## DS Final Project

## Description:

Nowadays, more and more people appreciate independent music and become the fans of indie band. However, since independent music is not mainstream, there are no search engines which are suitable for those people to help them get the latest information. Therefore, we develop a search engine better than Google and other search engines for those people to search. The appearance of the GUI is as Fig. 1.



# Figure 1. The graphical user interface (Search.jsp)

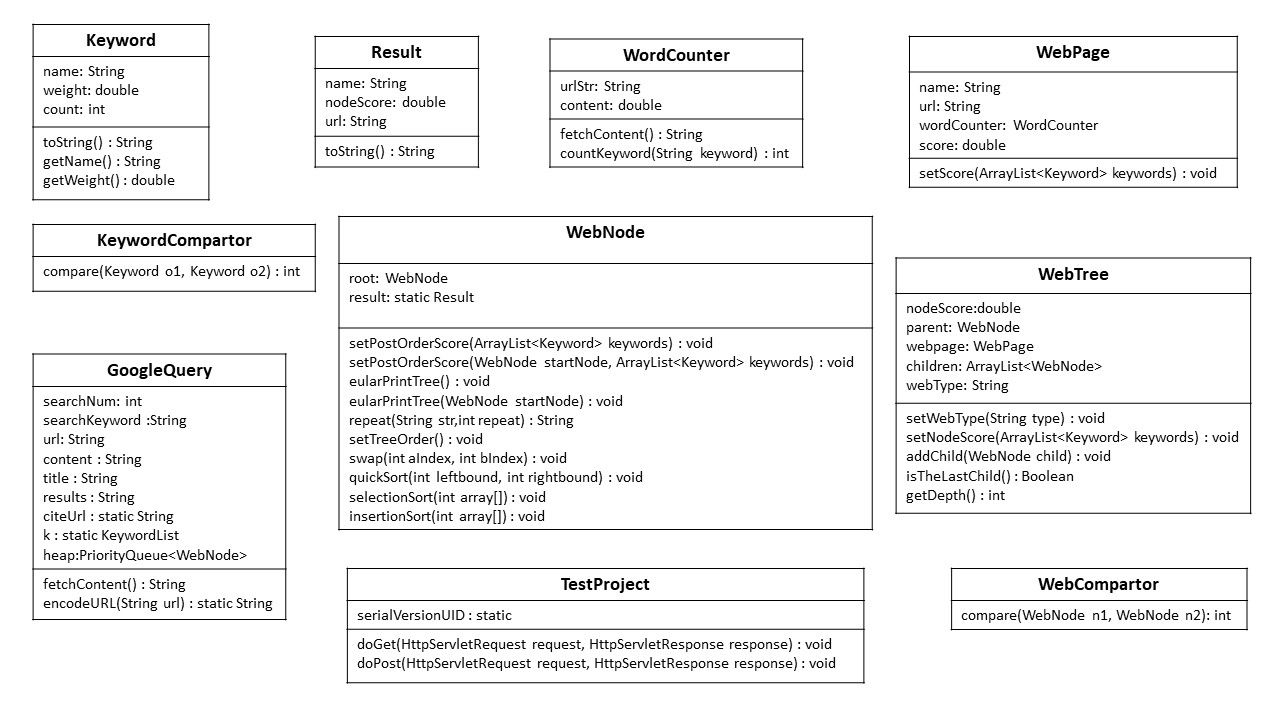


Figure 2. The UML Diagram

1. ***Keyword*** class

|  |  |
| --- | --- |
| ***Keyword*** | |
| **Modifier and type** | **Method (or Variable) and description** |
| **Instance variable** | |
| **String** | name |
| **double** | weight |
| **int** | count |
| **Constructor** | |
| **Keyword(String name, double weight)**  Enable to construct a *Student* object with given *name*, *weight*. | |
| **Instance methods** | |
| ***getters*** | getName(), getWeight() |
| **String** | toString()  Return a String description of the keyword.  **Sample output:**  [海豚刑警 , 2] |

1. ***KeywordComparator*** class

|  |  |
| --- | --- |
| **KeywordComparator implements Comparator<Keyword>** | |
| **Modifier and type** | **Method (or Variable) and description** |
| **Instance methods** | |
| **int** | compare (Keyword o1, Keyword o2)  Compare the count of the keywords and return (1, 0, -1) based on the result. |

