

**Advanced Parsing Algorithm for Optimized Indexing of Site Data
found Through TCP/IP Sockets**

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Executive Summary

The advent of the Internet has provided a single human with more information at their fingertips than was ever available in the great libraries of the ancient world.

However, access to these terabytes upon terabytes of information available on the Internet is limited by the instruments that are available to comb through the mountains of information and find relevant information. Since the dawn of the Internet, many companies have written search programs and engines to accomplish these tasks, but irrelevant information is rampant because some publishers of inappropriate sites or unscrupulous site designers have found ways to "trick" search engines into submitting their site at the top of the search queue or as a most relevant site when it is really not relevant under the search parameters entered by the user.

The purpose of this project was to develop a search algorithm that was able to find relevant information faster than all other search engines, and was able to discount unscrupulous practices or ranking ones site as relevant when it really was not.

The project is able to crawl and index web sites using the database language Microsoft SQL. Because of the massive computing power needed to do this, the initial test version of the program was restricted to only a few websites. Based on the results from the sample, the project continues update the algorithm to better filter the pages. After the algorithm is refined, indexing of the entire web and development of the user interface.

Introduction

The Issue

The advent of the Internet has provided a single human with more information at their fingertips than was ever available in the great libraries of the ancient world. However, access to these terabytes upon terabytes of information available on the Internet is limited by the instruments that are available to comb through the mountains of information and find relevant information. Since the dawn of the Internet, many companies have written search programs and engines to accomplish these tasks, but irrelevant information is rampant because some publishers of inappropriate sites or unscrupulous site designers have found ways to "trick" search engines into submitting their site at the top of the search queue or as a most relevant site when it is really not relevant under the search parameters entered by the user. Webmasters are also starting to accept payments from companies in exchange for giving their websites higher priorities in their search engines. These methods hurt the user in that irrelevant information wastes their time, which is ever so valuable in the fast paced world humans reside in today. A quick, concise search of relevant information that is accurate and up to date is the objective of the project.

Our Project

The purpose of this project is to develop a search algorithm that is able to find relevant information faster than all other search engines, and be able to discount unscrupulous practices or ranking ones site as relevant when it really is not.

The project will be able to crawl and index web sites using the database language MicrosoftSQL. Because of the massive computing power needed to do this, we will be restricting the initial test version of the program to only search fifty sample pages. The fifty pages will be created with similar content, but each will use different methods to "trick" the search engine into tagging it as most relevant. Based on the results from the sample, we will continually update the algorithm to better filter the pages. After we refine the algorithm, we will begin indexing the entire web using high performance computing resources.

Background Information

Current search engines may be classified as adequate. They search with moderate speed and fetch fairly accurate results. However, these "adequate" search engines waste the user's time by returning irrelevant or inaccurate results. Some search engines, such as Hot Bot or Overture "crawl" the Web in real time and return results based on a quick search. Such engines do not crawl the entire web because that would require an extremely large amount of computing power and internet bandwidth. These search engines contrast Google, which indexes the entire web. Google indexes the entire web and so searches crawl through Google's database of web pages that it has already indexed and returns information that it deems relevant. The advantage to this approach is that the entire web is searched, not just a small portion. However, the disadvantage to this approach is that indexed material can often become out of date quickly, and speed is an issue when you are dealing with millions of web pages being created daily.

Another disadvantage to both of these types of search engines comes about when the business of searching the web sells itself out. Most major search engines, including Google have begun to sell preference of a company or individual's website or web page by its search engine for a fee. This hurts the user in that it can cause their time to be wasted. That is, the user may search for certain keywords and the most relevant results may be buried under a many screens of results because an advertiser paid to make its web page have more priority with the search engine.

An important issue in the development of the project was defining "relevance." The dictionary defines relevance as, "closely related to a matter under consideration." Relevance, however, is in the eye of the beholder. What is relevant to one person when searching for a few key words may be irrelevant to another person who is searching under the same keywords. So for the purpose of this project, relevance was defined as the dictionary definition. Major corporations have specialists who research what is relevant and what is not, however since relevance is so abstract, the program searches for key words, and returns results that match the keywords closest. After eliminating many sites and pages that are not applicable to the key words, the user then has more accurate choices so that the user can find information that is relevant to their own definition of relevance.

All these things considered, the research of this project found that many of the search engines to day are adequate, but they have room to be refined. These current search engines can be improved in terms of speed, accuracy of information, and finding other ways to fund their operation, in lieu of sacrificing the valuable time of the user for advertising dollars.

One large problem that appeared during this project was what programming language to use for the project. Java, C++, PHP and Visual Basic .NET were considered. After deciding to use Visual Basic, some statistics were found through a Microsoft conference that supported the choice to use Visual Basic .NET. Listed below is a list of advantages and benefits of using Visual Basic . NET:

- Visual Studio takes 1/3 the code to accomplish the same thing as java (based off the Java Petstore eCommerce model)
- Visual studio is up to 28 times faster than java (based off the Java Petstore eCommerce model)
- Visual studio can handle 6 times as many users (based off the Java Petstore eCommerce model)
- Between 100% and 300% faster than Java (Café Express, switched from Java to Visual Studio)
- Built in internet protocol tool
- ASP.NET online applications, capable of real-time debugging
- Powerful, well refined databasing tool: Microsoft SQL

Upon weighing the advantages versus the major disadvantage of Visual Studio not running on Linux (although a version is being created), Visual Basic .NET stood out as the optimal language for this project.

Project Description

This project was created to improve on many problems of current search engines. The project consisted of three separate independent phases. Each phase is

compiled independently, but they all interact through the main database (a Microsoft SQL database, created through Microsoft Access).

The first phase is simple a program that downloads websites in the “To Search” database. This phase is powered by Win Sockets, allowing it to easily interact with both HTTP and FTP servers. Because of the diversity of protocols for HTTP and FTP communication, the program uses a premade ActiveX component that also powers Internet Explorer. This component is capable of interacting through 4 sets of protocols (HTTP, HTTPS, FTP and GOPHER).

The first phase would pass on the HTML source code to the next phase, which does basic parsing and saves the file to a database. The basic parsing includes separating the HTML and the text, finding the title, looking for links and removing extra spaces and text.

The third phase is a website, powered by ASP.NET. When the user enters our search engine, they are presented with a form that connects to the third phase to return results to the user’s search. The final part looks for all appearances of keywords and executes the algorithm to decide its rating.

There were many challenges in designing the algorithm, because it had to meet to very important goals. The first goal was speed. The algorithm must be able to search thousands of pages extremely quickly. The second goal was accuracy. The search engine needed to return relevant, accurate pages for the user’s search keywords. To reach this goal, we decided on a very simple algorithm. Surprisingly, the simple algorithm worked very well with real world websites. The algorithm had four phases. The first phase looked for the keywords anywhere in the HTML source (The title, meta

tags, image alts, the page location, links and headers). Each tag that it appeared in added to the total points (no more than 40 points were given through the HTML, because based on research, HTML tags are useful, but webmaster of pornography or other inappropriate sites often put legitimate search keywords in their HTML tags so that their site appears high on the search results to an unsuspecting user). The second phase looked for general appearances of the keyword. A maximum of 100 points was given here. Next, the third phase looked for keywords appearing close together in the content, which gave up to 60 points. The last phase was created to remove results with large lists of keywords. To detect them, the program looked for a high ratio of commas, spaces and semicolons to the total length of the file. The page with the highest number of points was the first result.

Upon sorting all the results with the algorithm, the results are printed to the screen, where the user can then click any result to visit that particular screen.

Results

To test the search engine, numerous sample websites were created that took advantage of basic tricks used to trick many search engines. These included long lists of keywords hidden the document, titles filled with keywords, META tags and ALT tags. In addition, pages were created that had many of the same keywords, but different general subjects. These pages were then indexed those using the software. Then to confirm that the search engine works, users searched for words that appear in the documents, and then we compared the results of the pages that used tricks against the other pages. All except one of the times, the search engine provided the correct result. The one time that the search engine failed was when it was indexing a page with a large

list of words in the meta tag. The reasoning by this problem is currently unknown, but the problem is being identified by tracing where the points were given.

Conclusions

The search engine created was meant to fix three key problems in today's search engines. The first problem was the user interface, the second was the speed and third was the quality of the results.

The user interface was easily solved. The search engine we created contains only a field and a search button. Because there is no need for advanced options or choices, the search engine is simple and straightforward. Also, there is no advertising, making the layout clear. The common problem of confusing, complex layouts in modern search engines was fixed.

The search engine and web crawler came out faster than expect, but it is hard to compare with other modern search engines, because of the lack of public statistics. One large problem in measuring the time is all websites had to be downloaded through the internet and the program was run on a computer with only a cable connection. Most of the indexing time was spent on downloading the site (0.4 seconds), while only 0.2 seconds were spend parsing the HTML. In the third phase, when the user does the search, .266 seconds are spent opening the database, searching it for keywords ad then printing it to the screen. This seems reasonably fast. In one day, the search engine (operating with a T1, not a cable connection) could index 216,000 pages. Also, in a day, it could 1,440,000 searches. These results seem to suggest that the search engine is efficient.

