"    "G"    "C"    "C"    "A"    "C"    "A"    "C"    "A"
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[1,] "G"    "T"    "T"    "C"    "T"    "C"    "C"    "C"    "C"    "A"    "A"    "G"    "G"
[2,] "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"
[3,] "G"    "T"    "T"    "T"    "T"    "C"    "C"    "C"    "C"    "A"    "A"    "G"    "G"
```

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[4,] "G"     "T"     "T"     "C"     "T"     "C"     "C"     "C"     "C"     "A"     "A"     "G"     "G"
[5,] "G"     "T"     "T"     "C"     "T"     "C"     "C"     "C"     "C"     "A"     "A"     "G"     "G"
[6,] "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"
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[1,] "G"     "G"     "A"     "G"     "C"     "A"     "G"     "C"     "C"     "C"     "A"     "G"     "G"
[2,] "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"
[3,] "G"     "G"     "A"     "G"     "C"     "A"     "G"     "C"     "C"     "C"     "A"     "G"     "G"
[4,] "G"     "G"     "A"     "G"     "C"     "A"     "G"     "C"     "C"     "C"     "A"     "G"     "G"
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[1,] "G"     "C"     "C"     "A"     "A"     "G"     "C"     "C"     "C"     "C"     "G"     "C"     "T"
[2,] "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"
[3,] "G"     "C"     "C"     "A"     "A"     "G"     "C"     "C"     "C"     "C"     "G"     "C"     "T"
[4,] "G"     "C"     "C"     "A"     "A"     "G"     "C"     "C"     "C"     "C"     "G"     "C"     "T"
[5,] "G"     "C"     "C"     "A"     "A"     "G"     "C"     "C"     "C"     "C"     "G"     "C"     "T"
[6,] "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"
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[2,] "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"
[3,] "G"     "C"     "C"     "T"     "T"     "C"     "C"     "C"     "C"     "A"     "G"     "G"     "C"
[4,] "G"     "C"     "C"     "T"     "T"     "C"     "C"     "C"     "C"     "A"     "G"     "G"     "C"
[5,] "G"     "C"     "C"     "T"     "T"     "C"     "C"     "C"     "C"     "A"     "G"     "G"     "C"
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[1,] "C"     "A"     "C"     "A"     "G"     "T"     "G"     "C"     "G"     "T"     "C"     "C"     "A"
[2,] "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"
[3,] "C"     "A"     "C"     "A"     "G"     "T"     "G"     "C"     "G"     "T"     "C"     "C"     "A"
[4,] "C"     "A"     "C"     "A"     "G"     "T"     "G"     "C"     "G"     "T"     "C"     "C"     "A"
[5,] "C"     "A"     "C"     "A"     "G"     "T"     "G"     "C"     "G"     "T"     "C"     "C"     "A"
[6,] "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"
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[2,] "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"
[3,] "G"     "T"     "C"     "T"     "C"     "C"     "T"     "G"     "T"     "C"     "C"     "T"     "G"
[4,] "G"     "T"     "G"     "T"     "C"     "C"     "T"     "G"     "T"     "C"     "C"     "T"     "G"
[5,] "G"     "T"     "G"     "T"     "C"     "C"     "T"     "G"     "T"     "C"     "C"     "T"     "G"
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[1,] "C"     "C"     "A"     "C"     "G"     "T"     "G"     "T"     "C"     "T"     "T"     "T"     "T"
[2,] "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"
[3,] "C"     "C"     "A"     "C"     "G"     "T"     "G"     "T"     "C"     "T"     "C"     "T"     "T"
[4,] "C"     "C"     "A"     "C"     "G"     "T"     "G"     "T"     "C"     "T"     "C"     "T"     "T"
[5,] "C"     "C"     "A"     "C"     "G"     "T"     "G"     "T"     "C"     "T"     "C"     "T"     "T"
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[2,] "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"
[3,] "G"     "C"     "A"     "A"     "A"     "G"     "C"     "T"     "C"     "C"     "T"     "T"     "G"
[4,] "G"     "C"     "A"     "A"     "A"     "G"     "C"     "T"     "C"     "C"     "T"     "T"     "G"
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[2,] "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"
[3,] "G"     "A"     "T"     "G"     "T"     "G"     "G"     "A"     "G"     "A"     "C"     "A"     "G"
[4,] "G"     "A"     "T"     "G"     "T"     "G"     "G"     "A"     "C"     "A"     "C"     "A"     "G"
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[2,] "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"
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[4,] "A"     "T"     "G"     "T"     "C"     "T"     "T"     "T"     "A"     "C"     "T"     "A"     "G"
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[1,] "A"     "G"     "C"     "T"     "G"     "A"     "A"     "A"     "G"     "G"     "C"     "C"     "C"
[2,] "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"
[3,] "A"     "G"     "C"     "T"     "G"     "A"     "A"     "A"     "G"     "G"     "C"     "C"     "C"
