CHAPTER 7

SYSTEM IMPLEMENTATION AND CODING

7.0 Introduction

In order to translate the design into a machine-readable form, Microsoft Visual Basic 6.0 is the tool used to develop the system. This programming language is not only an event-driven programming, but also is an object-oriented programming due to its supportiveness of object-oriented programming. The system developed includes the client-side application and server-side application. An introduction of object-oriented programming, Microsoft Visual Basic 6.0, COM Component as well as the algorithm and coding are discussed in this chapter.

7.1 Object-Oriented Programming

Object-oriented programming is a programming paradigm involving a collection of objects that interacts within each other. The objects are interacted by passing messages to transform their state (Tucker & Noonan, 2002). The two most important concepts in object-oriented programming are the class and the object.

A class is a kind of mold or template that is used to create objects, which the data type is bounded together with the initializations and other operations (Wu, 2001;Tucker & Noonan, 2002). An object is an instance of a class. It can also be an instance of exactly one class and an instance of a class belongs to the class (Wu, 2001).

There are a few criteria in an object-oriented programming, abstraction, encapsulation, polymorphism and inheritance. Abstraction allows management of the complexities of a problem by allowing identifying a set of objects involved with that problem. Encapsulation enables the internal implementation of an abstraction being kept hidden within the particular object. Polymorphism provides multiple implementations of the same method on different objects. For example, different objects can have a same method name but each of the method performs a different processing. Inheritance allows the reuse of interface and the implementation of a class (Microsoft Corporation, 2004).

7.1.1 Microsoft Visual Basic 6.0

In general, Visual Basic is a programming environment that is specifically designed to facilitate the creation of new programs. Visual Basic 6 is an event-driven programming. Besides, Visual Basic 6 also has an object orientation significance to support object-oriented programming.

As an event-driven programming, Visual Basic 6 allows a programmer designs the program starting from GUI, including creating the graphical objects such as buttons and menu. After that, the programmer only needs to write code to the related events, such as button click event and menu click event (Burrows, 2000).

To support an object-oriented programming, Visual Basic 6 provides the capability to construct objects within a program that consists of data and instructions. The objects are software components that include data elements and behavior. Everything that works with Visual Basic are the objects, such as forms, controls, printers and databases.

Visual Basic also allows the programmer to create components ranging from code libraries to automation-enabled applications. Besides, Visual Basic also allows the programmer to merge with COM component and creation COM components (Microsoft Press, 1999).

7.1.2 COM Component

Component Object Model (COM) is a standard or a model for the interaction of objects. A COM component is a unit of executable code that provides specific functionality. COM components can either be an internal components or external components. Internal components are components that compile into a project and are available only to that project. External components are components that compile into an executable file (.exe) or dynamic-link library (.dll).

Visual Basic allows the programmer creates three types of COM components, such as ActiveX controls, DLLs, and ActiveX documents. COM code components, such as ActiveX DLLs and ActiveX EXEs are composed of one or more class modules in a Visual Basic project. ActiveX controls are COM components that provide a user interface.

COM components interact with application or other components through a client-server relationship. The client uses the features of a component where the server is the component and associated objects (Microsoft Press, 1999).

7.2 Code

Coding is a process of turning program logic into specific instructions that the computer system can execute. For doing so, programming languages are used to transform the program logic into code statements. In this chapter, some of the important algorithm, coding and the description are given. An algorithm is a finite instruction for performing a computation or for solving a problem. The given algorithm, coding and description are the implementation of the functions discussed in Chapter 5.

7.2.1 Login Page

Login page is the place where user registers to the system and the place for the system to recognize the existing users. This page only has two functions, including log in user and register user.

7.2.1.1 Log in user

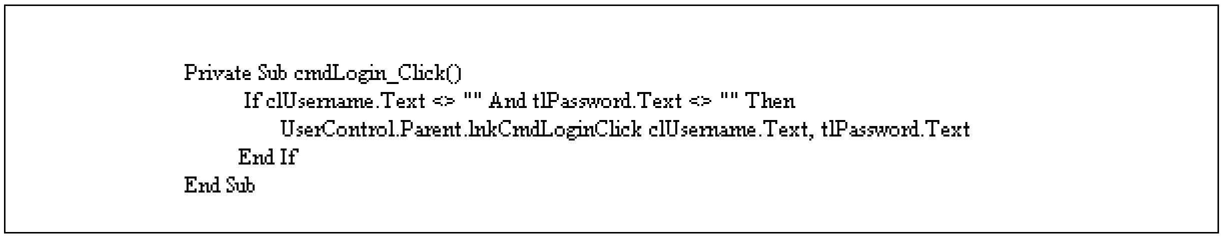
Figure 7.1 illustrates the source code for log in user. This function is used to log in a registered user.

Algorithm:

```
//Perform log in user.
Procedure cmdLogin_Click ()

If username field and password field were not empty then
        Call lnkCmdLoginClick function on ucMainWindow
End if
```

Coding:



```
Private Sub cmdLogin_Click()
    If clUsername.Text <> "" And tlPassword.Text <> "" Then
        UserControl.Parent.lnkCmdLoginClick clUsername.Text, tlPassword.Text
    End If
End Sub
```

Figure 7.1 Source Code For Log In User

7.2.1.2 Register user

Figure 7.2 illustrates the source code for a register user. This function is used to register a new user to the system.

Algorithm:

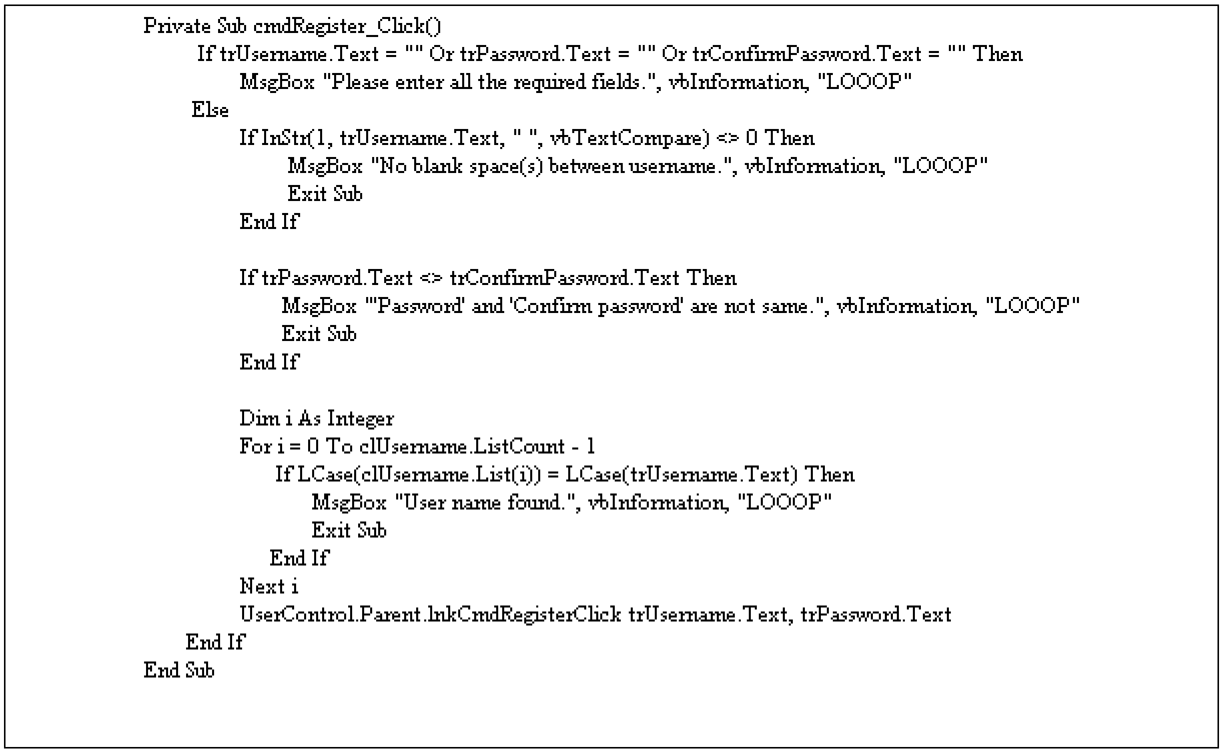
```
//Perform register user.
Procedure cmdRegister_Click ()

If username field and password field and confirm password field are empty then
        Notify user to type again
Else
        If there is blank space in username field then
                Notify user to re-enter again
        End if

        If the password and the confirm password are not the same then
                Notify user to re-enter again
        End if

        Check for exiting user
        If user is not found then
                Call lnkCmdRegisterUser on ucMainWindow
        End if
End if
```

