Министерство образования Республики Беларусь

Учреждение образования
БЕЛОРУССКИЙ ГОСУДАРСТВЕННЫЙ УНИВЕРСИТЕТ
ИНФОРМАТИКИ И РАДИОЭЛЕКТРОНИКИ

Факультет информационных технологий и управления

Кафедра информационных технологий автоматизированных систем

Отчет по лабораторной работе № 7
«Связь с внешней базой данных»
дисциплины «Банки и базы данных»

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Минск 2013

1 Цели работы

– изучение возможности работы с внешними базами из среды программирования;
– изучение возможностей работы с базой данных из VBA.

2 Задание

Расширить возможности программы, добавив кнопки для поиска, изменения, добавления и сохранения записи.

Реализовать SQL запросы для выборки студентов по возрасту, группе, успеваемости (в последнем случае ввести в таблицу поле успеваемости).

Добавить в базу вторую таблицу —- Библиотека, в которой отразить литературу, взятую студентами из библиотеки. Выполнить поиск из двух таблиц. Для этого нужно реализовать SQL-запрос к двум таблицам.

3 Ход работы

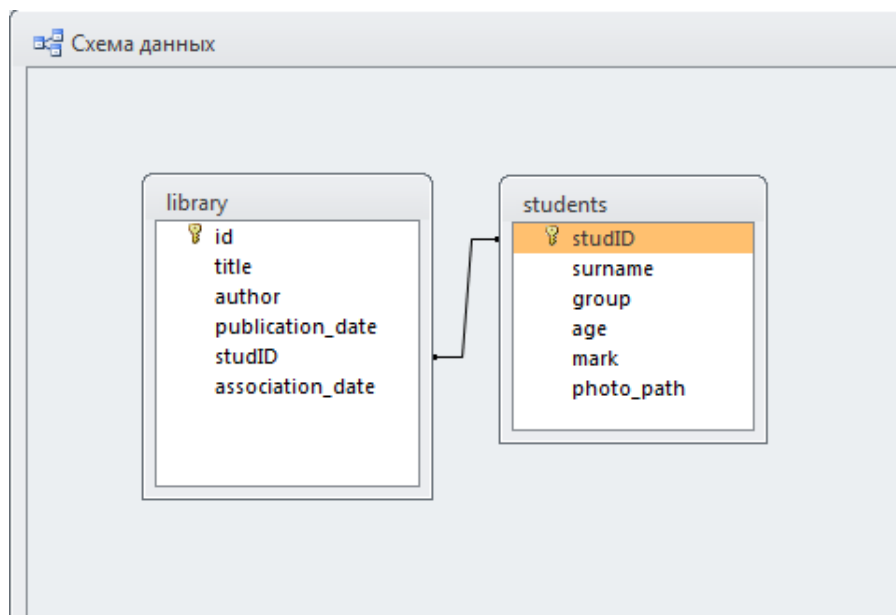Пусть имеется база данных со следующей схемой (рисунок 3.1).

Рисунок 1 – Схема базы данных

Разработанный документ имеет следующий вид (рисунки 3.2, 3.3, 3.4).

Рисунок 2 – Лист для работы с таблицей students

Рисунок 3 – Лист для работы с таблицей library

Далее приведен код обработчиков событий.

Поиск

| 5 | | Поиск |

Выполнить поиск по:

○ Фамилия студента

○ Группа студента

○ Название книги

○ Автор книги

● Задолженность

Результаты поиска:

Фамилия	Группа	Книга	Автор	Год изд.	Задолженность
Sidorov3	120609	Fizika	Berezin	2007	12.06.2013
Titov9	120607	VMiKA2	Mucha	2001	17.12.2013
Petrov	120608	OIT4	Strigalev	1980	17.12.2013
Vasiliev	120608	Filosofy	Alexandrova	2006	01.12.2013
Vasiliev	120608	VMiKA	Mucha	2001	17.12.2013
Vasiliev	120608	VMiKA	Mucha	2001	17.12.2013
Titov	120607	VM	Lushakova	2000	14.11.2013

