[1]Sorina SERBAN

VIEWING PERIODICAL SYSTEM WITH THE HELP OF MICROSOFT ACCESS DATA BASE

■ **Abstract:**

As an expression of periodic law, the structure of periodical system created by Mendeleev embodied many forms in time. For the present form of the periodic table, knowing the electronic configuration of each element and of outermost electrons in particular is of great importance.

The periodic table contains 110 elements organized in groups and periods, and recently elements with atomic numbers 111, 112, 114, 116, 118 have been discovered.

The most important properties are presented for each element (discovery, natural state, source, use and biological role), physical properties (atomic number, atomic weight, melting and boiling point, density, electron configuration, electron affinity), information on isotopes (nuclei, atomic mass, range, life duration), ionization energy.

The aim of this paper is to use a Microsoft Access study program for teaching purposes. This application is intended for high school pupils and for 1st and 2nd year college students as well, thus they will enlarge the perspective upon physical and chemical properties and electronic configuration of elements in periodical system.

■ **Keywords:**

periodical system, nonperiodic properties, atomic numbers, data base

■ **THEORETICAL CONSIDERATIONS**

As an expression of periodic law, the structure of periodical system created by Mendeleev embodied many forms in time. For the present form of the periodic table, knowing the electronic configuration of each element and of outermost electrons in particular is of great importance.

This explains the periodicity of specific properties in terms of atomic number Z (atomic and ionic radius, ionization energy, electron affinity, melting and boiling points). There are also certain properties, called nonperiodic properties that vary constantly (atomic mass, for example). Nonperiodic properties of elements are given by atomic nuclei, as the periodic properties are given by their electron shells.

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The most important properties are presented for each element (discovery, natural state, source, use and biological role), physical properties (atomic number, atomic weight, melting and

boiling point, density, electron configuration, electron affinity), information on isotopes (nuclei, atomic mass, range, life duration), ionization energy.

◼ **APPLICATION PRESENTATION**

To study the periodic table, a data base called Periodical System was created. The data base is designed to align all the elements with all their physical and chemical properties. Autoexec will open the form Introduction which is active for 8 seconds and then the main menu opens automatically. This form appears as:
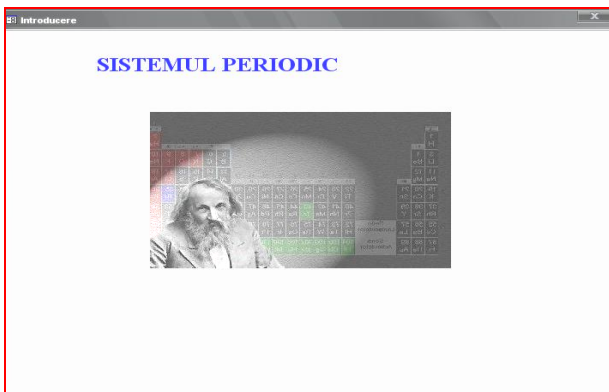

Fig. 1. Data Base Called Periodical System

For the form to work properly, the event Timer was programmed (with an 8000 millisecond interspace)

```
Private Sub Form_Timer()
        DoCmd.Close
        DoCmd.OpenForm "meniu"
End Sub
```
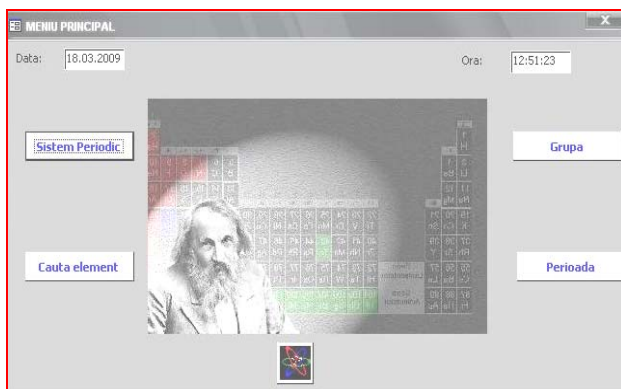