[4,] "A"     "G"     "C"     "T"     "G"     "A"     "A"     "A"     "G"     "G"     "C"     "C"     "C"
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[2,] "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"
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       [3,] "C"    "C"    "T"    "C"    "A"    "A"    "C"    "A"    "C"    "A"    "T"    "C"    "C"
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       [3,] "A"    "C"    "G"    "G"    "G"    "A"    "T"    "A"    "G"    "G"    "T"    "A"    "G"
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       [3,] "G"    "C"    "A"    "A"    "G"    "C"    "C"    "A"    "G"    "G"    "A"    "C"    "T"
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       [1,] "C"    "C"    "G"    "G"    "G"    "A"    "A"    "G"    "G"    "A"    "G"    "G"    "T"
       [2,] "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"    "-"
       [3,] "C"    "C"    "G"    "G"    "G"    "A"    "A"    "G"    "G"    "A"    "G"    "G"    "T"
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       [3,] "C"    "C"    "C"    "A"    "A"    "A"    "G"    "G"    "C"    "C"    "T"    "G"    "T"
       [4,] "C"    "C"    "C"    "A"    "A"    "A"    "G"    "G"    "C"    "C"    "T"    "G"    "T"
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       [5,] "G"    "C"    "G"    "T"    "C"    "C"    "A"    "A"    "G"    "T"    "G"    "G"    "A"
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       [2,] "-"      "-"      "-"      "-"      "-"      "-"      "-"      "-"      "-"      "-"      "-"      "-"      "-"
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       [2,] "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"
       [3,] "T"     "T"     "C"     "C"     "T"     "T"     "T"     "C"     "T"     "G"     "T"     "G"     "T"
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       [1,] "T"     "T"     "G"     "C"     "A"     "A"     "A"     "T"     "T"     "C"     "A"     "G"     "T"
       [2,] "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"
       [3,] "T"     "T"     "G"     "C"     "A"     "A"     "A"     "T"     "T"     "C"     "A"     "G"     "T"
       [4,] "T"     "T"     "G"     "C"     "A"     "A"     "A"     "T"     "T"     "C"     "A"     "G"     "T"
       [5,] "T"     "T"     "G"     "C"     "A"     "A"     "A"     "T"     "T"     "C"     "A"     "G"     "T"
       [6,] "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"
            [,2880] [,2881] [,2882] [,2883] [,2884] [,2885] [,2886] [,2887] [,2888] [,2889] [,2890] [,2891] [,2892]
       [1,] "G"     "T"     "T"     "A"     "A"     "C"     "T"     "A"     "A"     "A"     "T"     "A"     "A"
       [2,] "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"
       [3,] "G"     "T"     "T"     "A"     "A"     "C"     "T"     "A"     "A"     "A"     "T"     "A"     "A"
       [4,] "G"     "T"     "T"     "A"     "A"     "C"     "T"     "A"     "A"     "A"     "T"     "A"     "A"
       [5,] "G"     "T"     "T"     "A"     "A"     "C"     "T"     "A"     "A"     "A"     "T"     "A"     "A"
       [6,] "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"
            [,2893] [,2894] [,2895] [,2896] [,2897] [,2898] [,2899] [,2900] [,2901] [,2902] [,2903] [,2904] [,2905]
       [1,] "A"     "G"     "G"     "T"     "A"     "T"     "T"     "T"     "T"     "G"     "T"     "T"     "T"
       [2,] "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"
       [3,] "A"     "G"     "G"     "T"     "A"     "T"     "T"     "T"     "T"     "G"     "T"     "T"     "T"
       [4,] "A"     "G"     "G"     "T"     "A"     "T"     "T"     "T"     "T"     "G"     "T"     "T"     "T"
       [5,] "A"     "G"     "G"     "T"     "A"     "T"     "T"     "T"     "T"     "G"     "T"     "T"     "T"
       [6,] "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"     "-"
            [,2906] [,2907] [,2908] [,2909]
       [1,] "T"     "T"     "C"     "A"
       [2,] "-"     "-"     "-"     "-"
       [3,] "T"     "T"     "C"     "A"
       [4,] "T"     "T"     "C"     "A"
       [5,] "T"     "T"     "C"     "A"
       [6,] "-"     "-"     "-"     "-"
> # Compute the SFS
> SFS <- compute_SFS(alignment)
>
> # Output the SFS
> print(SFS)
[1]   41   37 1001  203 1622
>
> # The function for computeing TajimasD values
> TajimasD <- function(sfs){
+     #For the computed SFS
+     n <- length(sfs) + 1
+     ss <- sum(sfs)
+
+     a1 <- sum(1 / seq_len(n-1))
+     a2 <- sum(1 / seq_len(n-1)^2)
+
+     b1 <- (n + 1) / (3 * (n - 1))
+     b2 <- 2 * (n^2 + n + 3)/(9 * n * (n - 1))
+
+     c1 <- b1 - 1/a1
+     c2 <- b2 - (n + 2)/(a1 * n) + a2 / a1^2
+
+     e1 <- c1 / a1
+     e2 <- c2 / (a1^2 + a2)
+
+     Vd <- e1 * ss + e2 * ss * (ss - 1)
+
+     theta_pi <- sum(2 * seq_len(n-1) * (n - seq_len(n-1)) * sfs)/(n*(n-1))
+     theta_w <- ss / a1
+     res <- (theta_pi - theta_w) / sqrt(Vd)
+     return(res)
+ }
>
> #Compute TajimaD
> TajimasD(SFS)
[1] 0.05693666
```

>
>
>