Coding:



```
Private Sub cmdRegister_Click()
    If trUsername.Text = "" Or trPassword.Text = "" Or trConfirmPassword.Text = "" Then
        MsgBox "Please enter all the required fields.", vbInformation, "LOOOP"
    Else
        If InStr(1, trUsername.Text, " ", vbTextCompare) <> 0 Then
            MsgBox "No blank space(s) between username.", vbInformation, "LOOOP"
            Exit Sub
        End If

        If trPassword.Text <> trConfirmPassword.Text Then
            MsgBox "'Password' and 'Confirm password' are not same.", vbInformation, "LOOOP"
            Exit Sub
        End If

        Dim i As Integer
        For i = 0 To clUsername.ListCount - 1
            If LCase(clUsername.List(i)) = LCase(trUsername.Text) Then
                MsgBox "User name found.", vbInformation, "LOOOP"
                Exit Sub
            End If
        Next i
        UserControl.Parent.lnkCmdRegisterClick trUsername.Text, trPassword.Text
    End If
End Sub
```

Figure 7.2 Source Code For The Register User

7.2.2 Learning Contents Page

Learning contents page is the place for a registered user to manage his or her personal learning contents. This page provides several functions that are used to manage the contents.

7.2.2.1 Send contents by email

Figure 7.3 illustrates the source code for 'send contents by email' function. This function is used to send currently viewed content and note to other user by email through client mailing system.

Algorithm:

```
//Perform send contents by email
Procedure SendEmail()

Write the current viewed content to LOOOP language
Send it by email using client mailing system as attachment.
```

Coding:

```
Public Sub SendEmail()
   On Error GoTo errhandler
   If strUser = "" Then
      MsgBox "Please log in first.", vbInformation, "LOOOP"
      Exit Sub
   End If
   If stMainWindow.Tab = 1 Then
      Dim strContents As String
      strContents = "{|LOOOP|}{|LTITLE|}" & ucLearningControl.ScreenTitle & "{|/LTITLE|}"
      strContents = strContents & "{|LCONTENT|}" & ucLearningControl.ScreenHTMLText & "{|/LCONTENT|}"
      strContents = strContents & "{|LNOTE|}" & ucLearningControl.NoteText & "{|/LNOTE|}{|/LOOOP|}"
      Dim CallclsFile As clsFile
      Set CallclsFile = New clsFile
      CallclsFile.WriteTextToFile strFileDir & "\" & strUser & ".rLOOOP", strContents
      Session.SignOn
      Messages.SessionID = Session.SessionID
      Messages.Compose
      Messages.MsgSubject = "LOOOP content's file: " & ucLearningControl.ScreenTitle
      Messages.AttachmentPathName = strFileDir & "\" & strUser & ".rLOOOP"
      Messages.Send True
      Session.SignOff
      CallclsFile.DeleteFile strFileDir & "\" & strUser & ".rLOOOP"
      Set CallclsFile = Nothing
   End If
errhandler:
   If Err.Number <> 0 Then
      MsgBox "Cannot send email.", vbInformation, "LOOOP"
   End If
End Sub
```

Figure 7.3 Source Code For Send Contents By Email

7.2.2.2 New page

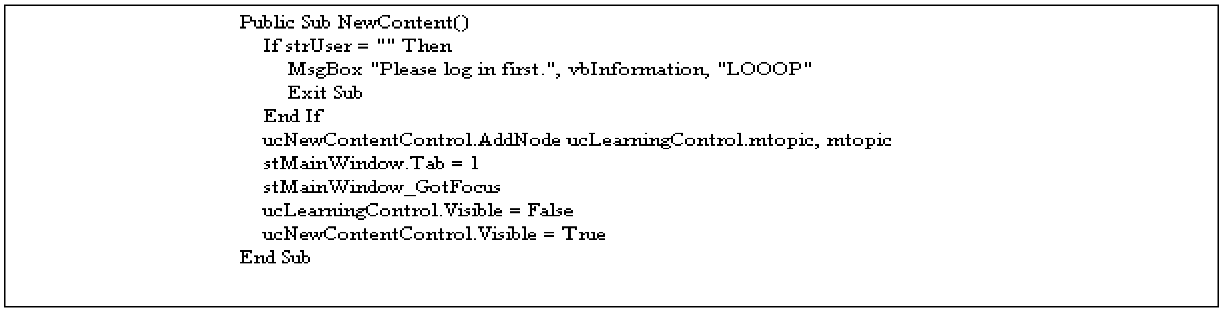
Figure 7.4 illustrates the source code for a new page function. This function is used to create a new content page.

Algorithm:

```
//Perform new page
Procedure NewContent()

Load ucNewContentControl
```

Coding:



```
Public Sub NewContent()
    If strUser = "" Then
        MsgBox "Please log in first.", vbInformation, "LOOOP"
        Exit Sub
    End If
    ucNewContentControl.AddNode ucLearningControl.mtopic, mtopic
    stMainWindow.Tab = 1
    stMainWindow_GotFocus
    ucLearningControl.Visible = False
    ucNewContentControl.Visible = True
End Sub
```

Figure 7.4 Source Code For A New Page

7.2.2.3 Open file

Figure 7.5 illustrates the source code for open file function. This function is used to open LOOOP file, web page, XML file, picture file or multimedia file.

Algorithm:

```
//Perform open file
Procedure OpenPage()

Get the file path
Check the file extension
Call related page to load the file
```

Coding:

```
Public Sub OpenPage()
   If strUser = "" Then
      MsgBox "Please log in first.", vbInformation, "LOOOP"
      Exit Sub
   End If
   cdl.Filter = "LOOOP file, XML page and Web page|*.htm;*.html;*.xml;*.rLOOOP"
   cdl.Filter = cdl.Filter & "|" & "Image, shockwave flash and multimedia file|*jpg;*.bmp;*.gif;*.swf;*.avi;*.wav"
   cdl.ShowOpen
   If cdl.FileName <> "" Then
      Dim clsTemp As clsFile
      Set clsTemp = New clsFile
      If clsTemp.FileExist(cdl.FileName) = True Then
         Select Case LCase(clsTemp.GetFileExtension(cdl.FileName))
            Case "html", "htm", "xml":
               Dim strTemp As String
               If Len(cdl.FileTitle) > 55 Then
                  strTemp = Left(cdl.FileTitle, 24) & "~" & Mid(cdl.FileTitle, Len(cdl.FileTitle) - 31)
               Else
                  strTemp = cdl.FileTitle
               End If
               ucSearchControl.OpenFile strTemp, "<wb>" & cdl.FileName
            Case "rlooop":
               ucSearchControl.OpenLOOOPPage cdl.FileName
            Case "bmp", "jpg", "gif":
               ucSearchControl.OpenPictureFile cdl.FileName
            Case "avi", "wav", "swf":
               ucSearchControl.OpenMultimediaFile cdl.FileName
         End Select
         cdl.FileName = ""
         stMainWindow.Tab = 2
         stMainWindow_GotFocus
      End If
      Set clsTemp = Nothing
   End If
End Sub
```

