Project Phase I: KWIC Architecture Specification

Versions 2.0
CS/SE 6362 Advanced Software Architecture (Fall 2015)

Submitted to:
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Submitted By: Team Name: Quick Search

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## Revision History

<table>
<thead>
<tr>
<th>Date</th>
<th>Version</th>
<th>Description</th>
<th>Author(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>9/29/2015</td>
<td>1.0</td>
<td>Preliminary version of K.W.I.C system architecture</td>
<td>All</td>
</tr>
<tr>
<td>10/15/2015</td>
<td>2.0</td>
<td>Updated version with professor suggestion from interim presentation</td>
<td>All</td>
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1. Introduction

The Project that our team will be working on is a web search engine.

A web search engine is a web-based tool that is designed to search and locate information on the World Wide Web. Popular examples includes Google, Yahoo! and Bing. These Search engines utilize automated software applications (referred to as robots, bots, crawlers or spiders) that travel along the Web, following links from page to page, site to site. The information gathered by the spiders is used to create a searchable index of the Web. The search results are generally presented in a line of results often referred to as search engine results pages (SERPs).

1.1 Purpose

The purpose of our project is to develop KWIC index System (Keyword In Context) proposed by David Parnas in early 70's using Java Applet. This System provides a convenient search mechanism for information in a long list of lines, such as book titles, or online documentation entries.

Parnas described the KWIC problem as follows:

“The KWIC index system accepts an ordered set of lines; each line is an ordered set of words, and each word is an ordered set of characters. Any line may be “circularly shifted” by repeatedly removing the first word and appending it at the end of the line. The KWIC index system outputs a list of all circular shifts of all lines in alphabetical order.”

In his paper of 1972, Parnas used the problem to contrast different criteria for decomposing a system into modules. Our team followed the same phenomena to implement KWIC system, by designing the system with 5 highly cohesive modules (input, line storage, circular shift, alphabetical sort, and output). We analyzed functional and nonfunctional requirement, design architecture styles, implement using Java applet and test the system. The KWIC system architecture style shall be an Abstract Data Type (ADT) style as this will provide clear object oriented structure with desire qualities of high cohesion and low coupling.

1.2 Scope

The KWIC system shall be designed, implemented and tested to satisfy list of functional and nonfunctional requirements. Based on design specification, the system should be implemented using Java applet. Finally, we describe user manual as a guideline for using KWIC system. All the materials of project should be uploaded on our web site.
1.3 Definitions, Acronyms, and Abbreviations

- KWIC: Key Word In Context describes a way to display related and accurate results to a specific search query.
- Architecture acronym if applicable
- UML (Unified Modeling Language): This provides a way to describe structure, behavior and architecture of application along with business process and data structure

1.4 Project Deliverables

Phase 1:

Phase 1.1: Interim Project I
Deliverables: Preliminary Definition, PPT, and Presentation
Due Date: September 29th
Team Leader: Barbara Mawe

Phase 1.2: Final Part I
Deliverables: Project Report, Presentation, and Design Plans
Due Date: October 15th
Team Leader: Sruthi Chappidi

Phase 2:

Phase 2.1: Interim Project II
Deliverables: Outline, Project Plan, Presentation
Due Date: November 10th
Team Leader: Maryellen Oltman

Phase 2b: Final Part II
Deliverables: Presentation and Demo
Due Date: December 1st
Team Leader: Twinkle Sharma
2. PROJECT ORGANIZATION

2.1 Process Model

2.2 Organizational Structure

2.3 Work Schedule

<table>
<thead>
<tr>
<th>Date</th>
<th>Task</th>
<th>Responsibility</th>
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<tr>
<td>9/03/2015</td>
<td>Requirements Gathering</td>
<td>Sruthi, Twinkle, Maryellen, Barbara</td>
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<tr>
<td>9/29/2015</td>
<td>Software Architecture Analysis &amp; Design</td>
<td>Sruthi, Barbara</td>
</tr>
<tr>
<td>10/15/2015</td>
<td>Developers</td>
<td>Twinkle, Maryellen</td>
</tr>
<tr>
<td>11/10/2015</td>
<td>Testers</td>
<td>Twinkle, Sruthi</td>
</tr>
<tr>
<td>12/1/2015</td>
<td>End users</td>
<td>Barbara, Maryellen</td>
</tr>
</tbody>
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3. Software Architecture

3.1 Abstract Data Type Architectural Style

Design 1

![Design 1 Diagram]

Design 2:

![Design 2 Diagram]
Functional Requirement and Software Architecture Traceability Matrix

<table>
<thead>
<tr>
<th>Functional Requirement</th>
<th>Architecture Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>FR1.0: The KWIC system shall provide an input field to accept an ordered set of lines.</td>
<td>KWIC system has an <em>input medium</em> to accept an ordered set of lines.</td>
</tr>
<tr>
<td>FR2.0: The KWIC system shall accept an ordered set of lines</td>
<td>KWIC System accepts ordered set of lines through the <em>input module</em>.</td>
</tr>
<tr>
<td>FR3.0: The KWIC system shall perform a “circular shift” on each the inputted ordered set of lines by repeatedly removing the first word and appending it at the end of the line</td>
<td>KWIC System provides a <em>circular shift module</em> to perform a circular shift on each input of ordered set of lines.</td>
</tr>
<tr>
<td>FR4.0: The KWIC system shall output a listing of all circular shifts of all ordered set of lines in ascending alphabetical order</td>
<td>KWIC System provides a <em>output medium</em> module that displays a listing of all circular shift of all ordered set of lines in ascending alphabetical order.</td>
</tr>
</tbody>
</table>
5. Prototype/Screen Shots

Here are the original lines:
1. Please enter some lines
2. With a dollar sign
3. In between each one

Here are the circular shifts:
1. Please enter some lines
2. enter some lines Please
3. some lines Please enter
4. lines Please enter some
5. With a dollar sign
6. a dollar sign With
7. dollar sign With a
8. sign With a dollar
9. In between each one
10. between each one In
11. each one In between
12. one In between each

Here are the alphabetized circular shifts:
1. a dollar sign With
2. between each one In
3. dollar sign With a
4. each one In between
5. enter some lines Please
6. In between each one
7. lines Please enter some
8. one In between each
9. Please enter some lines
10. sign With a dollar
11. some lines Please enter
12. With a dollar sign

6. References

- [http://www.utdallas.edu/~chung/SA/syllabus.htm](http://www.utdallas.edu/~chung/SA/syllabus.htm)