Locality Analyzer

Apparatus Specification

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Publication History

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For additional information, see The LoCuS Homepage:
URL: http://cgi.cs.arizona.edu/projects/locus/labs/

LoCuS (Laboratory fOr CompUter Science) System is instructional software for teaching computer science theories through experiments (that is, laboratory exercises, as in other sciences like biology, chemistry, and physics). A locus (Latin for "place") is a "collection of points which share a property" or "the path through which a point moves to fulfill a given condition." Our goal is for LoCuS to define a new place to emphasize the science of computation as well as a new path for computer science, in the form of labs.
Contents

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Introduction</td>
<td>1</td>
</tr>
<tr>
<td>2 Functionality</td>
<td>1</td>
</tr>
<tr>
<td>3 User Interface</td>
<td>1</td>
</tr>
<tr>
<td>4 XML Specification</td>
<td>2</td>
</tr>
<tr>
<td>5 Implementation Details</td>
<td>3</td>
</tr>
</tbody>
</table>
1 Introduction

This apparatus is intended to be used for the Locality Lab in order to illustrate concepts of locality and caching. It displays a long string of characters and allows the user to interact with the apparatus in order to calculate the strength of locality in any string.

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2 Functionality

This apparatus will visualize a long string of characters with which the user will observe the effects of locality. The user has the ability to decide the size of the locality set for a particular run. The apparatus will run through the data and add each character to its locality set. If there is not enough room in the locality set, as determined by the user, the least recently added item to the set will be thrown out. Every time that a character is encountered which is already in the locality set, the score for that simulation will be incremented. The user can either step through the simulation forwards or backwards. The user also has the ability to skip to the beginning or the end of a run.

3 User Interface

The Sequence Analyzer apparatus contains a GUI containing four primary panels and one dropdown menu.

1. The topmost panel contains a user-controlled slider which indicates the maximum size of the locality set and a note indicating the number of characters in the string.

2. The second panel displays the string of characters and highlights which are currently in the locality set.

3. The third panel (Navigation) contains three buttons. These buttons allow the user to step through the simulation in forward or reverse and to skip to the beginning or end of the simulation.

4. The last panel shows various statistics about the simulations current state.

5. The drop-down menu in the top left is used to send data to the Plotter apparatus to be visualized.
4 XML Specification

The apparatus accepts parameters from locus in the form of an XML node object (passed in through \texttt{setOptions(.)} method. Please see Apparatus Developers Guide). Following is a sample XML node that the apparatus will accept:

\begin{verbatim}
<options>
  <dataFile>"data.txt"</dataFile>
</options>
\end{verbatim}

The \texttt{dataFile} element indicates what file the string of characters should be read from. There is no default value for this element, but if \texttt{dataFile} is not given, a default set of characters will be used.
5 Implementation Details

The standard Java JPanels should suffice for all the graphics related functionality. This apparatus makes significant use of Java Swing. A large data structure will need to be created to hold the simulation features in memory, so that they can be sped through and jumped through using the search bar.