Finally, the results showed that the search engine could better order and choose results than engines like HotBot, Overture and Lycos. To compare results, the example search used on Google, HotBot and Overture were compared to the same searches using the example pages on this project's search engine. In a few searches, the search engine could outperform Google by being able to distinguish between long lists of words and actual content. In many cases, the search engine returned similar results to Google. Finally, in two of the searches, it returned results less accurate than Google.

Overall, the project returned very accurate results and solved many of the key problems in today's search engines.

Recommendations

Now that the indexing and database part of the program is complete, future work will include developing a user interface and indexing the World Wide Web. Developing a user interface will be accomplished using the same Visual Studio and Microsoft.Net framework to build a user interface that is simple to use, yet takes advantage of the powerful features that the search engine enables the user to search with. This user interface will most likely be web based and simple to use. It should be so easy to use that someone who does not know about advanced search techniques or Boolean Logic should be able to quickly and easily execute a search.

Indexing the web will probably be the most important objective of the project that needs to be done. This will be accomplished by installing the main program on a server and twenty client computers. These computers will work over an ISDN line to index the World Wide Web. Should this program ever be taken commercially, even more

computing resources can be used to index the World Wide Web faster and more efficiently to keep up with the constantly changing and growing World Wide Web.

A few improvements can be made to the algorithm to better include new forms of web design. The largest problem is that the search engine is unable to access individual frames on a page, causing pages with frames to be skipped or ignored. Also, the search engine cannot handle XML websites, which are becoming a very popular design language. In addition, a few improvements can be made to ensure that websites added to the database later are refreshed faster than websites added recently.

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Appendix A: Code

```

Option Strict Off
Option Explicit On
Friend Class MainForm
    Inherits System.Windows.Forms.Form
    Const newline = Chr(13) & Chr(10)
    Const tab = Chr(9)
    Dim StopS As Boolean

#Region "Windows Form Designer generated code "
    Public Sub New()
        MyBase.New()
        If m_vb6FormDefInstance Is Nothing Then
            If m_InitializingDefInstance Then
                m_vb6FormDefInstance = Me
            Else
                Try
                    'For the start-up form, the first instance
                    created is the default instance.
                    If
                        System.Reflection.Assembly.GetExecutingAssembly.EntryPoint.DeclaringType Is
                        Me.GetType Then
                            m_vb6FormDefInstance = Me
                        End If
                    Catch
                    End Try
                End If
            End If
            'This call is required by the Windows Form Designer.
            InitializeComponent()
        End Sub
        'Form overrides dispose to clean up the component list.
        Protected Overloads Overrides Sub Dispose(ByVal Disposing As Boolean)
            If Disposing Then
                If Not components Is Nothing Then
                    components.Dispose()
                End If
            End If
            MyBase.Dispose(Disposing)
        End Sub
    Private components As System.ComponentModel.IContainer
        'Required by the Windows Form Designer
        Public ToolTip1 As System.Windows.Forms.ToolTip
        Public WithEvents pageHTML As System.Windows.Forms.TextBox
        Public WithEvents pageText As System.Windows.Forms.TextBox
        Public WithEvents btBegin As System.Windows.Forms.Button
        Public WithEvents txtLang As System.Windows.Forms.TextBox
        Public WithEvents txtSize As System.Windows.Forms.TextBox
        Public WithEvents txtType As System.Windows.Forms.TextBox
        Public WithEvents txtStep As System.Windows.Forms.TextBox
        Public WithEvents txtURL As System.Windows.Forms.TextBox
        Public WithEvents InetSocket As AxInetCtrlsObjects.AxInet
        Public WithEvents lbHTML As System.Windows.Forms.Label
        Public WithEvents lbSource As System.Windows.Forms.Label

```

```

Public WithEvents lbLang As System.Windows.Forms.Label
Public WithEvents lbSize As System.Windows.Forms.Label
Public WithEvents lbType As System.Windows.Forms.Label
Public WithEvents lbStep As System.Windows.Forms.Label
Public WithEvents lbURL As System.Windows.Forms.Label
'NOTE: The following procedure is required by the Windows Form Designer
'It can be modified using the Windows Form Designer.
'Do not modify it using the code editor.
<System.Diagnostics.DebuggerStepThrough(> Private Sub
InitializeComponent()
    Me.components = New System.ComponentModel.Container()
    Dim resources As System.Resources.ResourceManager = New
System.Resources.ResourceManager(GetType(MainForm))
    Me.ToolTip1 = New System.Windows.Forms.ToolTip(Me.components)
    Me.lbURL = New System.Windows.Forms.Label()
    Me.txtURL = New System.Windows.Forms.TextBox()
    Me.lbLang = New System.Windows.Forms.Label()
    Me.lbType = New System.Windows.Forms.Label()
    Me.txtLang = New System.Windows.Forms.TextBox()
    Me.lbSource = New System.Windows.Forms.Label()
    Me.txtType = New System.Windows.Forms.TextBox()
    Me.InetSocket = New AxInetCtrlsObjects.AxInet()
    Me.btBegin = New System.Windows.Forms.Button()
    Me.pageHTML = New System.Windows.Forms.TextBox()
    Me.btStop = New System.Windows.Forms.Button()
    Me.pageText = New System.Windows.Forms.TextBox()
    Me.DBConnection = New System.Data.OleDb.OleDbConnection()
    Me.lbHTML = New System.Windows.Forms.Label()
    Me.lbStep = New System.Windows.Forms.Label()
    Me.lbSize = New System.Windows.Forms.Label()
    Me.txtStep = New System.Windows.Forms.TextBox()
    Me.txtSize = New System.Windows.Forms.TextBox()
    CType(Me.InetSocket,
System.ComponentModel.ISupportInitialize).BeginInit()
    Me.SuspendLayout()
    '
    'lbURL
    '
    Me.lbURL.BackColor = System.Drawing.SystemColors.Control
    Me.lbURL.Cursor = System.Windows.Forms.Cursors.Default
    Me.lbURL.Font = New System.Drawing.Font("Arial", 8!,
System.Drawing.FontStyle.Regular, System.Drawing.GraphicsUnit.Point, CType(0,
Byte))
    Me.lbURL.ForeColor = System.Drawing.SystemColors.ControlText
    Me.lbURL.Location = New System.Drawing.Point(16, 8)
    Me.lbURL.Name = "lbURL"
    Me.lbURL.RightToLeft = System.Windows.Forms.RightToLeft.No
    Me.lbURL.Size = New System.Drawing.Size(81, 17)
    Me.lbURL.TabIndex = 0
    Me.lbURL.Text = "Website URL:"
    '
    'txtURL
    '
    Me.txtURL.AcceptsReturn = True
    Me.txtURL.AutoSize = False
    Me.txtURL.BackColor = System.Drawing.SystemColors.Window
    Me.txtURL.Cursor = System.Windows.Forms.Cursors.IBeam

```

```

    Me.txtURL.Font = New System.Drawing.Font("Arial", 8!,
System.Drawing.FontStyle.Regular, System.Drawing.GraphicsUnit.Point, CType(0,
Byte))
    Me.txtURL.ForeColor = System.Drawing.SystemColors.WindowText
    Me.txtURL.Location = New System.Drawing.Point(96, 8)
    Me.txtURL.MaxLength = 0
    Me.txtURL.Name = "txtURL"
    Me.txtURL.ReadOnly = True
    Me.txtURL.RightToLeft = System.Windows.Forms.RightToLeft.No
    Me.txtURL.Size = New System.Drawing.Size(337, 19)
    Me.txtURL.TabIndex = 1
    Me.txtURL.Text = ""
    '
    'lbLang
    '
    Me.lbLang.BackColor = System.Drawing.SystemColors.Control
    Me.lbLang.Cursor = System.Windows.Forms.Cursors.Default
    Me.lbLang.Font = New System.Drawing.Font("Arial", 8!,
System.Drawing.FontStyle.Regular, System.Drawing.GraphicsUnit.Point, CType(0,
Byte))
    Me.lbLang.ForeColor = System.Drawing.SystemColors.ControlText
    Me.lbLang.Location = New System.Drawing.Point(288, 56)
    Me.lbLang.Name = "lbLang"
    Me.lbLang.RightToLeft = System.Windows.Forms.RightToLeft.No
    Me.lbLang.Size = New System.Drawing.Size(65, 17)
    Me.lbLang.TabIndex = 8
    Me.lbLang.Text = "Language:"
    '
    'lbType
    '
    Me.lbType.BackColor = System.Drawing.SystemColors.Control
    Me.lbType.Cursor = System.Windows.Forms.Cursors.Default
    Me.lbType.Font = New System.Drawing.Font("Arial", 8!,
System.Drawing.FontStyle.Regular, System.Drawing.GraphicsUnit.Point, CType(0,
Byte))
    Me.lbType.ForeColor = System.Drawing.SystemColors.ControlText
    Me.lbType.Location = New System.Drawing.Point(16, 56)
    Me.lbType.Name = "lbType"
    Me.lbType.RightToLeft = System.Windows.Forms.RightToLeft.No
    Me.lbType.Size = New System.Drawing.Size(81, 17)
    Me.lbType.TabIndex = 4
    Me.lbType.Text = "File Type:"
    '
    'txtLang
    '
    Me.txtLang.AcceptsReturn = True
    Me.txtLang.AutoSize = False
    Me.txtLang.BackColor = System.Drawing.SystemColors.Window
    Me.txtLang.Cursor = System.Windows.Forms.Cursors.IBeam
    Me.txtLang.Font = New System.Drawing.Font("Arial", 8!,
System.Drawing.FontStyle.Regular, System.Drawing.GraphicsUnit.Point, CType(0,
Byte))
    Me.txtLang.ForeColor = System.Drawing.SystemColors.WindowText
    Me.txtLang.Location = New System.Drawing.Point(352, 56)
    Me.txtLang.MaxLength = 0
    Me.txtLang.Name = "txtLang"
    Me.txtLang.ReadOnly = True