Figure 7.5 Source Code For Open File

7.2.2.4 Save to database

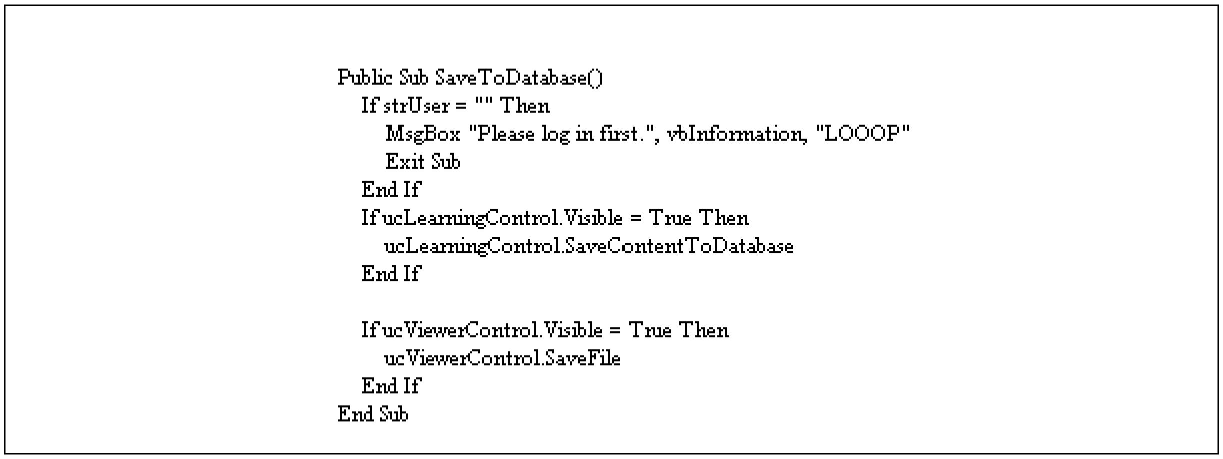
Figure 7.6 illustrates the source code for save to database function. This function is used to save the current viewed content to database.

Algorithm:

```
//Perform save to database
Procedure SaveToDatabase()

Call SaveContentToDatabase on ucLearningContent
```

Coding:



```
Public Sub SaveToDatabase()
   If strUser = "" Then
      MsgBox "Please log in first.", vbInformation, "LOOOP"
      Exit Sub
   End If
   If ucLearningControl.Visible = True Then
      ucLearningControl.SaveContentToDatabase
   End If

   If ucViewerControl.Visible = True Then
      ucViewerControl.SaveFile
   End If
End Sub
```

Figure 7.6 Source Code For Save To Database On Learning Contents Page

7.2.2.5 Save as LOOOP file

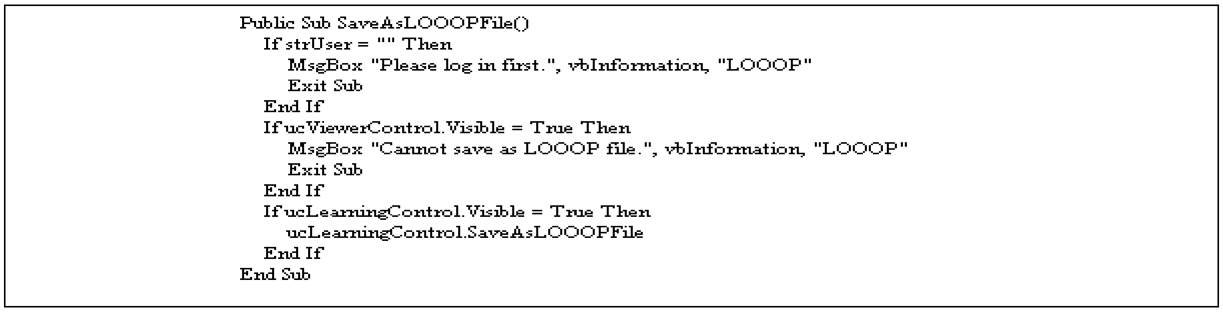
Figure 7.7 illustrates the source code for save as LOOOP file function. This function is used to save the current viewed content as LOOOP file.

Algorithm:

```
//Perform save as LOOOP file
Procedure SaveAsLOOOPFile()

Call SaveAsLOOOPFile on ucLearningContent
```

Coding:



```
Public Sub SaveAsLOOOPFile()
   If strUser = "" Then
      MsgBox "Please log in first.", vbInformation, "LOOOP"
      Exit Sub
   End If
   If ucViewerControl.Visible = True Then
      MsgBox "Cannot save as LOOOP file.", vbInformation, "LOOOP"
      Exit Sub
   End If
   If ucLearningControl.Visible = True Then
      ucLearningControl.SaveAsLOOOPFile
   End If
End Sub
```

Figure 7.7 Source Code For Save As LOOOP File

7.2.2.6 Save as XML file

Figure 7.8 illustrates the source code for save as XML file. This function is used to save the current viewed content as XML file.

Algorithm:

```
//Perform save as XML file
Procedure SaveAsXMLFile()

Write content into XML language
Save the file in XML format
```

Coding:

```
Public Sub SaveAsXMLFile()
   If strUser = "" Then
      MsgBox "Please log in first.", vbInformation, "LOOOP"
      Exit Sub
   End If
   If ucViewerControl.Visible = True Then
      MsgBox "Cannot save as XML file.", vbInformation, "LOOOP"
      Exit Sub
   End If
   If ucLearningControl.Visible = True Then
      cdl.Filter = "XML file|*.XML"
      cdl.ShowSave
      If cdl.FileName <> "" Then
         Dim strContents As String
         strContents = "<?xml version='1.0' encoding='utf-8'?><LOOOP><LTITLE>" & ucLearningControl.ScreenTitle & "</LTITLE>"
         strContents = strContents & "<LCONTENT>" & ucLearningControl.ScreenText & "</LCONTENT>"
         strContents = strContents & "<LNOTE>" & ucLearningControl.NoteText & "</LNOTE></LOOOP>"
         Dim CallclsFile As clsFile
         Set CallclsFile = New clsFile
         CallclsFile.WriteTextToFile cdl.FileName, strContents
         Set CallclsFile = Nothing
         cdl.FileName = ""
      End If
   End If
End Sub
```

Figure 7.8 Source Code For Save As XML File

7.2.2.7 Save as sharable learning contents

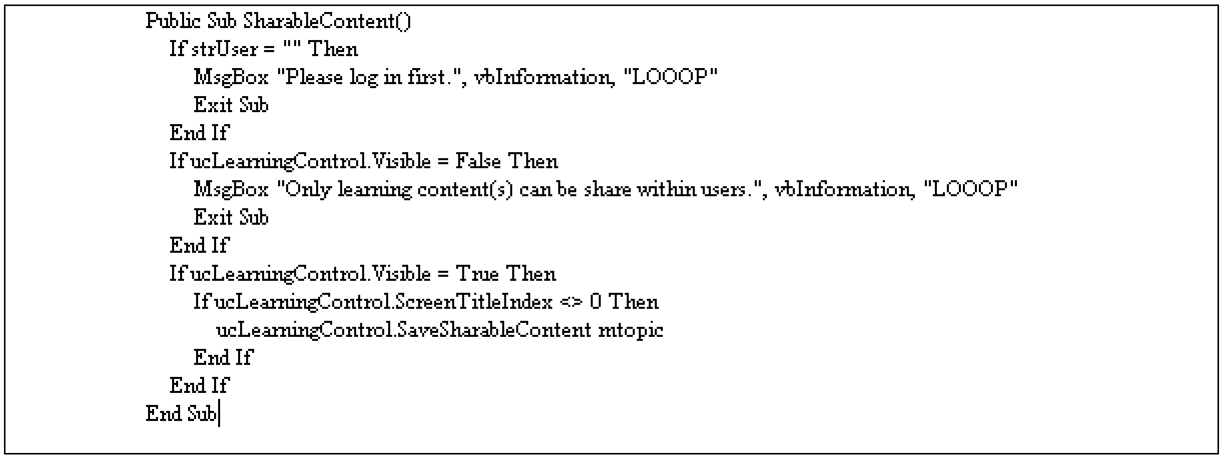
Figure 7.9 illustrates the source code for save as sharable learning contents. This function is used to save the current viewed content to sharable learning contents