1. ***GoogleQuery*** class

|  |  |
| --- | --- |
| **GoogleQuery** | |
| **Modifier and type** | **Method (or Variable) and description** |
| **Instance variable** | |
| **int** | searchNum |
| **String** | url |
| **String** | searchKeyword |
| **String** | content |
| **String** | title |
| **String** | results |
| **static String** | citeUrl |
| **KeywordList** | kLst |
| **PriorityQueue<WebNode>** | heap |
| **long** | startingTime |
| **Constructor** | |
| **GoogleQuery(String searchKeyword)**  Construct a GoogleQuery object and set the input parameters for connecting the google server.  Make sure to declare the url parameter with the related value below:  ***this.url = "http://www.google.com/search?q=" + this.searchKeyword + "&oe=utf8&num=50";***  and initializes other parameters. | |

|  |  |
| --- | --- |
| **Instance methods** | |
| **String** | fetchContent ()  Use URLConnection and related methods to fetch the content we want*.* |
| **HashMap<String, String>** | query()  Add founded websites and urls to Hashmap, and call the related methods to compute score of pages, print tree, sort and show results. |
| **ArrayList<String>** | hyper ()  Add founded websites and url to an ArrayList.. |
| **static String** | encodeURL (String url)  Encode the url which was founded. |

1. ***Result*** class

|  |  |
| --- | --- |
| **Result** | |
| **Modifier and type** | **Method (or Variable) and description** |
| **Instance variable** | |
| **String** | name |
| **String** | url |
| **double** | nodeScore |
| **Constructor** | |
| **Result (String name, double nodeScore, String url)**  Enable to construct a Result object and instantiate the name, url and nodeScore. | |
| **String** | toString()  Return a String description of the result. |

1. ***KeywordList*** class

|  |  |
| --- | --- |
| **KeywordList** | |
| **Modifier and type** | **Method (or Variable) and description** |
| **Instance variable** | |
| **ArrayList<Result>** | lst  The execution for user to connect the input with the database. |
| **Constructor** | |
| **KeywordList ()**  Construct a KeywordList object and instantiate **ArrayList<Result>** lst. | |
| **Instance methods** | |
| **ArrayList<Result>** | getList ()  Return lst. |
| **void** | add(Result result)  Add the result to lst. |
| **void** | sort()  Use quickSort, bubbleSort, selectionSort, or insertionSort to sort items. |
| **private void** | quickSort(int leftbound, int rightbound)  Implement quickSort. |
| **private void** | bubbleSort(int array[])  Implement bubbleSort. |
| **private void** | selectionSort(int array[])  Implement selectionSort. |
| **private void** | insertionSort(int array[])  Implement selectionSort. |
| **void** | swap(int a, int b)  Swap the position of lst. |
| **void** | show()  Show the result of sorting. |

1. ***WebComparator*** class

|  |  |
| --- | --- |
| **WebComparator implements from Comparator<WebNode>** | |
| **Modifier and type** | **Method (or Variable) and description** |
| **Instance methods** | |
| **int** | compare (WebNode n1, WebNode n2)  Compare the nodeScore of the Webs and return a number based on the result. |

1. ***WebNode*** class

|  |  |
| --- | --- |
| ***WebNode*** | |
| **Modifier and type** | **Method (or Variable) and description** |
| **Instance variable** | |
| **double** | nodeScore |
| **WebNode** | parent |
| **WebPage** | webPage |
| **ArrayList<WebNode>** | children |
| **String** | webType |
| **Constructor** | |
| **WebNode(WebPage webPage)**  Enable to construct a WebNode object and instantiate the webPage and children. | |
| **void** | setWebType (String type)  Instantiate webType with given type. |
| **void** | setNodeScore (ArrayList<Keyword> keywords)  Set the node score of keywords to arraylist. |
| **void** | addChild(WebNode child)  Add the given child to children arraylist. Besides, set the child’s parent is this. |
| **boolean** | isTheLastChild()  Check whether it is the last child or not. |
| **int** | getDepth()  Compute the depth of the node tree. |

1. ***WebPage*** class

|  |  |
| --- | --- |
| ***WebPage*** | |
| **Modifier and type** | **Method (or Variable) and description** |
| **Instance variable** | |
| **String** | url |
| **String** | name |
| **WordCounter** | wordCounter |
| **double** | score |
| **Constructor** | |
| **WebPage(String url,String name)**  Enable to construct a WebNode object and instantiate the name, url and wordCounter. Besides, you also need to consider the UnsupportedEncodingException. | |
| **void** | setScore (ArrayList<Keyword> keywords)  Set the score of keywords to arraylist. |

1. ***WebTree*** class

|  |  |
| --- | --- |
| ***WebTree*** | |
| **Modifier and type** | **Method (or Variable) and description** |
| **Instance variable** | |
| **WebNode** | root |
| **static Result** | result |
| **Constructor** | |
| **WebTree(WebPage rootPage)**  Enable to construct a WebTree object and instantiate the root with given WebPage. | |
| **void** | setPostOrderScore(ArrayList<Keyword> keywords)  Call the private void setPostOrderScore method. |
| **private void** | setPostOrderScore(WebNode startNode, ArrayList<Keyword> keywords)  Implement setPostOrderScore. |
| **void** | eularPrintTree()  Call the private void eularPrintTree method. |
| **private void** | eularPrintTree(WebNode startNode)  Print the tree result include web pages and url. |
| **private String** | repeat(String str,int repeat)  Return a string object. |
| **void** | setTreeOrder()  Implement quickSort method. |
| **private void** | swap(int aIndex, int bIndex)  Swap the position of root.children. |
| **private void** | quickSort(int leftbound, int rightbound)  Implement quickSort. |
| **private void** | bubbleSort(int array[])  Implement bubbleSort. |
| **private void** | selectionSort(int array[])  Implement selectionSort. |
| **private void** | insertionSort(int array[])  Implement insertionSort. |