```

```

Me.txtLang.RightToLeft = System.Windows.Forms.RightToLeft.No
Me.txtLang.Size = New System.Drawing.Size(81, 19)
Me.txtLang.TabIndex = 9
Me.txtLang.Text = ""
'
'lbSource
'
Me.lbSource.BackColor = System.Drawing.SystemColors.Control
Me.lbSource.Cursor = System.Windows.Forms.Cursors.Default
Me.lbSource.Font = New System.Drawing.Font("Arial", 8!,
System.Drawing.FontStyle.Regular, System.Drawing.GraphicsUnit.Point, CType(0,
Byte))
Me.lbSource.ForeColor = System.Drawing.SystemColors.ControlText
Me.lbSource.Location = New System.Drawing.Point(16, 128)
Me.lbSource.Name = "lbSource"
Me.lbSource.RightToLeft = System.Windows.Forms.RightToLeft.No
Me.lbSource.Size = New System.Drawing.Size(209, 17)
Me.lbSource.TabIndex = 11
Me.lbSource.Text = "Source (No HTML):"
'
'txtType
'
Me.txtType.AcceptsReturn = True
Me.txtType.AutoSize = False
Me.txtType.BackColor = System.Drawing.SystemColors.Window
Me.txtType.Cursor = System.Windows.Forms.Cursors.IBeam
Me.txtType.Font = New System.Drawing.Font("Arial", 8!,
System.Drawing.FontStyle.Regular, System.Drawing.GraphicsUnit.Point, CType(0,
Byte))
Me.txtType.ForeColor = System.Drawing.SystemColors.WindowText
Me.txtType.Location = New System.Drawing.Point(96, 56)
Me.txtType.MaxLength = 0
Me.txtType.Name = "txtType"
Me.txtType.ReadOnly = True
Me.txtType.RightToLeft = System.Windows.Forms.RightToLeft.No
Me.txtType.Size = New System.Drawing.Size(41, 19)
Me.txtType.TabIndex = 5
Me.txtType.Text = ""
'
'InetSocket
'
Me.InetSocket.Enabled = True
Me.InetSocket.Location = New System.Drawing.Point(416, 200)
Me.InetSocket.Name = "InetSocket"
Me.InetSocket.OcxState =
CType(resources.GetObject("InetSocket.OcxState"),
System.Windows.Forms.AxHost.State)
Me.InetSocket.Size = New System.Drawing.Size(38, 38)
Me.InetSocket.TabIndex = 14
'
'btBegin
'
Me.btBegin.BackColor = System.Drawing.SystemColors.Control
Me.btBegin.Cursor = System.Windows.Forms.Cursors.Default
Me.btBegin.Font = New System.Drawing.Font("Arial", 8!,
System.Drawing.FontStyle.Regular, System.Drawing.GraphicsUnit.Point, CType(0,
Byte))

```

```

Me.btBegin.Location = New System.Drawing.Point(16, 88)
Me.btBegin.Name = "btBegin"
Me.btBegin.RightToLeft = System.Windows.Forms.RightToLeft.No
Me.btBegin.Size = New System.Drawing.Size(208, 25)
Me.btBegin.TabIndex = 10
Me.btBegin.Text = "Begin"
'
'pageHTML
'
Me.pageHTML.AcceptsReturn = True
Me.pageHTML.AutoSize = False
Me.pageHTML.BackColor = System.Drawing.SystemColors.Window
Me.pageHTML.Cursor = System.Windows.Forms.Cursors.IBeam
Me.pageHTML.Font = New System.Drawing.Font("Arial", 8!,
System.Drawing.FontStyle.Regular, System.Drawing.GraphicsUnit.Point, CType(0,
Byte))
Me.pageHTML.ForeColor = System.Drawing.SystemColors.WindowText
Me.pageHTML.Location = New System.Drawing.Point(232, 152)
Me.pageHTML.MaxLength = 0
Me.pageHTML.Multiline = True
Me.pageHTML.Name = "pageHTML"
Me.pageHTML.ReadOnly = True
Me.pageHTML.RightToLeft = System.Windows.Forms.RightToLeft.No
Me.pageHTML.ScrollBars = System.Windows.Forms.ScrollBars.Both
Me.pageHTML.Size = New System.Drawing.Size(201, 177)
Me.pageHTML.TabIndex = 13
Me.pageHTML.Text = ""
Me.pageHTML.WordWrap = False
'
'btStop
'
Me.btStop.Enabled = False
Me.btStop.Location = New System.Drawing.Point(232, 88)
Me.btStop.Name = "btStop"
Me.btStop.Size = New System.Drawing.Size(208, 25)
Me.btStop.TabIndex = 15
Me.btStop.Text = "Stop"
'
'pageText
'
Me.pageText.AcceptsReturn = True
Me.pageText.AutoSize = False
Me.pageText.BackColor = System.Drawing.SystemColors.Window
Me.pageText.Cursor = System.Windows.Forms.Cursors.IBeam
Me.pageText.Font = New System.Drawing.Font("Arial", 8!,
System.Drawing.FontStyle.Regular, System.Drawing.GraphicsUnit.Point, CType(0,
Byte))
Me.pageText.ForeColor = System.Drawing.SystemColors.WindowText
Me.pageText.Location = New System.Drawing.Point(16, 152)
Me.pageText.MaxLength = 0
Me.pageText.Multiline = True
Me.pageText.Name = "pageText"
Me.pageText.ReadOnly = True
Me.pageText.RightToLeft = System.Windows.Forms.RightToLeft.No
Me.pageText.ScrollBars = System.Windows.Forms.ScrollBars.Both
Me.pageText.Size = New System.Drawing.Size(201, 177)
Me.pageText.TabIndex = 12

```

```

Me.pageText.Text = ""
Me.pageText.WordWrap = False
'
'DBConnection
'
Me.DBConnection.ConnectionString =
"Provider=Microsoft.Jet.OLEDB.4.0;Password="";User ID=Admin;Data
Source=C:\Visual " & _
"Studio\VB
Projects\Crawler\prjCrawler.NET\TheDatabase.mdb;Mode=ReadWrite|Share D" & _
"eny None;Extended Properties="";Jet OLEDB:System database="";Jet
OLEDB:Registry " & _
"Path="";Jet OLEDB:Database Password="";Jet OLEDB:Engine
Type=5;Jet OLEDB:Databas" & _
"e Locking Mode=1;Jet OLEDB:Global Partial Bulk Ops=2;Jet
OLEDB:Global Bulk Trans" & _
"actions=1;Jet OLEDB:New Database Password="";Jet OLEDB:Create
System Database=Fa" & _
"lse;Jet OLEDB:Encrypt Database=False;Jet OLEDB:Don't Copy Locale on
Compact=Fals" & _
"e;Jet OLEDB:Compact Without Replica Repair=False;Jet
OLEDB:SFP=False"
'
'lbHTML
'
Me.lbHTML.BackColor = System.Drawing.SystemColors.Control
Me.lbHTML.Cursor = System.Windows.Forms.Cursors.Default
Me.lbHTML.Font = New System.Drawing.Font("Arial", 8!,
System.Drawing.FontStyle.Regular, System.Drawing.GraphicsUnit.Point, CType(0,
Byte))
Me.lbHTML.ForeColor = System.Drawing.SystemColors.ControlText
Me.lbHTML.Location = New System.Drawing.Point(232, 128)
Me.lbHTML.Name = "lbHTML"
Me.lbHTML.RightToLeft = System.Windows.Forms.RightToLeft.No
Me.lbHTML.Size = New System.Drawing.Size(129, 17)
Me.lbHTML.TabIndex = 14
Me.lbHTML.Text = "HTML Tags:"
'
'lbStep
'
Me.lbStep.BackColor = System.Drawing.SystemColors.Control
Me.lbStep.Cursor = System.Windows.Forms.Cursors.Default
Me.lbStep.Font = New System.Drawing.Font("Arial", 8!,
System.Drawing.FontStyle.Regular, System.Drawing.GraphicsUnit.Point, CType(0,
Byte))
Me.lbStep.ForeColor = System.Drawing.SystemColors.ControlText
Me.lbStep.Location = New System.Drawing.Point(16, 32)
Me.lbStep.Name = "lbStep"
Me.lbStep.RightToLeft = System.Windows.Forms.RightToLeft.No
Me.lbStep.Size = New System.Drawing.Size(81, 17)
Me.lbStep.TabIndex = 2
Me.lbStep.Text = "Current Step:"
'
'lbSize
'
Me.lbSize.BackColor = System.Drawing.SystemColors.Control
Me.lbSize.Cursor = System.Windows.Forms.Cursors.Default