Fig. 2. The Main Menu

Thus, after 8 seconds this window will close automatically and it will open MAIN MENU; which is for us the main form. The main menu contains two text boxes that inform us on date and time, events programmed with Timer

property at a 1000 mseconds interspace. The code is:

```
Private Sub Form_Timer()
        Me!Data_txt.Value = Date
        Me!Ora_txt.Value = Time
End Sub
```

As for the rest, when pressing the buttons, the work forms will open, except for the button "close application". The code for the 4 open buttons is similar, so we will present only one:

```
Private Sub sisp_btn_Click()
On Error GoTo Err_sisp_btn_Click
    Dim stDocName As String
    Dim stLinkCriteria As String
    stDocName = "SIS_P"
    DoCmd.OpenForm stDocName, , , stLinkCriteria
Exit_sisp_btn_Click:
    Exit Sub

Err_sisp_btn_Click:
    MsgBox Err.Description
    Resume Exit_sisp_btn_Click
    End Sub
```

The code for closing application:

```
Private Sub STOP_Click()
On Error GoTo Err_STOP_Click
    DoCmd.Quit

Exit_STOP_Click:
    Exit Sub

Err_STOP_Click:
    MsgBox Err.Description
    Resume Exit_STOP_Click

End Sub
```
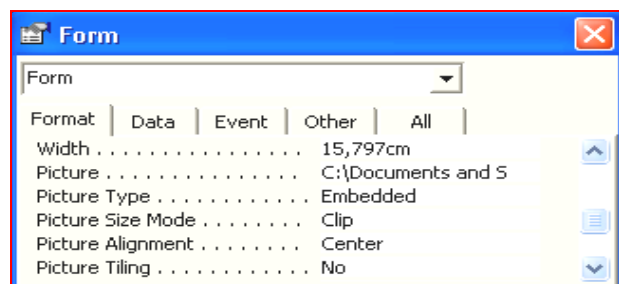

Fig.3. The Form

For most of the forms we used background images which can be added by opening the **Properties** window.

Thus, for **Pictures** property we choose the background file, **Embeded** type, in order to differentiate it from the image on the hard disk of the computer, and to embed it in our data base. For the forms that are bigger than the image we choose Strech option instead of Clip for the image to cover the entire form.
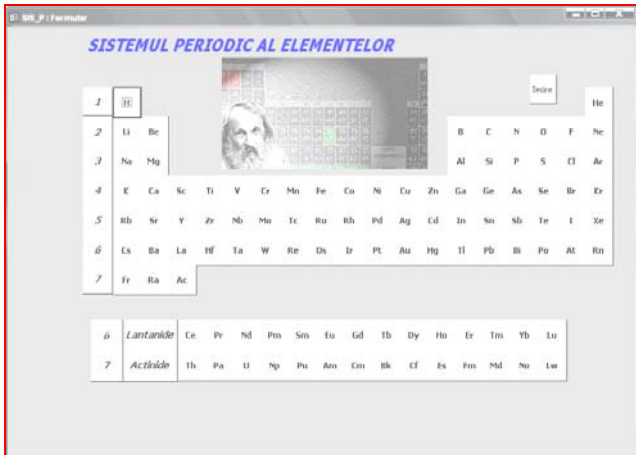
Fig. 4. The Periodical System

Fig. 5. The Periodical System. Example

When pressing the Periodical System button, the form with the same name will open. The form contains numerous buttons with the name of each element in periodic table. By pressing one button a form will open, the same for all buttons, Element form, which will post all elements' properties.

We realized the capture of this form in DESIGN mode to highlight the text box, Text0, which is a hidden box, and in this box the symbol of each element will appear when pressing the drawn buttons. We realized this to open the form Element, for the element which corresponds to each button. The form Element is generated when querying Element, and it will make a selection based on the content in the text box hidden in our form.

```
Private Sub H_Click()
On Error GoTo Err_H_Click

    Me!Text0.Value = "O"

    Dim stDocName As String
    Dim stLinkCriteria As String

    stDocName = "ELEMENT"
    DoCmd.OpenForm stDocName, , , stLinkCriteria

              Exit_H_Click:
Exit Sub

Err_H_Click:
    MsgBox Err.Description
    Resume Exit_H_Click

End Sub
```

The Element form appears as presented in the figure 5.

