CS325

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PROMGRAMMING ASSIGNMENT 2

PSEUDO-CODE

```
Given two strings s and t {      // Need to turn s into t
                                 // Use minimum editing operations

     D(m,n) = the edit distance between s1s2…si and t1t2…ti

     For i = 0 to m: D(i,0) = i
     For j = 0 to n: D(0,j) = j

     // Calculate edit distance
     // Remember alignment for visual output of computation (backtrace)

     For each i = 1…m
          For each j = 1…n

               If si == tj       // Characters each sequence are equal
                    D(i,j) = D(i-1,j-1)

               Else {
                                  { D(i-1,j) + 1     // Deletion
                    D(i,j) = min  { D(i,j-1) + 1     // Insertion
                                  { D(i-1,j-1) + diff(si, tj)
                                                     // Align i with j

                    // Altering the sequences for a visual alignment

                                  { LEFT  // Insertion
                    ptr(i,j) =    { DOWN  // Deletion
                                  { DIAG  // Align
               }

     // Returns sequences and cost
     Return D(m,n) and s and t
}
```

ASYMPTOTIC ANALYSIS OF RUN TIME

The overall runtime for this algorithm of running through the algorithm of either deleting, inserting, or substituting the sequences by aligning them, and then back-tracing through the sequences in order to nicely visualization what has been done overall at the end, is O(mn) + O(m+n).

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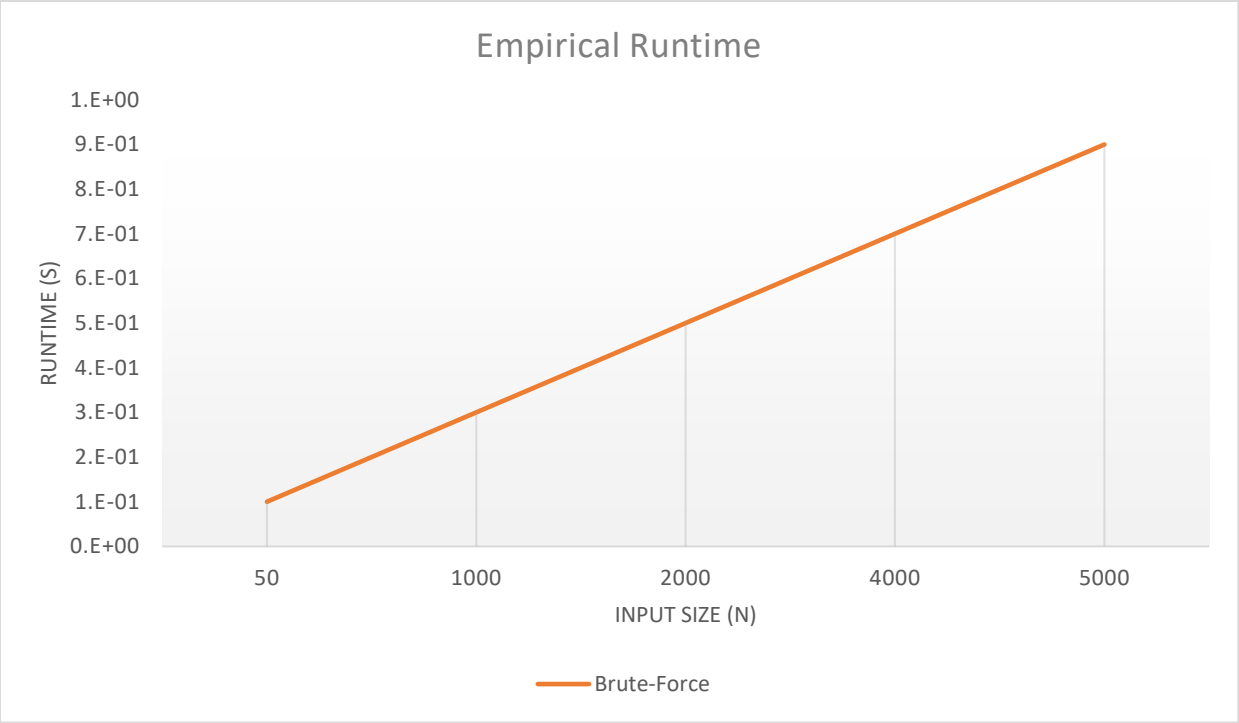
REPORTING AND PLOTTING THE RUNTIME