Algorithm:

```
//Perform save as sharable learning contents
Procedure SharableContent()

Call SaveSharableContent on ucLearningContent
```

Coding:



```
Public Sub SharableContent()
    If strUser = "" Then
        MsgBox "Please log in first.", vbInformation, "LOOOP"
        Exit Sub
    End If
    If ucLearningControl.Visible = False Then
        MsgBox "Only learning content(s) can be share within users.", vbInformation, "LOOOP"
        Exit Sub
    End If
    If ucLearningControl.Visible = True Then
        If ucLearningControl.ScreenTitleIndex <> 0 Then
            ucLearningControl.SaveSharableContent mtopic
        End If
    End If
End Sub
```

Figure 7.9 Source Code For Save As Sharable Learning Contents

7.2.2.8 Delete contents

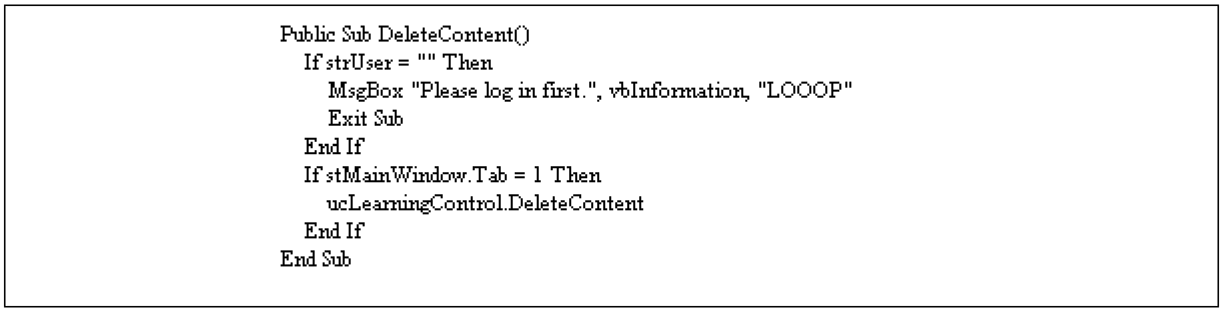
Figure 7.10 illustrates the source code for delete contents. This function is used to delete the current viewed content.

Algorithm:

```
//Perform Delete contents
Procedure DeleteContent()

Call DeleteContent on ucLearningContent
```

Coding:



```
Public Sub DeleteContent()
    If strUser = "" Then
        MsgBox "Please log in first.", vbInformation, "LOOOP"
        Exit Sub
    End If
    If stMainWindow.Tab = 1 Then
        ucLearningControl.DeleteContent
    End If
End Sub
```

Figure 7.10 Source Code For Delete Contents

7.2.2.9 Print content

Figure 7.11 illustrates the source code for print content function. This function is used to print the current viewed content and note.

Algorithm:

```
//Perform print content
Procedure PrintContent()

Integrated the content and note into HTML page
Print out the HTML page
```

Coding:

```
Public Sub PrintContent()
  If strUser = "" Then
    MsgBox "Please log in first.", vbInformation, "LOOOP"
    Exit Sub
  End If
  If stMainWindow.Tab = 1 Then
      Dim strhtml As String
      strhtml = "<HTML><TABLE><TR><TD><H2><U><B>Contents</B></U></H2></TD></TR><TR><TD>"
      strhtml = strhtml & ucLearningControl.ScreenHTMLText
      strhtml = strhtml & "</TD></TR></TABLE><BR><BR><TABLE><TR><TD><H2><U><B>Note</B></U></H2></TD></TR><TR><TD>'
      strhtml = strhtml & ucLearningControl.NoteText
      strhtml = strhtml & "</TD></TR></TABLE></HTML>"

      Dim aDoc As IHTMLDocument2
      Set aDoc = wbPrint.Document
      aDoc.body.innerHTML = strhtml
      wbPrint.ExecWB OLECMDID_PRINTPREVIEW, OLECMDEXECOPT_DODEFAULT
      Set aDoc = Nothing
  ElseIf stMainWindow.Tab = 2 Then
    If ucSearchControl.PrintScreen = False Then
      MsgBox "Cannot print the page. Please try again later.", vbInformation, "LOOOP"
    End If
  End If
End Sub
```

Figure 7.11 Source Code For Print Content

7.2.2.10 Navigation buttons

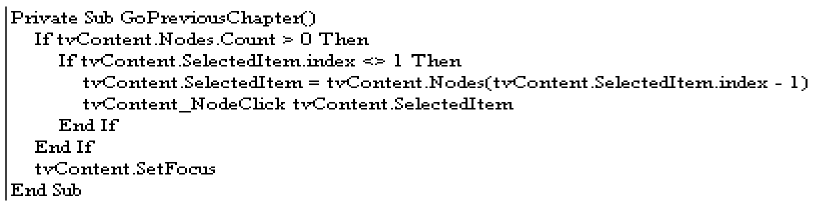
Navigation buttons functions includes first page, previous page, next page function and last page function. These functions are used for navigating personal learning contents. For example, the algorithm and coding for previous page are shown. Figure 7.12 illustrates the source code for previous page function.

Algorithm:

```
//Perform navigate previous page
Procedure GoPreviousChapter()

If there is a chapter before the currently viewed chapter then
        Go to previous content
End if
```

Coding:



```
Private Sub GoPreviousChapter()
   If tvContent.Nodes.Count > 0 Then
      If tvContent.SelectedItem.index <> 1 Then
         tvContent.SelectedItem = tvContent.Nodes(tvContent.SelectedItem.index - 1)
         tvContent_NodeClick tvContent.SelectedItem
      End If
   End If
   tvContent.SetFocus
End Sub
```

Figure 7.12 Source Code For Navigate Previous Page

7.2.2.11 Editing tools

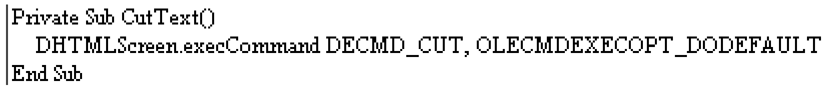
Editing tools functions include cut, copy, paste and others. These functions are used for editing the currently viewed content. For example, the algorithm and coding for cut function are shown. Figure 7.13 illustrates the source code for cut function.

Algorithm:

```
//Perform cut function
Procedure CutText()

Call DHTML control built-in cut function
```

Coding:



```
Private Sub CutText()
   DHTMLScreen.execCommand DECMD_CUT, OLECMDEXECOPT_DODEFAULT
End Sub
```

Figure 7.13 Source Code For Cut Function

7.2.2.12 Internet search

Figure 7.14 illustrates the source code for Internet search function. This function is used to perform Internet searching for current selected text on currently viewed content.