Рисунок 4 – Лист для осушествления поиска по БД

```
Dim opened As Boolean
Dim stud, library As recordset
Dim database As database

Private Sub addBookBtn_Click() ' create (add) book
If opened = True Then
    Dim cursorAddBook As recordset
    Set cursorAddBook = database.OpenRecordset("SELECT MAX(id) as
  max FROM library", dbOpenDynaset)
    curBookId = cursorAddBook.Fields("max").Value
    library.AddNew
    library.Fields("id").Value = curBookId + 1
    library.Fields("title").Value = Documents(1).titleTextBox.
Value
    library.Fields("author").Value = Documents(1).authorTextBox.
Value
    library.Fields("publication_date").Value = Documents(1).
dateTextBox.Value
    library.Fields("studID").Value = 0
    library.Update
```

```
        cursorAddBook.Close
        Set cursorAddBook = Nothing
End If
End Sub

Private Sub addBookToStudent_Click()
If opened = True Then
    If library.Fields("studID").Value = 0 Then
        library.Edit
        library.Fields("studID").Value = stud.Fields("studID").
    Value
        library.Fields("association_date").Value = Date
        library.Update
        MsgBox ("The book was successfully added!")
        assocStudID = library.Fields("studID")

        Documents(1).AssociationDateTextBox.Value = library.Fields
    ("association_date").Value

        If assocStudID = 0 Then
            Documents(1).AssociatedStundentTextBox.Value = "Free"
        Else
            Set bookAssoc = database.OpenRecordset("SELECT surname
     FROM students WHERE (studID =" + Str(assocStudID) + ")",
    dbOpenDynaset)
            Documents(1).AssociatedStundentTextBox.Value =
    bookAssoc.Fields("surname")
        End If
     Else
        MsgBox ("Please, choose another book!")
    End If
Else
    MsgBox ("Please, open DataBase!")
End If
End Sub

Private Sub browseAllBook_Click()
    If opened = True Then
        Documents(1).releaseBook.Enabled = False

        Set library = database.OpenRecordset("library",
    dbOpenDynaset)
        Documents(1).titleTextBox.Value = library.Fields("title").
    Value
```

```
        Documents(1).authorTextBox.Value = library.Fields("author
").Value
        Documents(1).dateTextBox.Value = library.Fields("
publication_date").Value

        assocDate = library.Fields("association_date").Value
        If IsNull(assocDate) Then
            Documents(1).AssociationDateTextBox.Value = "Free"
        Else
            Documents(1).AssociationDateTextBox.Value = assocDate
        End If

        assocStudID = library.Fields("studID")
        If assocStudID = 0 Then
            Documents(1).AssociatedStundentTextBox.Value = "Free"
        Else
            Set bookAssoc = database.OpenRecordset("SELECT surname
 FROM students WHERE (studID =" + Str(assocStudID) + ")",
dbOpenDynaset)
            Documents(1).AssociatedStundentTextBox.Value =
bookAssoc.Fields("surname")
        End If
    Else
        MsgBox ("Please, open DataBase!")
    End If
End Sub

Private Sub browseStudentBook_Click()
    If opened = True Then

        curStudId = Str(stud.Fields("studID").Value)
        Set library = database.OpenRecordset("SELECT * FROM
library WHERE (studID =" + curStudId + ")", dbOpenDynaset)
        If library.EOF() = False Then
            Documents(1).releaseBook.Enabled = True

            Documents(1).titleTextBox.Value = library.Fields("
title").Value
            Documents(1).authorTextBox.Value = library.Fields("
author").Value
            Documents(1).dateTextBox.Value = library.Fields("
publication_date").Value

            assocDate = library.Fields("association_date").Value
```

```vb
                If IsNull(assocDate) Then
                    Documents(1).AssociationDateTextBox.Value = "Free"
                Else
                    Documents(1).AssociationDateTextBox.Value =
   assocDate
                End If

                assocStudID = library.Fields("studID")
                If assocStudID = 0 Then
                    Documents(1).AssociatedStundentTextBox.Value = "
   Free"
                Else
                    Set bookAssoc = database.OpenRecordset("SELECT
   surname FROM students WHERE (studID =" + Str(assocStudID) + ")
   ", dbOpenDynaset)