```

```

    Me.lbSize.Font = New System.Drawing.Font("Arial", 8!,
System.Drawing.FontStyle.Regular, System.Drawing.GraphicsUnit.Point, CType(0,
Byte))
    Me.lbSize.ForeColor = System.Drawing.SystemColors.ControlText
    Me.lbSize.Location = New System.Drawing.Point(152, 56)
    Me.lbSize.Name = "lbSize"
    Me.lbSize.RightToLeft = System.Windows.Forms.RightToLeft.No
    Me.lbSize.Size = New System.Drawing.Size(57, 17)
    Me.lbSize.TabIndex = 6
    Me.lbSize.Text = "Byte Size:"
    '
    'txtStep
    '
    Me.txtStep.AcceptsReturn = True
    Me.txtStep.AutoSize = False
    Me.txtStep.BackColor = System.Drawing.SystemColors.Window
    Me.txtStep.Cursor = System.Windows.Forms.Cursors.IBeam
    Me.txtStep.Font = New System.Drawing.Font("Arial", 8!,
System.Drawing.FontStyle.Regular, System.Drawing.GraphicsUnit.Point, CType(0,
Byte))
    Me.txtStep.ForeColor = System.Drawing.SystemColors.WindowText
    Me.txtStep.Location = New System.Drawing.Point(96, 32)
    Me.txtStep.MaxLength = 0
    Me.txtStep.Name = "txtStep"
    Me.txtStep.ReadOnly = True
    Me.txtStep.RightToLeft = System.Windows.Forms.RightToLeft.No
    Me.txtStep.Size = New System.Drawing.Size(337, 19)
    Me.txtStep.TabIndex = 3
    Me.txtStep.Text = "Wait For User Activation..."
    '
    'txtSize
    '
    Me.txtSize.AcceptsReturn = True
    Me.txtSize.AutoSize = False
    Me.txtSize.BackColor = System.Drawing.SystemColors.Window
    Me.txtSize.Cursor = System.Windows.Forms.Cursors.IBeam
    Me.txtSize.Font = New System.Drawing.Font("Arial", 8!,
System.Drawing.FontStyle.Regular, System.Drawing.GraphicsUnit.Point, CType(0,
Byte))
    Me.txtSize.ForeColor = System.Drawing.SystemColors.WindowText
    Me.txtSize.Location = New System.Drawing.Point(208, 56)
    Me.txtSize.MaxLength = 0
    Me.txtSize.Name = "txtSize"
    Me.txtSize.ReadOnly = True
    Me.txtSize.RightToLeft = System.Windows.Forms.RightToLeft.No
    Me.txtSize.Size = New System.Drawing.Size(73, 19)
    Me.txtSize.TabIndex = 7
    Me.txtSize.Text = ""
    '
    'MainForm
    '
    Me.AutoScaleBaseSize = New System.Drawing.Size(5, 13)
    Me.ClientSize = New System.Drawing.Size(467, 347)
    Me.Controls.AddRange(New System.Windows.Forms.Control() {Me.btStop,
Me.pageHTML, Me.pageText, Me.btBegin, Me.txtLang, Me.txtSize, Me.txtType,
Me.txtStep, Me.txtURL, Me.InetSocket, Me.lbHTML, Me.lbSource, Me.lbLang,
Me.lbSize, Me.lbType, Me.lbStep, Me.lbURL})

```

```

    Me.Font = New System.Drawing.Font("Arial", 8!,
System.Drawing.FontStyle.Regular, System.Drawing.GraphicsUnit.Point, CType(0,
Byte))
    Me.FormBorderStyle = System.Windows.Forms.FormBorderStyle.FixedSingle
    Me.Icon = CType(resources.GetObject("$this.Icon"),
System.Drawing.Icon)
    Me.Location = New System.Drawing.Point(3, 29)
    Me.MaximizeBox = False
    Me.MinimizeBox = False
    Me.Name = "MainForm"
    Me.Text = "PerkZip - Web Crawler/Indexer - Portal Systems"
    CType(Me.InetSocket,
System.ComponentModel.ISupportInitialize).EndInit()
    Me.ResumeLayout(False)

End Sub
#End Region
#Region "Upgrade Support "
Private Shared m_vb6FormDefInstance As MainForm
Private Shared m_InitializingDefInstance As Boolean
Public Shared Property DefInstance() As MainForm
    Get
        If m_vb6FormDefInstance Is Nothing OrElse
m_vb6FormDefInstance.IsDisposed Then
            m_InitializingDefInstance = True
            m_vb6FormDefInstance = New MainForm()
            m_InitializingDefInstance = False
        End If
        DefInstance = m_vb6FormDefInstance
    End Get
    Set
        m_vb6FormDefInstance = Value
    End Set
End Property
#End Region

Private Sub RemoveComments(ByRef TheText As String)
    Dim ThePlaceA As Short, ThePlaceB As Short
    ThePlaceA = InStr(TheText, "<!")
    If ThePlaceA = 0 Then
        Exit Sub
    End If
    ThePlaceB = InStr(ThePlaceA, TheText, ">")
    While ThePlaceA < ThePlaceB And ThePlaceA > 0
        TheText = Mid$(TheText, 1, ThePlaceA - 1) & Mid$(TheText,
ThePlaceB + 1)
        ThePlaceA = InStr(ThePlaceA + 1, TheText, "<!")
        If ThePlaceA > 0 Then
            ThePlaceB = InStr(ThePlaceA, TheText, ">")
        End If
    End While
End Sub

Private Sub RemoveScript(ByRef TheText As String)
    Dim ThePlaceA As Short, ThePlaceB As Short
    ThePlaceA = InStr(TheText, "<script", CompareMethod.Text)
    If ThePlaceA = 0 Then

```



```

        Exit Sub
    End If
    ThePlaceB = InStr(ThePlaceA, TheText, "</script>",
CompareMethod.Text)
    While ThePlaceB > 0 And ThePlaceA > 0
        TheText = Mid$(TheText, 1, ThePlaceA - 1) & Mid$(TheText,
ThePlaceB + 9)
        ThePlaceA = InStr(ThePlaceA + 1, TheText, "<script",
CompareMethod.Text)
        If ThePlaceA > 0 Then
            ThePlaceB = InStr(ThePlaceA, TheText, "</script>",
CompareMethod.Text)
        End If
    End While
End Sub

Private Sub RemoveStyle(ByRef TheText As String)
    Dim ThePlaceA As Short, ThePlaceB As Short
    ThePlaceA = InStr(TheText, "<style", CompareMethod.Text)
    If ThePlaceA = 0 Then
        Exit Sub
    End If
    ThePlaceB = InStr(ThePlaceA, TheText, "</style>", CompareMethod.Text)
    While 0 < ThePlaceB And ThePlaceA > 0
        TheText = Mid$(TheText, 1, ThePlaceA - 1) & Mid$(TheText,
ThePlaceB + 8)
        ThePlaceA = InStr(ThePlaceA + 1, TheText, "<style",
CompareMethod.Text)
        If ThePlaceA > 0 Then
            ThePlaceB = InStr(ThePlaceA, TheText, "</style>",
CompareMethod.Text)
        End If
    End While
End Sub

Private Function ReplaceChars(ByVal Text As String) As String
    ReplaceChars = Replace(Text, "'", "' ' ")
End Function

Private Function IndexPage() As Object
    Dim URL As String

    Dim QueryString As OleDb.OleDbCommand
    Dim Results As OleDb.OleDbDataReader

    DBConnection.Open()

    QueryString = DBConnection.CreateCommand()
    QueryString.CommandText = "SELECT * FROM ToSearch"
    Results = QueryString.ExecuteReader()

    Results.Read()

    URL = Results.Item(0)
    txtURL.Text = URL

    Results.Close()