Algorithm:

```
//Perform Internet searching
Procedure InternetSearch()

Call InternetSearching function on ucMainWindow
```

Coding:

```
Private Sub InternetSearch()
   If DHTMLScreen.DOM.selection.Type = "Text" Then
      UserControl.Parent.InternetSearching DHTMLScreen.DOM.selection.createRange.Text
   End If
End Sub
```

Figure 7.14 Source Code For Internet Search

7.2.2.13 Reader agent

Figure 7.15 illustrates the source code for reader agent. This function is used to play text reading.

Algorithm:

```
//Perform reader agent read text
Function ActivateReader(bTrue: Boolean)

If there is a selected text then
        Read the selected text
Else
        Read the full content
End if
```

Coding:

```
Public Function ActivateReader(bTrue As Boolean) As Boolean
   On Error GoTo errhandler
   If bTrue = True Then
      If tts.IsSpeaking = 1 Then
         tts.StopSpeaking
      End If
      If DHTMLScreen.DOM.selection.createRange.Text <> "" Then
         tts.Speak DHTMLScreen.DOM.selection.createRange.Text
      Else
         If DHTMLScreen.DOM.body.innerText <> "" Then
            tts.Speak DHTMLScreen.DOM.body.innerText
         End If
      End If
      DHTMLToolbar2.Buttons(13).Enabled = True
   Else
      tts.StopSpeaking
      DHTMLToolbar2.Buttons(13).Enabled = False
   End If
errhandler:
   If Err.Number <> 0 Then
      If Err.Number <> 35600 Then
         Exit Function
      End If
   End If
End Function
```

Figure 7.15 Source Code For Reader Agent

7.2.2.14 Highlight text and clear highlighted text

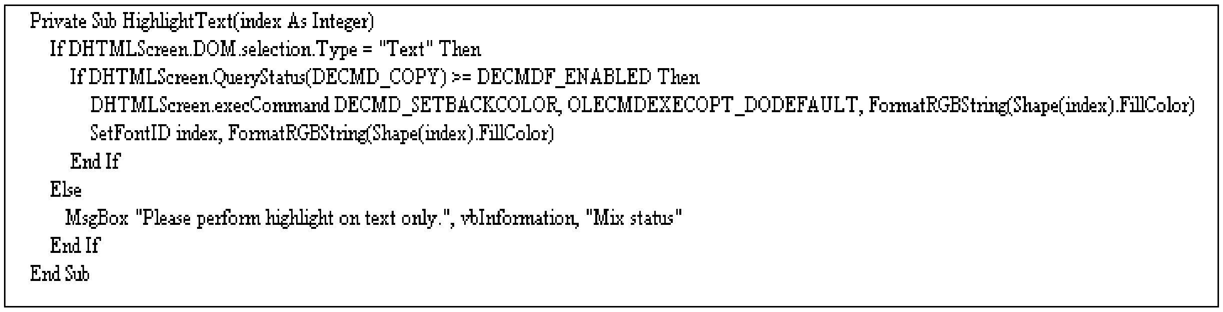
These functions are used to highlight the text and clear the highlighted text. For example, the highlight text function algorithm and coding are shown. Figure 7.16 illustrates the hightlight text function.

Algorithm:

```
//Perform highlight text
Function HighlightText(index: Integer)

If there is a selected text then
        Highlight the text with specific color
End if
```

Coding:



```
Private Sub HighlightText(index As Integer)
    If DHTMLScreen.DOM.selection.Type = "Text" Then
        If DHTMLScreen.QueryStatus(DECMD_COPY) >= DECMDF_ENABLED Then
            DHTMLScreen.execCommand DECMD_SETBACKCOLOR, OLECMDEXECOPT_DODEFAULT, FormatRGBString(Shape(index).FillColor)
            SetFontID index, FormatRGBString(Shape(index).FillColor)
        End If
    Else
       MsgBox "Please perform highlight on text only.", vbInformation, "Mix status"
    End If
End Sub
```

Figure 7.16 Source Code For Highlight Text

7.2.2.15 Play board file

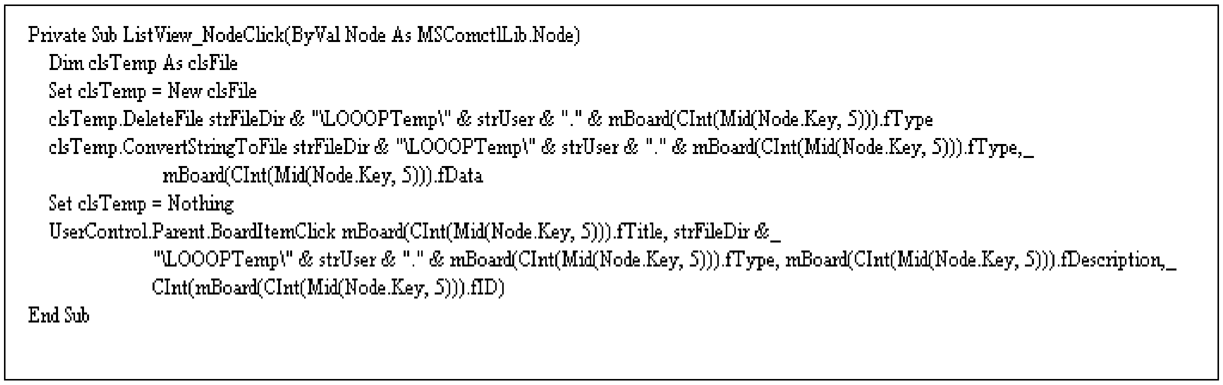
Figure 7.17 illustrates the source code for play board file function. This function is used to play the associated file for current viewed content.

Algorithm:

```
//Perform play board file
Function ListView_NodeClick(Node: MSComctLib.Node)

Convert the file string to file
Call BoardItemClick function on ucMainWindow to open the file
```

Coding:



```
Private Sub ListView_NodeClick(ByVal Node As MSComctlLib.Node)
   Dim clsTemp As clsFile
   Set clsTemp = New clsFile
   clsTemp.DeleteFile strFileDir & "\LOOOPTemp\" & strUser & "." & mBoard(CInt(Mid(Node.Key, 5))).fType
   clsTemp.ConvertStringToFile strFileDir & "\LOOOPTemp\" & strUser & "." & mBoard(CInt(Mid(Node.Key, 5))).fType,_
                  mBoard(CInt(Mid(Node.Key, 5))).fData
   Set clsTemp = Nothing
   UserControl.Parent.BoardItemClick mBoard(CInt(Mid(Node.Key, 5))).fTitle, strFileDir &_
                 "\LOOOPTemp\" & strUser & "." & mBoard(CInt(Mid(Node.Key, 5))).fType, mBoard(CInt(Mid(Node.Key, 5))).fDescription,_
                 CInt(mBoard(CInt(Mid(Node.Key, 5))).fID)
End Sub
```

Figure 7.17 Source Code For Play Board File

7.2.3 Search Information Page

Search information page is the place for user searching the keyword from the Internet or sharable learning contents. The result page found can also be a source for user to add it as learning contents.