                    Documents(1).AssociatedStundentTextBox.Value =
   bookAssoc.Fields("surname")
                End If
            Else
                MsgBox ("Can't find any suitable book!")
            End If
        Else
            MsgBox ("Please, open DataBase!")
        End If
End Sub

Private Sub closeDbBtn_Click() 'close database
        If opened = True Then
            stud.Close
            database.Close
            Set stud = Nothing
            opened = False
        End If
        openDbBtn.Enabled = True
        Documents(1).famTextBox.Value = ""
        Documents(1).groupTextBox.Value = ""
        Documents(1).ageTextBox.Value = ""
        Documents(1).markTextBox.Value = ""
        Documents(1).photoPathTextBox.Value = ""
        Documents(1).image.Picture = LoadPicture("", 100, 100, Color)
        Documents(1).titleTextBox.Value = ""
        Documents(1).authorTextBox.Value = ""
        Documents(1).dateTextBox.Value = ""
        Documents(1).AssociatedStundentTextBox.Value = ""
```

```vba
        Documents(1).AssociationDateTextBox.Value = ""
End Sub

Private Sub createStudBtn_Click() 'create student
If opened = True Then
    Dim cursor As recordset
    Set cursor = database.OpenRecordset("SELECT MAX(studID) as max
    FROM students", dbOpenDynaset)
    curStudId = cursor.Fields("max").Value

    stud.AddNew
    stud.Fields("studID").Value = curStudId + 1
    stud.Fields("surname").Value = Documents(1).famTextBox.Value
    stud.Fields("group").Value = Documents(1).groupTextBox.Value
    stud.Fields("age").Value = Documents(1).ageTextBox.Value
    stud.Fields("mark").Value = Documents(1).markTextBox.Value
    stud.Fields("photo_path").Value = Documents(1).
    photoPathTextBox.Value
    stud.Update

    photoPath = Documents(1).photoPathTextBox.Value
    Documents(1).image.Picture = LoadPicture(photoPath, 100, 100,
    Color)

    cursor.Close
    Set cursor = Nothing
Else
    MsgBox ("Please, open DataBase!")
End If
End Sub

Private Sub delBookBtn_Click() ' delete book
If opened = True Then
    library.Delete
    library.MoveFirst
    If library.EOF() = False Then
        Documents(1).titleTextBox.Value = library.Fields("title").
    Value
        Documents(1).authorTextBox.Value = library.Fields("author
    ").Value
        Documents(1).dateTextBox.Value = library.Fields("
    publication_date").Value
    Else
        Documents(1).titleTextBox.Value = ""
```

```vb
            Documents(1).authorTextBox.Value = ""
            Documents(1).dateTextBox.Value = ""
      End If
Else
      MsgBox ("Please, open DataBase!")
End If
End Sub

Private Sub deleteStudBtn_Click() 'delete student
If opened = True Then
      Dim curStudId As Integer
      curStudId = stud.Fields("studID").Value
      deleteConnectedBooksQuery = "Update library set studId = 0
    where (studId = " + Str(curStudId) + ")"
      database.Execute (deleteConnectedBooksQuery)
      stud.Delete

      stud.MoveFirst
      Documents(1).famTextBox.Value = stud.Fields("surname").Value
      Documents(1).groupTextBox.Value = stud.Fields("group").Value
      Documents(1).ageTextBox.Value = stud.Fields("age").Value
      Documents(1).markTextBox.Value = stud.Fields("mark").Value
      photoPath = stud.Fields("photo_path").Value
      Documents(1).photoPathTextBox.Value = photoPath
      Documents(1).image.Picture = LoadPicture(photoPath, 100, 100,
    Color)

Else
      MsgBox ("Please, open DataBase!")
End If
End Sub

Sub clearTable()
      Dim i As Integer
      i = 2
      maxRow = Documents(1).Tables(2).Rows.Count
      Do While (i <= maxRow)
            Documents(1).Tables(2).Cell(i, 1).Range.Text = ""
            Documents(1).Tables(2).Cell(i, 2).Range.Text = ""
            Documents(1).Tables(2).Cell(i, 3).Range.Text = ""
            Documents(1).Tables(2).Cell(i, 4).Range.Text = ""
            Documents(1).Tables(2).Cell(i, 5).Range.Text = ""
            Documents(1).Tables(2).Cell(i, 6).Range.Text = ""
            i = i + 1
```

```
        Loop
End Sub


Sub printRecordset(resultSet As recordset)
    Call clearTable
    i = 2
    Do While Not (resultSet.EOF())
        Documents(1).Tables(2).Cell(i, 1).Range.Text = resultSet.
    Fields("surname").Value