```

```

        QueryString = DBConnection.CreateCommand()
        QueryString.CommandText = "DELETE FROM MainIndex WHERE PageLocation =
'" & ReplaceChars(URL) & "'"
        QueryString.ExecuteNonQuery()

        QueryString = DBConnection.CreateCommand()
        QueryString.CommandText = "DELETE FROM ToSearch WHERE Address = '" &
ReplaceChars(URL) & "'"
        QueryString.ExecuteNonQuery()

        DBConnection.Close()

        Dim PageTitle As String

        If InetSocket.StillExecuting = True Then
            MsgBox("Wait up... Too fast.", MsgBoxStyle.OKOnly Or
MsgBoxStyle.Exclamation, "Error")
            Exit Function
        End If

        txtStep.Text = "Downloading Website Through Socket..."

        Dim Content As String

        On Error Goto FailSocket
        Content = InetSocket.OpenURL(URL)
        On Error Goto 0

        PageTitle = ""
        If InStr(LCase(Content), "<title>") > 0 Then
            PageTitle = Mid$(Content, InStr(LCase(Content), "<title>") + 7,
InStr(LCase(Content), "</title>") - InStr(LCase(Content), "<title>") - 7)
        End If

        If Len(Content) < 20 Then
            Goto FailSocket
        End If

        txtSize.Text = Mid(Str(Len(Content)), 2)

        If InStr(1, Content, " the ", CompareMethod.Text) = 0 And InStr(1,
Content, "welcome", CompareMethod.Text) = 0 And InStr(1, Content, " an ",
CompareMethod.Text) = 0 And InStr(1, Content, " and ", CompareMethod.Text) =
0 And InStr(1, Content, " or ", CompareMethod.Text) = 0 And InStr(1, Content,
"english", CompareMethod.Text) = 0 Then
            txtLang.Text = "Unknown"
            'Goto FailLang
        Else
            txtLang.Text = "English"
        End If

        txtStep.Text = "Preparing Content for Parsing..."

        ' Scripts
        RemoveScript(Content)
    
```

```

'Style Sheet
RemoveStyle(Content)

' Comments
RemoveComments(Content)

Dim noHTML, yesHTML As String
Dim NextTag, LastTag As Short
NextTag = InStr(Content, "<")
LastTag = 1
While NextTag > 0
    If LastTag < NextTag Then
        noHTML = noHTML & " " & Mid(Content, LastTag + 1, (NextTag -
LastTag) - 1)
    End If

    LastTag = InStr(NextTag + 1, Content, ">")
    yesHTML = yesHTML & Mid(Content, NextTag, LastTag - NextTag + 1)
    NextTag = InStr(NextTag + 1, Content, "<")
End While

noHTML = Replace(noHTML, "&nbsp;", " ")

While InStr(noHTML, tab) > 0
    noHTML = Replace(noHTML, tab, " ")
End While
While InStr(noHTML, " ") > 0
    noHTML = Replace(noHTML, " ", " ")
End While
While InStr(noHTML, newline & " ") > 0
    noHTML = Replace(noHTML, newline & " ", newline)
End While
While InStr(noHTML, " " & newline) > 0
    noHTML = Replace(noHTML, " " & newline, newline)
End While
While InStr(noHTML, newline & newline) > 0
    noHTML = Replace(noHTML, newline & newline, newline)
End While
While InStr(yesHTML, "><") > 0
    yesHTML = Replace(yesHTML, "><", ">" & newline & "<")
End While

pageText.Text = noHTML
pageHTML.Text = yesHTML

DBConnection.Open()

QueryString = DBConnection.CreateCommand()
QueryString.CommandText = "INSERT INTO MainIndex (Title,
PageLocation, Content, HTMLOnly) VALUES ('" & ReplaceChars(PageTitle) & "','"
& ReplaceChars(URL) & "','" & ReplaceChars(noHTML) & "','" &
ReplaceChars(yesHTML) & "')"
QueryString.ExecuteNonQuery()

Dim HtmlTags() As String, i As Integer, tmpa As Integer, tmpb As
Integer
Dim Links As New Scripting.Dictionary(), res As Integer

```

```

res = 0

HtmlTags = Split(yesHTML, newline)
i = 0
While i < UBound(HtmlTags)
    If LCase(Mid$(HtmlTags(i), 1, 3)) = "<a " Then
        tmpa = InStr(LCase(HtmlTags(i)), "href=")
        If tmpa > 0 Then
            tmpa = tmpa + 5
            If Mid$(HtmlTags(i), tmpa, 1) = "\"" Then
                tmpa = tmpa + 1
                tmpb = InStr(tmpa, HtmlTags(i), "\"")
                If tmpb > 0 Then
                    tmpb = tmpb - tmpa
                    Links.Add(res, Mid$(HtmlTags(i), tmpa, tmpb))
                    res = res + 1
                End If
            Else
                tmpb = InStr(tmpa, HtmlTags(i), " ")
                If tmpb > 0 Then
                    tmpb = tmpb
                Else
                    tmpb = InStr(tmpa, HtmlTags(i), ">")
                End If
                tmpb = tmpb - tmpa
                Links.Add(res, Mid$(HtmlTags(i), tmpa, tmpb))
                res = res + 1
            End If
        End If
    End If
    i = i + 1
End While

Dim DirSt As String
DirSt = InetSocket.Document
DirSt = Mid$(DirSt, 1, InStrRev(DirSt, "/"))

Dim Pro As String
If InetSocket.Protocol = InetCtlsObjects.ProtocolConstants.icFTP Then
    Pro = "ftp://"
ElseIf InetSocket.Protocol = InetCtlsObjects.ProtocolConstants.icHTTP
Then
    Pro = "http://"
ElseIf InetSocket.Protocol =
InetCtlsObjects.ProtocolConstants.icHTTPS Then
    Pro = "https://"
Else
    Pro = "http://"
End If

i = 0
While i < res
    If Mid$(Links(i), 1, 1) = "/" Then
        Links(i) = Pro & InetSocket.RemoteHost & Links(i)
    ElseIf Mid$(Links(i), 1, 7) <> "http://" And Mid$(Links(i), 1, 6)
<> "ftp://" And Mid$(Links(i), 1, 8) <> "https://" Then

```

Advanced Parsing Algorithm for Optimized Indexing of Site Data found Through TCP/IP Sockets

```
        Links(i) = Pro & InetSocket.RemoteHost & DirSt & Links(i)
    End If
    QueryString = DBConnection.CreateCommand()
    QueryString.CommandText = "INSERT INTO ToSearch (Address) VALUES
('" & ReplaceChars(Links(i)) & "')"
    QueryString.ExecuteNonQuery()
    i += 1
End While

DBConnection.Close()

FailSocket:
    Exit Function

FailLang:
    MsgBox("PerkZip only supports English websites.", MsgBoxStyle.OKOnly,
"Language")
    Exit Function
End Function

Private Sub btBegin_Click(ByVal eventSender As System.Object, ByVal
eventArgs As System.EventArgs) Handles btBegin.Click
    btStop.Enabled = True
    btBegin.Enabled = False
    StopS = False
    While StopS = False
        IndexPage()
    End While
    btStop.Enabled = False
    btBegin.Enabled = True
End Sub

Friend WithEvents DBConnection As System.Data.OleDb.OleDbConnection
Friend WithEvents btStop As System.Windows.Forms.Button

Private Sub btStop_Click(ByVal sender As System.Object, ByVal e As
System.EventArgs) Handles btStop.Click
    StopS = True
End Sub
End Class
```

Advanced Parsing Algorithm for Optimized Indexing of Site Data found Through TCP/IP Sockets

```
Public Class WebForm1
    Inherits System.Web.UI.Page
    Protected WithEvents DBConnection As System.Data.OleDb.OleDbConnection
    Protected WithEvents SearchLabel As System.Web.UI.WebControls.Label
    Protected WithEvents SearchField As System.Web.UI.WebControls.TextBox
    Protected WithEvents SearchButton As System.Web.UI.WebControls.Button
    Protected WithEvents RequiredFieldValidator1 As
System.Web.UI.WebControls.RequiredFieldValidator
    Protected WithEvents ResultArea As System.Web.UI.WebControls.Label
    Protected WithEvents ErrorMes As System.Web.UI.WebControls.Label
    Protected WithEvents Status As System.Web.UI.WebControls.Label

#Region " Web Form Designer Generated Code "

    'This call is required by the Web Form Designer.
    <System.Diagnostics.DebuggerStepThrough(> Private Sub
InitializeComponent()
    Me.DBConnection = New System.Data.OleDb.OleDbConnection()
    '
    'DBConnection
    '
    Me.DBConnection.ConnectionString =
"Provider=Microsoft.Jet.OLEDB.4.0;Password="";User ID=Admin;Data
Source=C:\Visual " & _
"Studio\VB
Projects\Crawler\prjCrawler.NET\TheDatabase.mdb;Mode=ReadWrite|Share D" & _
"eny None;Extended Properties="";Jet OLEDB:System database="";Jet
OLEDB:Registry " & _
"Path="";Jet OLEDB:Database Password="";Jet OLEDB:Engine
Type=5;Jet OLEDB:Databas" & _
"e Locking Mode=1;Jet OLEDB:Global Partial Bulk Ops=2;Jet
OLEDB:Global Bulk Trans" & _
"actions=1;Jet OLEDB:New Database Password="";Jet OLEDB:Create
System Database=Fa" & _
"lse;Jet OLEDB:Encrypt Database=False;Jet OLEDB:Don't Copy Locale on
Compact=Fals" & _
"e;Jet OLEDB:Compact Without Replica Repair=False;Jet
OLEDB:SFP=False"

    End Sub

    Private Sub Page_Init(ByVal sender As System.Object, ByVal e As
System.EventArgs) Handles MyBase.Init
    'CODEGEN: This method call is required by the Web Form Designer
    'Do not modify it using the code editor.
    InitializeComponent()
    End Sub

#End Region

    Private Sub Page_Load(ByVal sender As System.Object, ByVal e As
System.EventArgs) Handles MyBase.Load
    'Put user code to initialize the page here
    End Sub

    Private Function ReplaceChars(ByVal Text As String) As String
    ReplaceChars = Replace(Text, "'", "'')
    End Function
End Class
```