*** For the graph record and change the values of the runtime for each of the input sizes*

*** Describe how the running time is measured in your experiments.*

The runtime is measured in our experiments by

***What type of machine is used for the experiments?*

The type of machine that is used for our experiment are regular computers that can run programs like ours that conducts our algorithms properly and calculate the runtime done by our algorithms.

***Is there any part excluded from the runtime measurements (e.g., output of the alignment)?*

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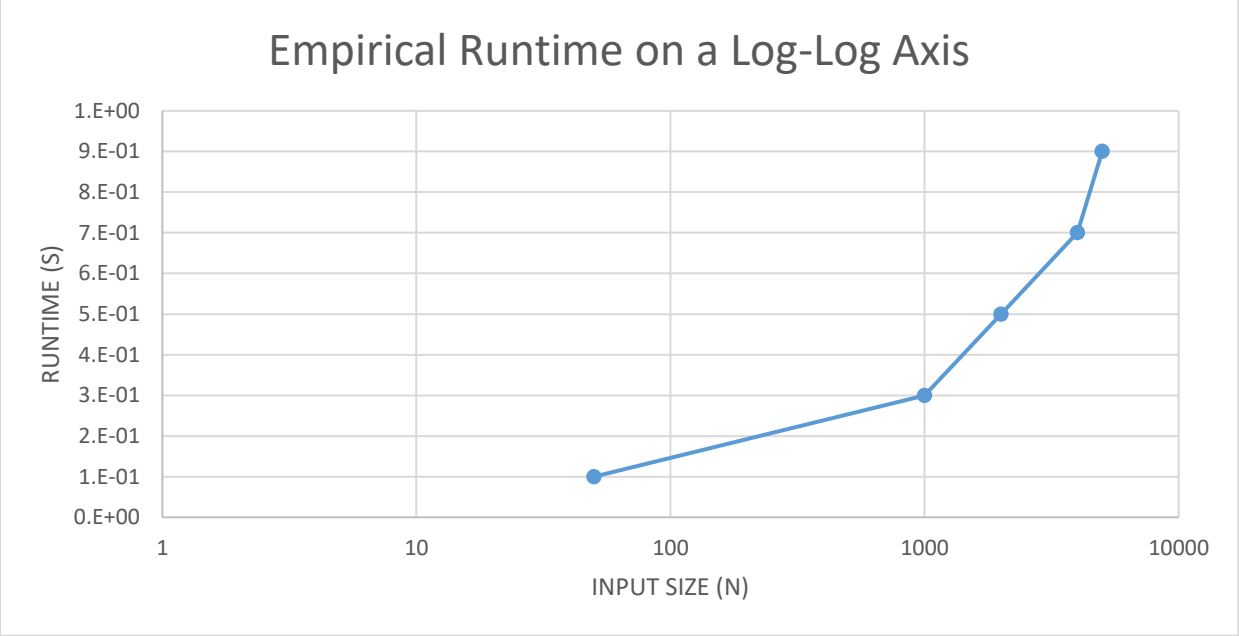

*** Plot the running times as a function of the input size.*

*** Include an additional plot of the running times on a log-log axis 1.*

Note that if the slope of a line in a log-log plot is m, then the line is of the form O(xm) on a linear plot.

*** Determine the slope of the line in your log-log plot and from the slope, infer the experimental running time for your algorithm.*

INTERPRETATION AND DISCUSSION

*** Discuss the runtime plot.*

*** Do the growth curve match your expectation based on their theoretical bounds?*