We can observe The Structure image, which is an OLE type object in our data base. A second button, Search element in main menu, opens a form where we can search a chemical element using three criteria: name, symbol, atomic number.
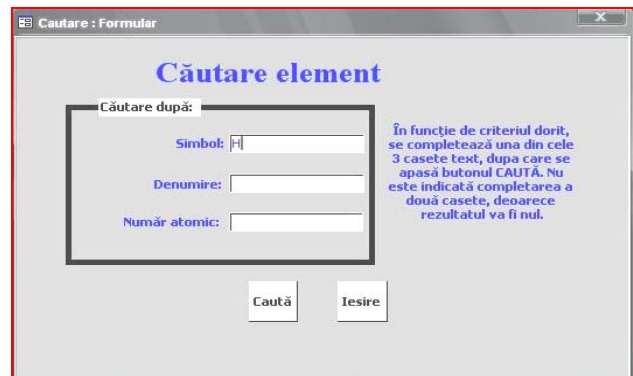

Fig. 6. The Periodical System. Search Meniu

Apart from the filled in text box, when pressing the Search button a new form will open and it will contain the element we searched for with all its properties. Behind this form there is a query which will have as a selection criterion all the 3 text boxes, and only one of them needs to be filled in.
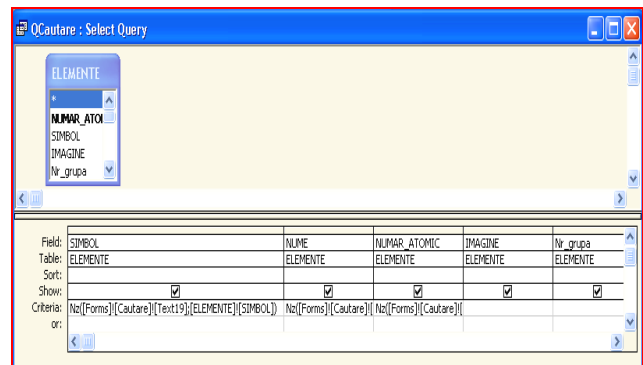

Fig. 7 The Periodical System. Select Query

Thus, as a selection criterion, we will use a function:

Nz([Forms]![Cautare]![Text19];[ELEMENTE]![SIMBOL])

This will search in the text box corresponding to our Seach form for any text, and if there is a text inside, the value in the text box will be the criterion, and if there is no text, it will select all values in Elements table, then it will pass to the next column to continue the criterion. The generated form will have a structure that differs from Element form shown above.

Fig.8. Generated form of Search

On the main interface there are two more buttons; when pressing them we can see the position of chemical elements in group and period.

Fig. 9. Position of chemical elements in group

Fig. 9. Position of chemical elements in period

Groups are considered the most common way to classify the items. In some groups, the elements have properties similar or identical property whole group - these groups are given names that are used quite often, eg. alkali metals, alkaline-earth metals, transitional metals, etc.

A period is a horizontal row of the periodic table. Although groups are the most common way to group elements are regions of the periodic system where the similarities are more significant horizontal than vertical. The number shows the number of layers occupied by electrons.

The problems encountered when using the periodic table for teaching purposes are: the complexity of properties that characterize each and every element and the multitude of elements.

■ CONCLUSION

The usage of educational soft will increase the students' proficiency and creativity, the level of medium and superior training, the amount of knowledge and it will lead subsequently to a better usage of Informatics in various fields of activity.

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■ AUTHORS & AFFILIATION

[1]SORINA SERBAN

[1]UNIVERSITY POLITEHNICA TIMISOARA, FACULTY OF ENGINEERING HUNEDOARA, DEPARTMENT OF ENGINEERING & MANAGEMENT, ROMANIA