        Documents(1).Tables(2).Cell(i, 2).Range.Text = resultSet.
    Fields("group").Value
        If Not IsNull(resultSet.Fields("title").Value) Then
            Documents(1).Tables(2).Cell(i, 3).Range.Text =
    resultSet.Fields("title").Value
            Documents(1).Tables(2).Cell(i, 4).Range.Text =
    resultSet.Fields("author").Value
            Documents(1).Tables(2).Cell(i, 5).Range.Text =
    resultSet.Fields("publication_date").Value
            Documents(1).Tables(2).Cell(i, 6).Range.Text =
    resultSet.Fields("association_date").Value
        Else
            Documents(1).Tables(2).Cell(i, 3).Range.Text = ""
            Documents(1).Tables(2).Cell(i, 4).Range.Text = ""
            Documents(1).Tables(2).Cell(i, 5).Range.Text = ""
            Documents(1).Tables(2).Cell(i, 6).Range.Text = ""
        End If
        resultSet.MoveNext
        i = i + 1
    Loop
End Sub

Sub printDateRecordset(resultSet As recordset)
    Call clearTable
    Dim assocDate As Date, numberOfDays As Integer, thresholdDays
    As Integer
    thresholdDays = Documents(1).findTextBox.Value
    i = 2
    Do While Not (resultSet.EOF())
        If Not IsNull(resultSet.Fields("association_date").Value)
    Then
            assocDate = resultSet.Fields("association_date").Value
            numberOfDays = DateDiff("d", assocDate, Date)
```

```
                    If (numberOfDays >= thresholdDays) Then
                        Documents(1).Tables(2).Cell(i, 1).Range.Text =
    resultSet.Fields("surname").Value
                        Documents(1).Tables(2).Cell(i, 2).Range.Text =
    resultSet.Fields("group").Value
                        Documents(1).Tables(2).Cell(i, 3).Range.Text =
    resultSet.Fields("title").Value
                        Documents(1).Tables(2).Cell(i, 4).Range.Text =
    resultSet.Fields("author").Value
                        Documents(1).Tables(2).Cell(i, 5).Range.Text =
    resultSet.Fields("publication_date").Value
                        Documents(1).Tables(2).Cell(i, 6).Range.Text =
    resultSet.Fields("association_date").Value
                        i = i + 1
                    End If
                End If
                resultSet.MoveNext
        Loop
End Sub

Function generateRecordset(searchField As String, searchPredicate
    As String) As recordset
        searchQuery = "SELECT * FROM students LEFT OUTER JOIN library
    ON students.studID = library.studID WHERE (" + searchField + "
    Like '*" + searchPredicate + "*')"
        Dim generateRecorset As recordset
        Set generateRecordset = database.OpenRecordset(searchQuery,
    dbOpenDynaset)
End Function

Private Sub findBtn_Click()
        Dim stringFind As String
        stringFind = Trim(Documents(1).findTextBox.Value)
If stringFind = "" Then
        MsgBox ("Enter text")
Else
        If findStudentSurnameOpBtn.Value = True Then
            Dim findSurname As recordset
            Set findSurname = generateRecordset("students.surname",
    stringFind)
            Call printRecordset(findSurname)
        End If

        If findStudentGroupOpBtn.Value = True Then
```

```vb
        Dim findStudentsGroup As recordset
        Set findStudentsGroup = generateRecordset("students.group
   ", stringFind)
        Call printRecordset(findStudentsGroup)
    End If

    If findBookTitleOpBtn.Value = True Then
        Dim findTitle As recordset
        Set findTitle = generateRecordset("library.title",
   stringFind)
        Call printRecordset(findTitle)
    End If

    If findBookAuthorOpBtn.Value = True Then
        Dim findAuthor As recordset
        Set findAuthor = generateRecordset("library.author",
   stringFind)
        Call printRecordset(findAuthor)
    End If

    If findBorrowedBookOpBtn.Value = True Then
        Dim findAll As recordset
        Set findAll = generateRecordset("students.surname", "*")
        Call printDateRecordset(findAll)
    End If

End If
End Sub

Private Sub libraryNext_Click() '>>>>
If opened = True Then
    If library.EOF() = False Then
        library.MoveNext
        If library.EOF() = True Then
            library.MovePrevious
        End If
        Documents(1).titleTextBox.Value = library.Fields("title").