7.2.3.1 Search from Internet or contents

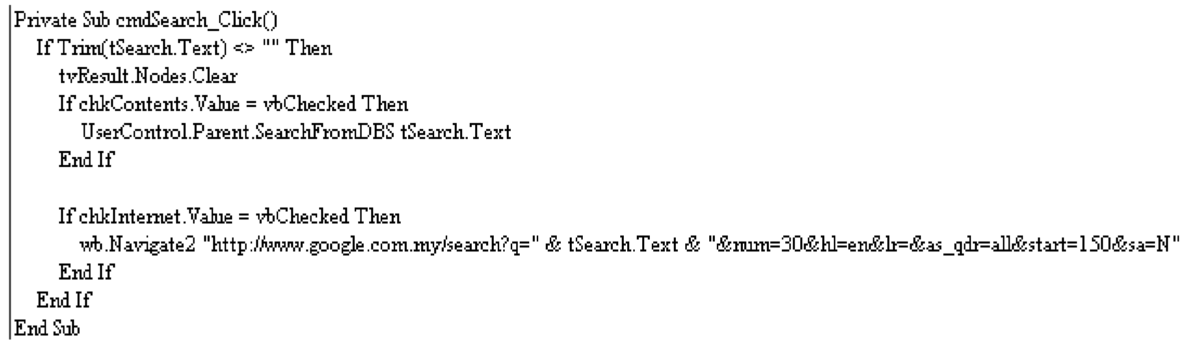
Figure 7.18 illustrates the source code for search from internet or contents function. This function is used to search the keyword from Internet or sharable learning contents.

Algorithm:

```
//Perform search from Internet or contents.
Procedure cmdSearch_Click()

If search from contents checkbox is selected then
        Call SearchFromDBS on ucMainWindow
End if
If search from contents checkbox is selected then
        Set web browser navigate to google.com search page
End if
```

Coding:



```
Private Sub cmdSearch_Click()
   If Trim(tSearch.Text) <> "" Then
      tvResult.Nodes.Clear
      If chkContents.Value = vbChecked Then
         UserControl.Parent.SearchFromDBS tSearch.Text
      End If

      If chkInternet.Value = vbChecked Then
         wb.Navigate2 "http://www.google.com.my/search?q=" & tSearch.Text & "&num=30&hl=en&lr=&as_qdr=all&start=150&sa=N"
      End If
   End If
End Sub
```

Figure 7.18 Source Code For Search From Internet And Contents

7.2.3.2 Save to contents

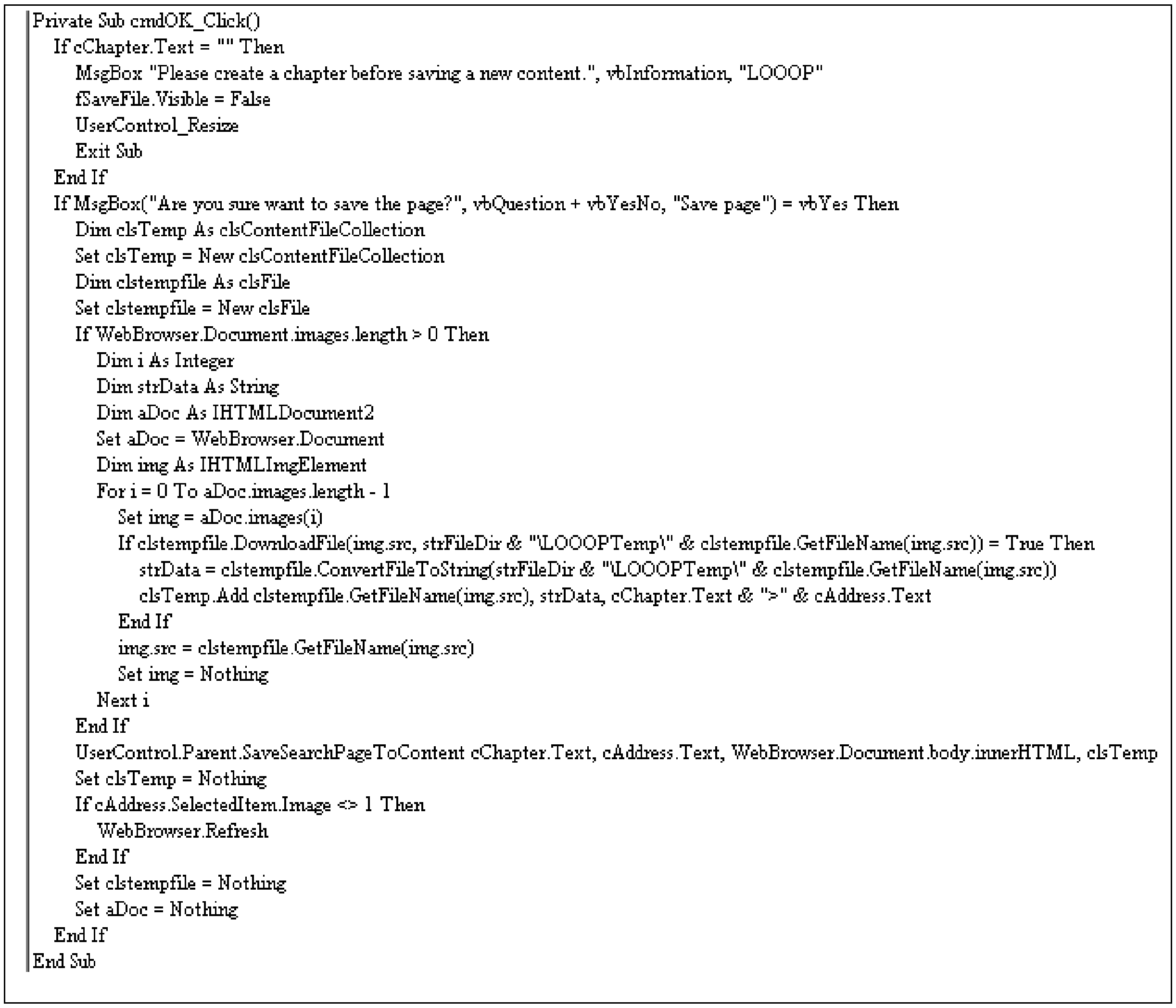
Figure 7.19 illustrates the source code for save to contents function. This function is used to save the current viewed page as content.

Algorithm:

```
//Perform save to contents.
Procedure cmdOK_Click()

Check for the image file included inside the page
If any image file is found then
        Get the file path from the list and download it
        Convert the file to string
        Delete the downloaded file
End if
Call SaveSearchPageToContent on ucMainWindow to save the file
```

Coding:



```
Private Sub cmdOK_Click()
   If cChapter.Text = "" Then
      MsgBox "Please create a chapter before saving a new content.", vbInformation, "LOOOP"
      fSaveFile.Visible = False
      UserControl_Resize
      Exit Sub
   End If
   If MsgBox("Are you sure want to save the page?", vbQuestion + vbYesNo, "Save page") = vbYes Then
      Dim clsTemp As clsContentFileCollection
      Set clsTemp = New clsContentFileCollection
      Dim clstempfile As clsFile
      Set clstempfile = New clsFile
      If WebBrowser.Document.images.length > 0 Then
         Dim i As Integer
         Dim strData As String
         Dim aDoc As IHTMLDocument2
         Set aDoc = WebBrowser.Document
         Dim img As IHTMLImgElement
         For i = 0 To aDoc.images.length - 1
            Set img = aDoc.images(i)
            If clstempfile.DownloadFile(img.src, strFileDir & "\LOOOPTemp\" & clstempfile.GetFileName(img.src)) = True Then
               strData = clstempfile.ConvertFileToString(strFileDir & "\LOOOPTemp\" & clstempfile.GetFileName(img.src))
               clsTemp.Add clstempfile.GetFileName(img.src), strData, cChapter.Text & ">" & cAddress.Text
            End If
            img.src = clstempfile.GetFileName(img.src)
            Set img = Nothing
         Next i
      End If
      UserControl.Parent.SaveSearchPageToContent cChapter.Text, cAddress.Text, WebBrowser.Document.body.innerHTML, clsTemp
      Set clsTemp = Nothing
      If cAddress.SelectedItem.Image <> 1 Then
         WebBrowser.Refresh
      End If
      Set clstempfile = Nothing
      Set aDoc = Nothing
   End If
End Sub
```