1. ***WordCounter*** class

|  |  |
| --- | --- |
| ***WordCounter*** | |
| **Modifier and type** | **Method (or Variable) and description** |
| **Instance variable** | |
| **String** | urlStr  The website’s nodeScore. |
| **String** | content  The parent website. |
| **Constructor** | |
| **WordCounter** **(String urlStr)**  Enable to construct a WordCounter object and instantiate the urlStr. | |
| **String** | fetchContent ()  Fetch the content of url |
| **int** | countKeyword(String keyword)  Compute how many times does the keyword appear. |

1. ***TestProject***

**import java.io.File;**

**import java.io.IOException;**

**import java.io.InputStream;**

**import java.io.PrintWriter;**

**import java.util.HashMap;**

**import java.util.Map.Entry;**

**import java.util.Properties;**

**import javax.servlet.ServletContext;**

**import javax.servlet.ServletException;**

**import javax.servlet.annotation.WebServlet;**

**import javax.servlet.http.HttpServlet;**

**import javax.servlet.http.HttpServletRequest;**

**import javax.servlet.http.HttpServletResponse;**

**import java.util.\*;**

**import javax.servlet.ServletContext;**

**import javax.servlet.ServletException;**

**import javax.servlet.annotation.WebServlet;**

**import javax.servlet.http.HttpServlet;**

**import javax.servlet.http.HttpServletRequest;**

**import javax.servlet.http.HttpServletResponse;**

**/\*\***

**\* Servlet implementation class TestProject**

**\*/**

**@WebServlet("/TestProject")**

**public class TestProject extends HttpServlet {**

**private static final long serialVersionUID = 1L;**

**/\*\***

**\* @see HttpServlet#HttpServlet()**

**\*/**

**public TestProject() {**

**// Used as Main.java**

**super();**

**}**

**/\*\***

**\* @see HttpServlet#doGet(HttpServletRequest request, HttpServletResponse response)**

**\*/**

**protected void doGet(HttpServletRequest request, HttpServletResponse response) throws ServletException, IOException {**

**// TODO Auto-generated method stub**

**response.setCharacterEncoding("UTF-8");**

**request.setCharacterEncoding("UTF-8");**

**response.setContentType("text/html");**

**int search = 20;**

**if(request.getParameter("searchNum") != null) {**

**search = Integer.parseInt(request.getParameter("searchNum"));**

**}**

**// search.jsp**

**if(request.getParameter("keyword")== null) {**

**String requestUri = request.getRequestURI();**

**request.setAttribute("requestUri", requestUri);**

**request.getRequestDispatcher("Search.jsp").forward(request, response);**

**return;**

**}**

**// googleitem.jsp**

**GoogleQuery google;**

**google = new GoogleQuery(request.getParameter("keyword"));**

**HashMap<String, String> query = google.query();**

**int index = query.size();**

**String[][] s = new String[index][2];**

**request.setAttribute("query", s);**

**int num = 0;**

**for(Entry<String, String> entry : query.entrySet()) {**

**String key = entry.getKey();**

**s[num][0] = key;**

**String val = entry.getValue();**

**s[num][1] = val;**

**num = num + 1;**

**}**

**KeywordList kLst = google.kLst;**

**for(int i = 0 ; i < kLst.lst.size() ; i++) {**

**s[i][0] = kLst.lst.get(i).name;**

**s[i][1] = kLst.lst.get(i).url;**

**}**

**request.getRequestDispatcher("googleitem.jsp").forward(request, response);**

**}**

**/\*\***

**\* @see HttpServlet#doPost(HttpServletRequest request, HttpServletResponse response)**

**\*/**

**protected void doPost(HttpServletRequest request, HttpServletResponse response) throws ServletException, IOException {**

**// TODO Auto-generated method stub**

**doGet(request, response);**

**}**

**}**

**TestProject extends HttpServlet**

**/\*\***

**\* @see HttpServlet#HttpServlet()**

**\*/**

**public TestProject() {**

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**}**

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**if(request.getParameter("keyword")== null) {**

**String requestUri = request.getRequestURI();**

**request.setAttribute("requestUri", requestUri);**

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**return;**

**}**

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**for(Entry<String, String> entry : query.entrySet()) {**

**String key = entry.getKey();**

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**}**

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**// TODO Auto-generated method stub**

**doGet(request, response);**

**}**

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