   Value
        Documents(1).authorTextBox.Value = library.Fields("author
   ").Value
        Documents(1).dateTextBox.Value = library.Fields("
   publication_date").Value

        assocDate = library.Fields("association_date").Value
```

```
            If IsNull(assocDate) Then
                Documents(1).AssociationDateTextBox.Value = "Free"
            Else
                Documents(1).AssociationDateTextBox.Value = assocDate
            End If

            assocStudID = library.Fields("studID")
            If assocStudID = 0 Then
                Documents(1).AssociatedStundentTextBox.Value = "Free"
            Else
                Set bookAssoc = database.OpenRecordset("SELECT surname
    FROM students WHERE (studID =" + Str(assocStudID) + ")",
    dbOpenDynaset)
                Documents(1).AssociatedStundentTextBox.Value =
    bookAssoc.Fields("surname")
            End If
        End If
Else
    MsgBox ("Please, open DataBase!")
End If
End Sub

Private Sub libraryPrevious_Click()
If opened = True Then
    If library.BOF() = False Then
        library.MovePrevious
        If library.BOF() = True Then
            library.MoveNext
        End If
        Documents(1).titleTextBox.Value = library.Fields("title").
    Value
        Documents(1).authorTextBox.Value = library.Fields("author
    ").Value
        Documents(1).dateTextBox.Value = library.Fields("
    publication_date").Value

        assocDate = library.Fields("association_date").Value
        If IsNull(assocDate) Then
            Documents(1).AssociationDateTextBox.Value = "Free"
        Else
            Documents(1).AssociationDateTextBox.Value = assocDate
        End If

        assocStudID = library.Fields("studID")
```

```
            If assocStudID = 0 Then
                Documents(1).AssociatedStundentTextBox.Value = "Free"
            Else
                Set bookAssoc = database.OpenRecordset("SELECT surname
    FROM students WHERE (studID =" + Str(assocStudID) + ")",
    dbOpenDynaset)
                Documents(1).AssociatedStundentTextBox.Value =
    bookAssoc.Fields("surname")
            End If
        End If
Else
    MsgBox ("Please, open DataBase!")
End If
End Sub


Private Sub nextStubBtn_Click()
If opened = True Then
    If stud.EOF() = False Then
        stud.MoveNext
        If stud.EOF() = True Then
            stud.MovePrevious
        End If
        Documents(1).famTextBox.Value = stud.Fields("surname").
    Value
        Documents(1).groupTextBox.Value = stud.Fields("group").
    Value
        Documents(1).ageTextBox.Value = stud.Fields("age").Value
        Documents(1).markTextBox.Value = stud.Fields("mark").Value
        photoPath = stud.Fields("photo_path").Value
        Documents(1).photoPathTextBox.Value = photoPath
        Documents(1).image.Picture = LoadPicture(photoPath, 100,
    100, Color)
    End If
Else
    MsgBox ("Please, open DataBase!")
End If
End Sub


Private Sub openDbBtn_Click() 'open database
    pathDB = Documents(1).dbPathTextBox.Text
    If pathDB = "" Then
        MsgBox "Database path is wrong!"
        Exit Sub
    End If
```

```
  If opened = True Then
      MsgBox "Database is open!"
  Else
      Set database = OpenDatabase(Name:=pathDB, Options:=True)
      Set stud = database.OpenRecordset("students",
dbOpenDynaset)
      Set library = database.OpenRecordset("library",
dbOpenDynaset)

      Documents(1).famTextBox.Value = stud.Fields("surname").
Value
      Documents(1).groupTextBox.Value = stud.Fields("group").
Value
      Documents(1).ageTextBox.Value = stud.Fields("age").Value
      Documents(1).markTextBox.Value = stud.Fields("mark").Value
      photoPath = stud.Fields("photo_path").Value
      Documents(1).photoPathTextBox.Value = photoPath
      Documents(1).image.Picture = LoadPicture(photoPath, 100,
100, Color)

      Documents(1).titleTextBox.Value = library.Fields("title").
Value
      Documents(1).authorTextBox.Value = library.Fields("author
").Value
      Documents(1).dateTextBox.Value = library.Fields("
publication_date").Value

      assocDate = library.Fields("association_date").Value
      If IsNull(assocDate) Then
          Documents(1).AssociationDateTextBox.Value = "Free"
      Else