Figure 7.19 Source Code For Save To Contents

7.2.3.3 Save as board file

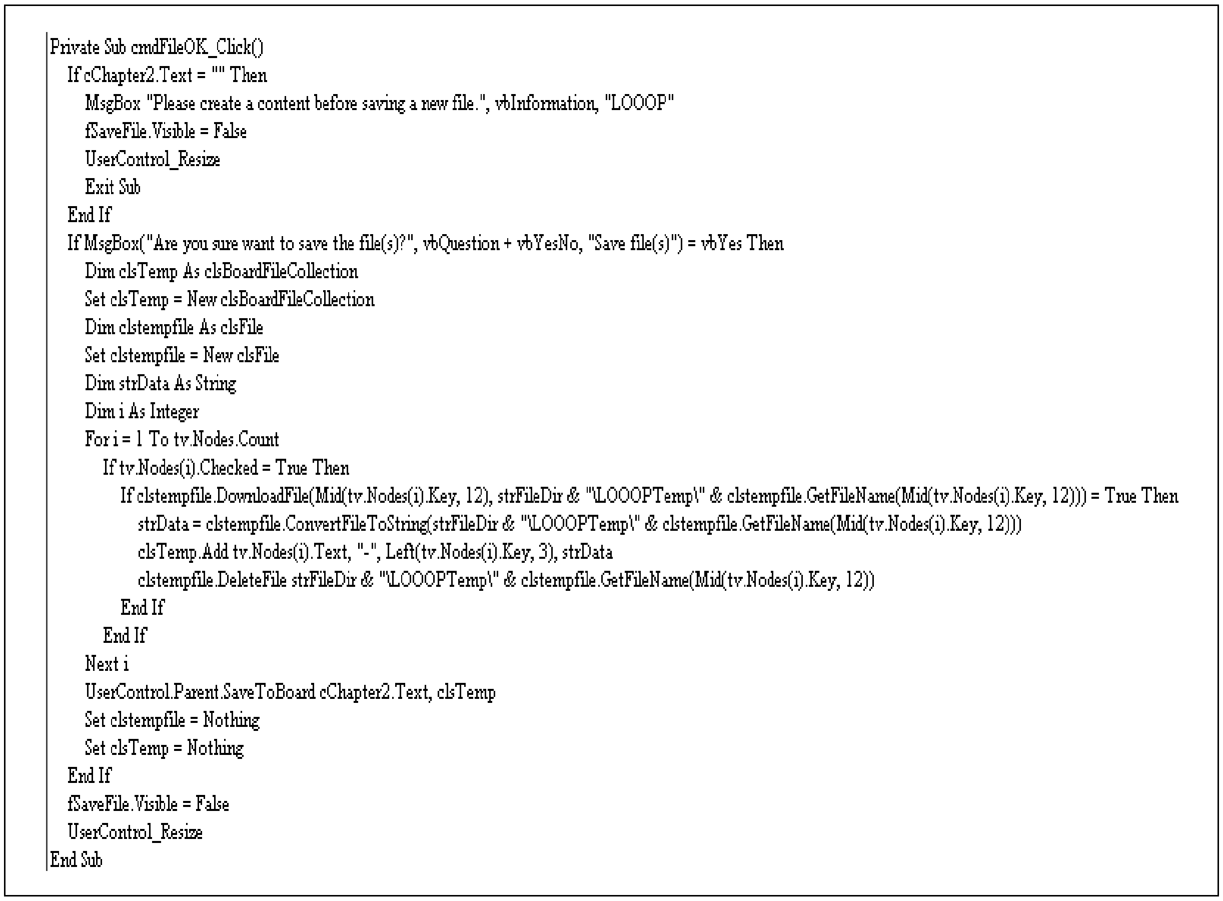
Figure 7.20 illustrates the source code for save as board file function. This function is used to save the multimedia file or picture file to selected content.

Algorithm:

```
//Perform save as board file.
Procedure cmdFileOK_Click()

Check for the selected file from file list
If the file is selected then
        Get the file path from the list and download it
        Convert the file to string
        Delete the downloaded file
End if
Call SaveToBoard on ucMainWindow to save the file
```

Coding:



```
Private Sub cmdFileOK_Click()
    If cChapter2.Text = "" Then
        MsgBox "Please create a content before saving a new file.", vbInformation, "LOOOP"
        fSaveFile.Visible = False
        UserControl_Resize
        Exit Sub
    End If
    If MsgBox("Are you sure want to save the file(s)?", vbQuestion + vbYesNo, "Save file(s)") = vbYes Then
        Dim clsTemp As clsBoardFileCollection
        Set clsTemp = New clsBoardFileCollection
        Dim clstempfile As clsFile
        Set clstempfile = New clsFile
        Dim strData As String
        Dim i As Integer
        For i = 1 To tv.Nodes.Count
            If tv.Nodes(i).Checked = True Then
                If clstempfile.DownloadFile(Mid(tv.Nodes(i).Key, 12), strFileDir & "\LOOOPTemp\" & clstempfile.GetFileName(Mid(tv.Nodes(i).Key, 12))) = True Then
                    strData = clstempfile.ConvertFileToString(strFileDir & "\LOOOPTemp\" & clstempfile.GetFileName(Mid(tv.Nodes(i).Key, 12)))
                    clsTemp.Add tv.Nodes(i).Text, "-", Left(tv.Nodes(i).Key, 3), strData
                    clstempfile.DeleteFile strFileDir & "\LOOOPTemp\" & clstempfile.GetFileName(Mid(tv.Nodes(i).Key, 12))
                End If
            End If
        Next i
        UserControl.Parent.SaveToBoard cChapter2.Text, clsTemp
        Set clstempfile = Nothing
        Set clsTemp = Nothing
    End If
    fSaveFile.Visible = False
    UserControl_Resize
End Sub
```

Figure 7.20 Source Code For Save As Board File

7.2.4 View File Page

View file page is the place for the user to view and manage the board file, which is the file that is associated with the personal learning contents.

7.2.4.1 Save to database

Figure 7.21 illustrates the source code for save to database function. This function is used to save the modified file information of currently viewed file.

Algorithm:

```
//Perform save to database.
Procedure SaveFile()

Call lnkModifyBoardFile function on ucMainWindow
```

Coding:

```
Public Sub SaveFile()
    UserControl.Parent.lnkModifyBoardFile txtTitle.Text, txt.Text, intFileOpenID
End Sub
```

Figure 7.21 Source Code For Save To Database On View File Page

7.2.4.2 Save as external file

Figure 7.22 illustrates the save as external file function. This function is used to save the currently viewed file to original format file.

Algorithm:

```
//Perform save as external file.
Procedure SaveAsFile (strDestPath: String)

Include clsFile class
Call copy file function to save the file on selected file path
```

Coding:

```
Public Sub SaveAsFile(strDestPath As String)
    Dim clsTemp As clsFile
    Set clsTemp = New clsFile
    clsTemp.CopyFile strFileOpen, strDestPath
    Set clsTemp = Nothing
End Sub
```

Figure 7.22 Source Code For Save As External File

7.2.4.3 Delete file

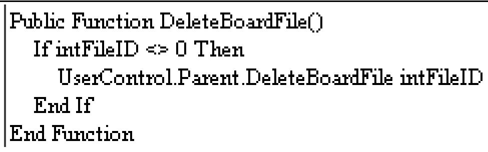
Figure 7.23 illustrates the source code for delete file function. This function is used to delete currently viewed file.