End Function

```

Private Sub SearchButton_Click(ByVal sender As System.Object, ByVal e As
System.EventArgs) Handles SearchButton.Click
    Dim QueryString As OleDb.OleDbCommand
    Dim Results As OleDb.OleDbDataReader
    Dim KeyWords As String()
    Dim i As Integer, count As Integer, u As Integer, h As Integer, c As
Integer

    Dim Title As New Collection(), Location As New Collection(), Content
As New Collection(), HTMLTags As New Collection(), PageID As New Collection()

    SearchField.Text = Replace(SearchField.Text, "\"", "")
    SearchField.Text = Replace(SearchField.Text, ",", "")
    SearchField.Text = Replace(SearchField.Text, ".", "")
    SearchField.Text = Replace(SearchField.Text, "?", "")
    SearchField.Text = Replace(SearchField.Text, "/", "")
    SearchField.Text = Replace(SearchField.Text, " ", " ")

    KeyWords = Split(SearchField.Text, " ")

    If KeyWords.GetUpperBound(0) > 9 Then
        ErrorMes.Text = "No more than 10 key words."
        ErrorMes.DataBind()
        Exit Sub
    End If

    DBConnection.Open()

    QueryString = DBConnection.CreateCommand()
    QueryString.CommandText = "SELECT * FROM MainIndex WHERE"
    i = 0
    While i <= KeyWords.GetUpperBound(0)
        If i > 0 Then
            QueryString.CommandText = QueryString.CommandText & " AND"
        End If
        QueryString.CommandText = QueryString.CommandText & " Content
LIKE '%" & ReplaceChars(KeyWords(i)) & "%'"
        i = i + 1
    End While
    Results = QueryString.ExecuteReader()

    count = 0

    While Results.Read()
        Title.Add(Results.Item(1), Str$(Results.Item(0)))
        Location.Add(Results.Item(2), Str$(Results.Item(0)))
        Content.Add(Results.Item(3), Str$(Results.Item(0)))
        HTMLTags.Add(Results.Item(4), Str$(Results.Item(0)))

        PageID.Add(Str$(Results.Item(0)), Str$(Results.Item(0)))

        count = count + 1
    End While

```

```

Results.Close()

DBConnection.Close()

Dim PagePoints As Integer()
Dim Page As String()
Dim KeyWordLocs As Integer(,)
Dim HtmlLines As String()
Dim CurPoints As Integer

Dim LastOc As Integer

Dim Highest As Integer
Dim Lowest As Integer

i = KeyWords.GetUpperBound(0)

ReDim PagePoints(Title.Count)
ReDim Page(Title.Count)

u = 1
While u <= Title.Count
    ReDim KeyWordLocs(i, 20)

    Page(u - 1) = PageID(u)

    ' Check For Big List
    If ((Len(Content(u)) - Len(Replace(Content(u), ",", ""))) /
Len(Content(u))) > 0.01 Then
        PagePoints(u - 1) -= 150
    ElseIf ((Len(Content(u)) - Len(Replace(Content(u), ".", ""))) /
Len(Content(u))) > 0.03 Then
        PagePoints(u - 1) -= 150
    ElseIf ((Len(Content(u)) - Len(Replace(Content(u), ";", ""))) /
Len(Content(u))) > 0.01 Then
        PagePoints(u - 1) -= 150
    End If

    i = 0
    While i <= KeyWords.GetUpperBound(0)
        ' Check Title
        If InStr(Title(u), KeyWords(i), CompareMethod.Text) > 0 Then
            If Len(Title(u)) < 21 Then
                PagePoints(u - 1) += 8
            Else
                PagePoints(u - 1) += 2
            End If
        End If

        ' Check URL
        If InStr(Location(u), KeyWords(i), CompareMethod.Text) > 0
Then
            PagePoints(u - 1) += 3
        End If

        ' Check HTML Tags
        Erase HtmlLines
    
```



```

HtmlLines = Split(HTMLTags(u), Chr(13) & Chr(10))
CurPoints = 0
h = 0
While h <= HtmlLines.GetUpperBound(0)
    If Len(HtmlLines(h)) > 5 Then
        If InStr(HtmlLines(h), KeyWords(i),
CompareMethod.Text) > 0 Then
            If LCase(Mid$(HtmlLines(h), 1, 4)) = "<img" Then
                CurPoints += 3
            End If
            If LCase(Mid$(HtmlLines(h), 1, 2)) = "<a" Then
                CurPoints += 5
            End If
            If LCase(Mid$(HtmlLines(h), 1, 5)) = "<meta" Then
                If Len(HtmlLines(h)) < 200 Then
                    CurPoints += 6
                Else
                    CurPoints += 2
                End If
            End If
        End If
    End If
    h += 1
End While
If CurPoints > 40 Then
    CurPoints = 40
End If
PagePoints(u - 1) += CurPoints

' Check Content
LastOc = 0
h = 0
CurPoints = 0
While h < 20
    LastOc = InStr(LastOc + 1, Content(u), KeyWords(i),
CompareMethod.Text)
    KeywordLocs(i, h) = LastOc
    If LastOc = 0 Then
        h = 20
    Else
        If (LastOc / Len(Content(u))) < 0.25 Then
            CurPoints += 8
        ElseIf (LastOc / Len(Content(u))) < 0.5 Then
            CurPoints += 4
        Else
            CurPoints += 2
        End If
    End If
    h = h + 1
End While
If CurPoints > 90 Then
    CurPoints = 90
End If
PagePoints(u - 1) += CurPoints

i += 1
End While

```

```

' Compare Key Word Positions = 0
i = 0
CurPoints = 0
While i <= (KeyWords.GetUpperBound(0) - 1)
    c = 0
    While c < 20
        If KeyWordLocs(i, c) > 0 Then
            h = 0
            While h < 20
                If KeyWordLocs(i, h) > 0 Then
                    If Math.Abs(KeyWordLocs(i, h) -
KeyWordLocs(i, c)) < 5 Then
                        CurPoints += 8
                    End If
                End If
                h = h + 1
            End While
        End If
        c = c + 1
    End While
    i = i + 1
End While
If CurPoints > 60 Then
    CurPoints = 60
End If
PagePoints(u - 1) += CurPoints

If PagePoints(u - 1) > Highest Then
    Highest = PagePoints(u - 1) + 1
End If

If PagePoints(u - 1) < Lowest Then
    Lowest = PagePoints(u - 1)
End If

u = u + 1
End While

Dim FinalOrder As String()
ReDim FinalOrder(Highest - Lowest)
'Trace.Write(Highest)
u = 1
While u <= Title.Count

    'Trace.Write("Points:" & Str(PagePoints(u - 1)) & ":" & Page(u -
1) & "(" & Str$(u))
    FinalOrder(PagePoints(u - 1) - Lowest) = Page(u - 1)
    If FinalOrder(PagePoints(u - 1) - Lowest) = "" Then
        FinalOrder(PagePoints(u - 1) - Lowest) = Page(u - 1)
    Else
        FinalOrder(PagePoints(u - 1) - Lowest + 1) = Page(u - 1)
    End If
    u = u + 1
End While

' Points Given Completed

```

```
' Outputing Results
ResultArea.Text = ""
u = Highest - Lowest
While u > 0
    If FinalOrder(u) <> "" Then
        ResultArea.Text = ResultArea.Text & "<p><a href="" &
Location(FinalOrder(u)) & ""><b>" & Title(FinalOrder(u)) & "</b><br><small>"
& Location(FinalOrder(u)) & "</a> Rating: " & Str$(u) & "</small></p>" &
Chr(13) & Chr(10)
        End If
        u = u - 1
    End While

    Status.Text = "The search for <b>" & SearchField.Text & "</b>
returned <b>" & Str$(count) & "</b> results."

    ResultArea.DataBind()
    Status.DataBind()
End Sub
End Class
```