          Documents(1).AssociationDateTextBox.Value = assocDate
      End If

      assocStudID = library.Fields("studID")
      If assocStudID = 0 Then
          Documents(1).AssociatedStundentTextBox.Value = "Free"
      Else
          Set bookAssoc = database.OpenRecordset("SELECT surname
 FROM students WHERE (studID =" + Str(assocStudID) + ")",
dbOpenDynaset)
          Documents(1).AssociatedStundentTextBox.Value =
bookAssoc.Fields("surname")
      End If
```

```vbnet
            opened = True
            openDbBtn.Enabled = False
      End If
End Sub

Private Sub prevStudBtn_Click()
If opened = True Then
      If stud.BOF() = False Then
            stud.MovePrevious
            If stud.BOF() = True Then
                  stud.MoveNext
            End If
            Documents(1).famTextBox.Value = stud.Fields("surname").
   Value
            Documents(1).groupTextBox.Value = stud.Fields("group").
   Value
            Documents(1).ageTextBox.Value = stud.Fields("age").Value
            Documents(1).markTextBox.Value = stud.Fields("mark").Value
            photoPath = stud.Fields("photo_path").Value
            Documents(1).photoPathTextBox.Value = photoPath
            Documents(1).image.Picture = LoadPicture(photoPath, 100,
   100, Color)
      End If
Else
      MsgBox ("Please, open DataBase!")
End If

End Sub

Private Sub releaseBook_Click()
If opened = True Then
      library.Edit
      library.Fields("studID").Value = 0
      library.Fields("association_date").Value = Null
      library.Update

      curStudId = Str(stud.Fields("studID").Value)
      Set library = database.OpenRecordset("SELECT * FROM library
   WHERE (studID =" + curStudId + ")", dbOpenDynaset)
      If library.EOF() = False Then
            Documents(1).titleTextBox.Value = library.Fields("title").
   Value
```

```vba
        Documents(1).authorTextBox.Value = library.Fields("author
    ").Value
        Documents(1).dateTextBox.Value = library.Fields("
    publication_date").Value

        assocDate = library.Fields("association_date").Value
        If IsNull(assocDate) Then
            Documents(1).AssociationDateTextBox.Value = "Free"
        Else
            Documents(1).AssociationDateTextBox.Value = assocDate
        End If

        assocStudID = library.Fields("studID")
        If assocStudID = 0 Then
            Documents(1).AssociatedStundentTextBox.Value = "Free"
        Else
            Set bookAssoc = database.OpenRecordset("SELECT surname
     FROM students WHERE (studID =" + Str(assocStudID) + ")",
    dbOpenDynaset)
            Documents(1).AssociatedStundentTextBox.Value =
    bookAssoc.Fields("surname")
        End If
     Else
        Documents(1).titleTextBox.Value = ""
        Documents(1).authorTextBox.Value = ""
        Documents(1).dateTextBox.Value = ""
        Documents(1).dateTextBox.Value = ""
        Documents(1).AssociatedStundentTextBox.Value = ""
        Documents(1).AssociatingDateTextBox.Value = ""
     End If
Else
    MsgBox ("Please, open DataBase!")
End If
End Sub

Private Sub updateBookBtn_Click() 'update book
If opened = True Then
    library.Edit
    library.Fields("title").Value = Documents(1).titleTextBox.
    Value
    library.Fields("author").Value = Documents(1).authorTextBox.
    Value
    library.Fields("publication_date").Value = Documents(1).
    dateTextBox.Value
```

```
        library.Update
Else
    MsgBox ("Please, open DataBase!")
End If

End Sub

Private Sub updateStudBtn_Click() 'update student
If opened = True Then
    stud.Edit
    stud.Fields("surname").Value = Documents(1).famTextBox.Value
    stud.Fields("group").Value = Documents(1).groupTextBox.Value
    stud.Fields("age").Value = Documents(1).ageTextBox.Value
    stud.Fields("mark").Value = Documents(1).markTextBox.Value
    stud.Fields("photo_path").Value = Documents(1).
  photoPathTextBox.Value
    stud.Update

    photoPath = Documents(1).photoPathTextBox.Value
    Documents(1).image.Picture = LoadPicture(photoPath, 100, 100,
  Color)
Else
    MsgBox ("Please, open DataBase!")
End If

End Sub
```

Рисунок 5 – VBA code

4 Вывод

В ходе лабораторной работы были изучены возможности интеграции MS Word с MS Access посредством VBA.