Algorithm:

```
//Perform delete file.
Function DeleteBoardFile ()

If file id is not empty then
        Call DeleteBoardFile on ucMainWindow
End if
```

Coding:



```
Public Function DeleteBoardFile()
    If intFileID <> 0 Then
        UserControl.Parent.DeleteBoardFile intFileID
    End If
End Function
```

Figure 7.23 Source Code For Delete File

7.2.5 Forum Window

Forum window is the place for registered user to communicate with another online LOOOP registered user.

7.2.5.1 Send file

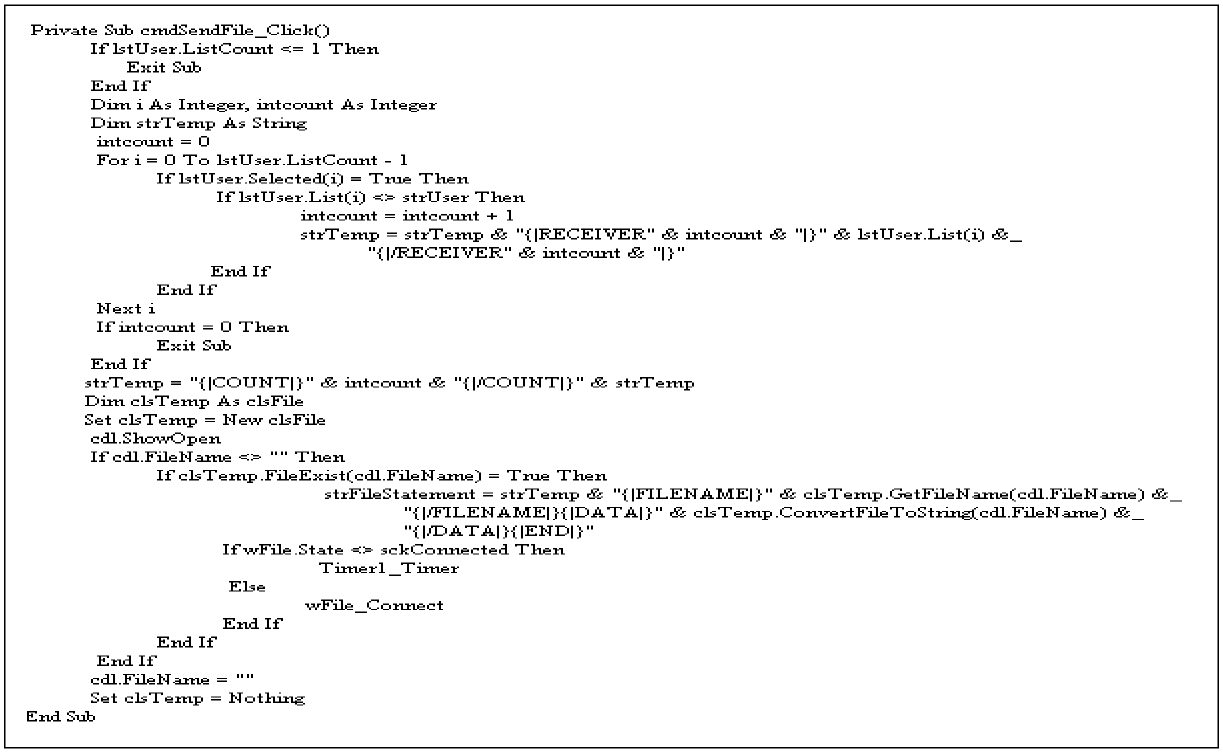
Figure 7.24 illustrates the source code for send file function. This function is used to send the selected file to another online LOOOP registered user.

Algorithm:

```
//Perform send file.
Procedure cmdSendFile_Click ()

Find whether any online registered user is selected as receiver
If there is then
        Set strTemp    //LOOOP language for selected user name
End if
Read the file path
Convert the file to string
Set the strTemp again with filename and file data
Send to LOOOP Socket and send to selected users
```

Coding:



```
Private Sub cmdSendFile_Click()
        If lstUser.ListCount <= 1 Then
             Exit Sub
        End If
        Dim i As Integer, intcount As Integer
        Dim strTemp As String
         intcount = 0
         For i = 0 To lstUser.ListCount - 1
                If lstUser.Selected(i) = True Then
                        If lstUser.List(i) <> strUser Then
                                intcount = intcount + 1
                                strTemp = strTemp & "{|RECEIVER" & intcount & "|}" & lstUser.List(i) &_
                                        "{|/RECEIVER" & intcount & "|}"
                        End If
                End If
         Next i
         If intcount = 0 Then
                Exit Sub
        End If
       strTemp = "{|COUNT|}" & intcount & "{|/COUNT|}" & strTemp
       Dim clsTemp As clsFile
       Set clsTemp = New clsFile
        cdl.ShowOpen
        If cdl.FileName <> "" Then
                If clsTemp.FileExist(cdl.FileName) = True Then
                                strFileStatement = strTemp & "{|FILENAME|}" & clsTemp.GetFileName(cdl.FileName) &_
                                        "{|/FILENAME|}{|DATA|}" & clsTemp.ConvertFileToString(cdl.FileName) &_
                                        "{|/DATA|}{|END|}"
                        If wFile.State <> sckConnected Then
                                Timer1_Timer
                         Else
                               wFile_Connect
                        End If
                End If
         End If
        cdl.FileName = ""
        Set clsTemp = Nothing
End Sub
```

Figure 7.24 Source Code For Send File

7.2.5.2 Send message

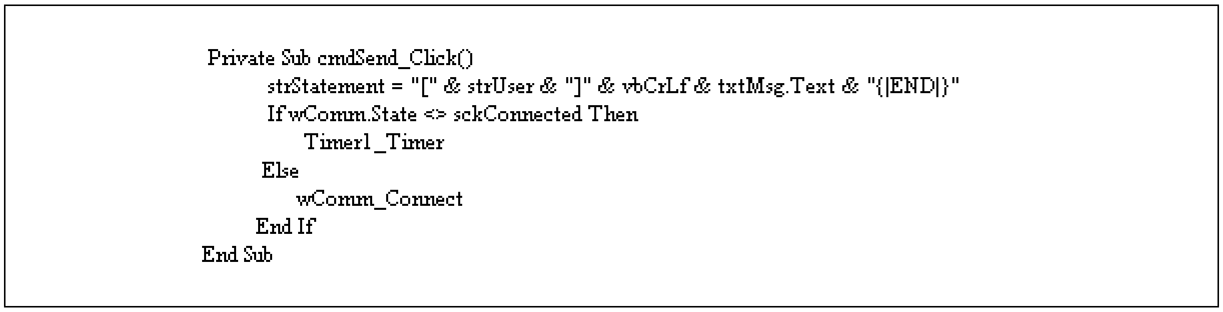
Figure 7.25 illustrates the source code for send message function. This function is used to send the message that typed in the message input area on forum window.

Algorithm:

```
//Perform send message.
Procedure cmdSend_Click ()

Set strStatement   //LOOOP language that include the user message typed
If the socket is disconnected then
        Call timer to connect it
Else
        Send the message
End if
```

Coding:



```
Private Sub cmdSend_Click()
        strStatement = "[" & strUser & "]" & vbCrLf & txtMsg.Text & "{|END|}"
        If wComm.State <> sckConnected Then
             Timer1_Timer
        Else
            wComm_Connect
        End If
End Sub
```

Figure 7.25 Source Code For Send Message

7.3 Summary

System implementation and coding is a step to turn the designed system process flow and data flow to a reality system. After the design is drawn, algorithms are well defined to convert the data flow diagram into a text format. In order to change from design to reality, Microsoft Visual Basic 6.0 is selected as the programming language to develop the system. Based on the written algorithms, the codes are written and some tests are performed on the written codes in the next steps of software development life cycle.