Appendix B- Indexed Web Pages Database

MainIndex		
ID	Title	PageLocation
12	MaxMo Technologies - Welcome	http://www.maxmo.net/index2.php
28	Error - Page Not Found	http://www.maxmo.net/about/future.php
29	Error - Page Not Found	http://www.maxmo.net/about/goals.php
35	MaxMo Technologies - MiniApp Network	http://www.maxmo.net/software/miniapps/
36	Error - Page Not Found	http://www.maxmo.net/software/miniapps/stock/
37	MaxMo Technologies - MiniApp Launcher	http://www.maxmo.net/software/miniapps/launch/
38	Weather MiniApp - By MaxMo Technologies	http://www.maxmo.net/software/miniapps/weather/
39	MaxMo Technologies - Encryption Software	http://www.maxmo.net/software/encrypt/
40	Error - Page Not Found	http://www.maxmo.net/software/devcd/
54	MaxMo Technologies - Item Details	http://www.maxmo.net/store/details.php?i=CRC1
55	MaxMo Technologies - Item Details	http://www.maxmo.net/store/details.php?i=DCB
56	MaxMo Technologies - Item Details	http://www.maxmo.net/store/details.php?i=SIP
58	MaxMo Technologies - Downloads	http://www.maxmo.net/download/?folder=1
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70	Index of /tools	http://www.maxmo.net/tools/?N=A
71	Index of /tools	http://www.maxmo.net/tools/?M=D
72	Index of /tools	http://www.maxmo.net/tools/?N=D
73	Index of /tools	http://www.maxmo.net/tools/?M=A
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76	MaxMo Technologies - Website Administrator	http://www.maxmo.net/tools/admin/
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80	MaxMo Technologies - Welcome to The Store	http://www.maxmo.net/store/
81	MaxMo Technologies - Item Details	http://www.maxmo.net/store/details.php?i=DLMAN
82	Index of /store/support	http://www.maxmo.net/store/support/?N=D
83	Index of /store/support	http://www.maxmo.net/store/support/?M=A
84	MaxMo Technologies - Downloads	http://www.maxmo.net/download/
85	MaxMo Technologies - About Portal Systems	http://www.maxmo.net/about/portal/
86	MaxMo Technologies - Browse Category	http://www.maxmo.net/store/show_categ.php?c=0
87	MaxMo Technologies - Browse Category	http://www.maxmo.net/store/show_categ.php?c=1

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90	MaxMo Technologies - Browse Category	http://www.maxmo.net/store/show_categ.php?c=4
91	MaxMo Technologies - Browse Category	http://www.maxmo.net/store/show_categ.php?c=5
92	Error - Page Not Found	http://www.maxmo.net/software/about.php
93	MaxMo Technologies - Browse Category	http://www.maxmo.net/store/show_categ.php?c=?
94	Error - Page Not Found	http://www.maxmo.net/software/support/
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96	MaxMo Technologies - MiniApp Network	http://www.maxmo.net/software/miniapps/about.php
97	MaxMo Technologies - MiniApps Survey	http://www.maxmo.net/software/miniapps/survey.php
98	MaxMo Technologies - Download a MiniApp	http://www.maxmo.net/software/miniapps/download.php
99	MaxMo Technologies - Downloads	http://www.maxmo.net/download/?file=MiniApp.Launcher.Setup
100	Error - Page Not Found	http://www.maxmo.net/dw5/about.htm
101	Error - Page Not Found	http://www.maxmo.net/dw5/services.php3
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108	Error - Page Not Found	http://www.maxmo.net/miniapp/survey.php3
109	Stock Ticker	http://www.maxmo.net/software/miniapps/weather/buy.php4
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113	Error - Page Not Found	http://www.maxmo.net/dw5/docs.php3?page=docs/copyright.htm
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117	Error - Page Not Found	http://www.maxmo.net/tools/about/
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120	MaxMo Technologies - About the Store	http://www.maxmo.net/store/info.php
121	MaxMo Technologies - Shop	http://www.maxmo.net/store/shop.php
122	MaxMo Technologies - Check Out	http://www.maxmo.net/store/checkout.php
123	MaxMo Technologies - Empty Cart	http://www.maxmo.net/store/clear.php
124	Index of /store/support	http://www.maxmo.net/store/support/?S=A
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130	Error - Page Not Found	http://www.maxmo.net/contact/
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135	Bosque School	http://www.bosqueschool.org/
136	About Bosque	http://www.bosqueschool.org/AboutBosque/aboutBosque.htm
137	Admissions	http://www.bosqueschool.org/Admissions/admissions.htm
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146	Bosque School	http://www.bosqueschool.org/Activities/./index.htm
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148	About Bosque	http://www.bosqueschool.org/Activities/./Admissions/./AboutBosque/aboutBosque.htm
149	Page Offline	http://www.maxmo.net/
150	Welcome to the Microsoft Corporate Web Site	http://www.microsoft.com/
151	DreamWorks SKG	http://www.dreamworks.com/
152	Macromedia	http://www.macromedia.com/
153	Welcome to the Microsoft Corporate Web	http://www.microsoft.com/isapi/gomscom.asp?target=/

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155	AiS Challenge Homepage	http://www.challenge.nm.org/
156	About The AiS Challenge	http://www.challenge.nm.org/About/
157	Student Resources	http://www.challenge.nm.org/Students/
158	Teacher Resources	http://www.challenge.nm.org/Teachers/
159	AiS Challenge mentors page	http://www.challenge.nm.org/Mentors/
160	Help For The New Mexico High School Supercomputing Challenge	http://www.challenge.nm.org/Help/
161	New Mexico High School Supercomputing Challenge Archive	http://www.challenge.nm.org/Archive/
162	Participating School Map	http://www.challenge.nm.org/map.shtml
163	Challenge 2001-2002 Sponsors	http://www.challenge.nm.org/sponsors.shtml
164	404 Not Found	http://www.challenge.nm.org/'survey/'
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166	Final Report Submissions	http://www.challenge.nm.org/FinalReports
167	2002 Awards Expo	http://www.challenge.nm.org/AwardsDay
168	AiS Challenge Scholarships	http://www.challenge.nm.org/AwardsDay/scholarships.shtml
169	Challenge Summer Teacher Institute	http://www.challenge.nm.org/sti
170	AiS Challenge - Java	http://www.challenge.nm.org/Java
171	Challenge Project: Cryptography	http://www.challenge.nm.org/Cryptography
172	Dates and Deadlines of	http://www.challenge.nm.org/dates.shtml

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174	AiS Challenge Project Abstracts	http://www.challenge.nm.org/Abstracts
175	AiS Challenge Project Interims	http://www.challenge.nm.org/Interims/
176	2002 AiS Challenge Regionals	http://www.challenge.nm.org/Regionals
177	2002 AiS Challenge Project Evaluations	http://www.challenge.nm.org/Evaluations
178	404 Not Found	http://www.challenge.nm.org/mailto:consult@challenge.nm.org
179	About The New Mexico High School Supercomputing Challenge	http://www.challenge.nm.org/About/csart.shtml
180	Acceptable Use Policy (AUP)	http://www.challenge.nm.org/Glorieta/aup.shtml
181	Guidelines For Choosing and Evaluating a Project	http://www.challenge.nm.org/About/guidelines.shtml
182	Areas of Science Appropriate for Participation	http://www.challenge.nm.org/About/areas.shtml
183	AiS Challenge Awards	http://www.challenge.nm.org/awards.shtml
184	AiS Challenge Scholarships	http://www.challenge.nm.org/scholarships.shtml
185	Challenge Rules and Responsibilities	http://www.challenge.nm.org/About/rules.shtml
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http://www.challenge.nm.org/051.shtml
http://www.challenge.nm.org/052.shtml
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http://www.challenge.nm.org/114.shtml
http://www.challenge.nm.org/061.shtml
http://www.challenge.nm.org/062.shtml
http://www.challenge.nm.org/115.shtml
http://www.challenge.nm.org/063.shtml
http://www.challenge.nm.org/066.shtml
http://www.challenge.nm.org/067.shtml
http://www.challenge.nm.org/068.shtml
http://www.challenge.nm.org/069.shtml
http://www.challenge.nm.org/071.shtml
http://www.challenge.nm.org/072.shtml
http://www.challenge.nm.org/073.shtml
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http://www.challenge.nm.org/080.shtml
http://www.challenge.nm.org/081.shtml
http://www.challenge.nm.org/085.shtml
http://www.challenge.nm.org/086.shtml

ToSearch
Address
http://www.challenge.nm.org/087.shtml
http://www.challenge.nm.org/088.shtml
http://www.challenge.nm.org/089.shtml
http://www.challenge.nm.org/090.shtml
http://www.challenge.nm.org/091.shtml
http://www.challenge.nm.org/092.shtml
http://www.challenge.nm.org/093.shtml
http://www.challenge.nm.org/094.shtml
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http://www.challenge.nm.org/099.shtml
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http://www.challenge.nm.org/102.shtml
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http://www.challenge.nm.org/104.shtml
http://www.challenge.nm.org/105.shtml
http://www.challenge.nm.org/106.shtml
http://www.challenge.nm.org/107.shtml
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http://www.challenge.nm.org/110.shtml
http://www.challenge.nm.org/111.shtml
http://www.challenge.nm.org/112.shtml
http://www.challenge.nm.org/113.shtml
http://www.challenge.nm.org/Interims/submit.shtml
http://www.challenge.nm.org/Interims/needment.shtml
http://www.challenge.nm.org/Interims/needment2.shtml
http://www.challenge.nm.org/Interims/001.shtml
http://www.challenge.nm.org/Interims/004.shtml
http://www.challenge.nm.org/Interims/005.shtml
http://www.challenge.nm.org/Interims/006.shtml
http://www.challenge.nm.org/Interims/007.shtml
http://www.challenge.nm.org/Interims/008.shtml
http://www.challenge.nm.org/Interims/009.shtml
http://www.macromedia.com/go/featuredevent/
http://www.macromedia.com/go/events/
http://www.macromedia.com/shockwave/download/index.cgi?P1_Prod_Version=ShockwaveFlash
http://www.macromedia.com/partners/
http://www.macromedia.com/partners/
http://www.macromedia.com/help/copyright.html
http://www.macromedia.com/help/copyright.html
http://www.macromedia.com/help/privacy.html

ToSearch
Address
http://www.macromedia.com/sitemap/
http://www.macromedia.com/macromedia/contact/
http://www.macromedia.com/help/accessibility.html
http://www.microsoft.com/isapi/gomscom.asp?target=/
http://www.microsoft.com/isapi/gosearch.asp?target=/us/default.asp
http://www.microsoft.com/isapi/gomscom.asp?target=/
http://www.microsoft.com/isapi/gomscom.asp?target=/
http://www.microsoft.com/trainingandservices/
http://register.microsoft.com/regsys/decisionpoint.asp?FU=http%3A%2F%2Fregister%2Emicrosoft%
http://www.microsoft.com/mscorp/
http://www.microsoft.com/downloads/
http://www.microsoft.com/worldwide/
http://msn.com/
http://www.microsoft.com/catalog/
http://www.microsoft.com/isapi/gomscom.asp?target=/catalog//isapi/gomscom.asp?target=/catalog/default.asp?subid=22'
http://www.microsoft.com/isapi/gomscom.asp?target=/catalog//isapi/gomscom.asp?target=/support/

Appendix C- Indexed Web Pages Database

Search For: [Past Searches](#)

The search for **maxmo** returned **81** results.

MaxMo Technologies - News

<http://www.maxmo.net/news.php?id=0> Rating: 196

[Add to Favorites](#)

MaxMo Technologies - About Us

<http://www.maxmo.net/about/> Rating: 188

[Add to Favorites](#)

MaxMo Technologies - Welcome

<http://www.maxmo.net/index2.php> Rating: 186

[Add to Favorites](#)

MaxMo Technologies - Encryption Software

<http://www.maxmo.net/software/encrypt/> Rating: 180

[Add to Favorites](#)

MaxMo Technologies - MiniApp Network

<http://www.maxmo.net/software/miniapps/about.php> Rating: 175

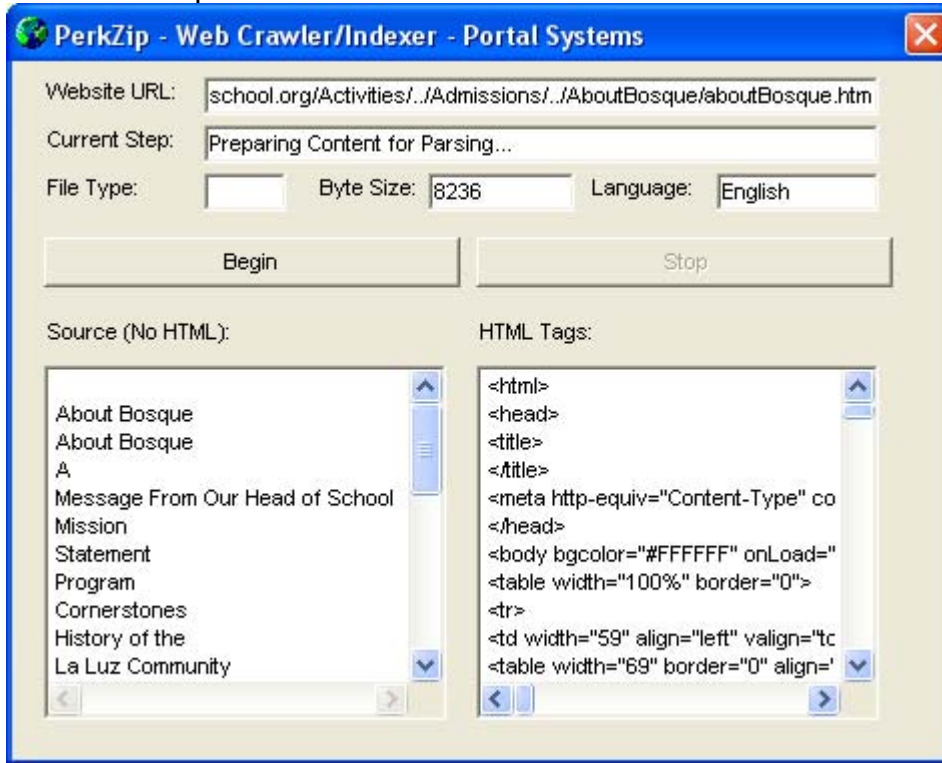
[Add to Favorites](#)

MaxMo Technologies - Welcome to The Store

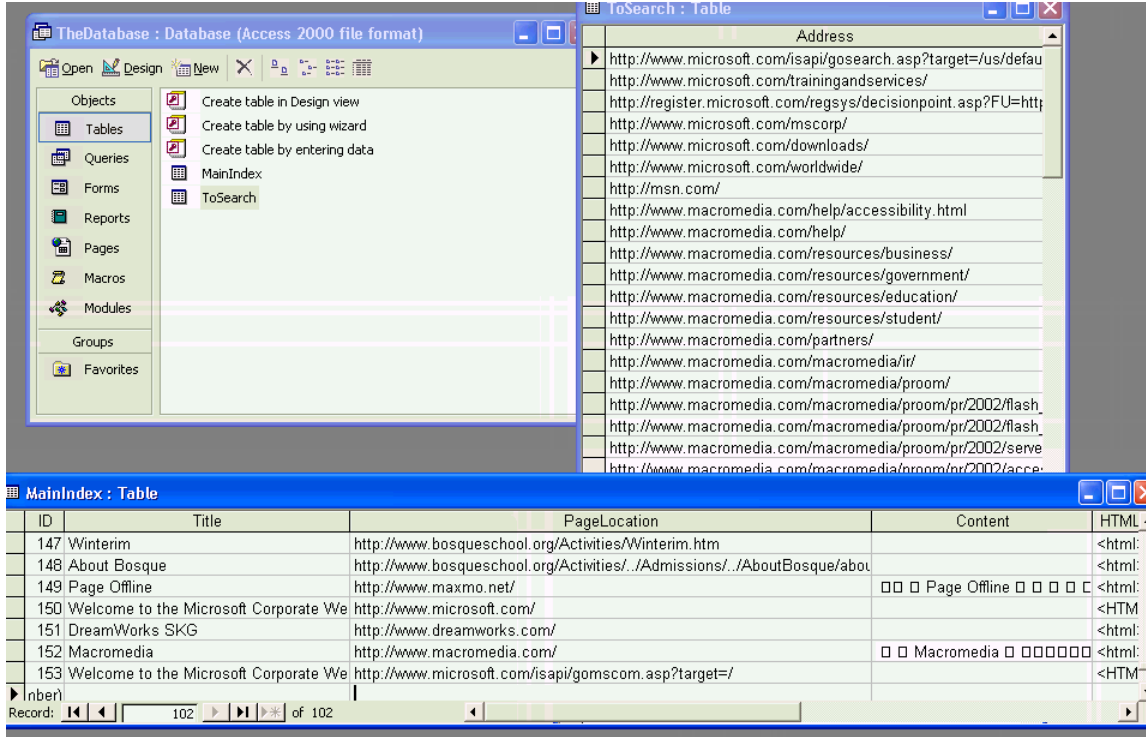
<http://www.maxmo.net/store/> Rating: 174

[Add to Favorites](#)

This is a sample search for **maxmo**.



The indexer when it is running.



A picture of access with all of the databases open.

1. [Instant Term Insurance Quotes](#)
Free real-time, term insurance quotes from top-rated li
plans, then apply online. Selected "Best of the Web" b
www.1stquote.com (Cost to advertiser: **\$3.04**)
2. [No.1 Term Life Insurance Quotes](#)
Free instant quotes - shop rates from over 200 top-rat
magazine rated us "Best of the Web."
www.intelliquote.com (Cost to advertiser: **\$3.03**)
3. [Nas-Financial Services](#)
Nas-Financial Services provides sales and marketing se
individuals.
www.nas-info.com (Cost to advertiser: **\$2.93**)
4. [InsWeb - Accurate Quotes, Top Companies](#)
Free life insurance quotes online. Fill out a simple form
needs. Shop at InsWeb - it pays off.
secure1.insweb.com (Cost to advertiser: **\$2.65**)
5. [Texas Only-We Cover You for Life!](#)
The agents at the Texas Insurance Web monitor the p
sure Texans get the best rates on their life insurance r
www.texasinsuranceweb.com (Cost to advertiser: **\$2.45**)

Overture's web results show the cost each advertiser is paying on a search for life insurance.