



Tehnickal resources in the construction indystry, educational software

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Abstract: *"Technical resources in the construction industry" is an educational software for the same teaching unit in the sixth grade of elementary school for technical and IT education. Educational software consists of a Windows Form and relational database. Relational database Technical resources in the construction industry consists of two tables and is a relational database with files picture. The basic mask as a Windows Form is connected to the database via SQL (Structured Query Language) queries that result in view of the database, a single value attribute view for each record (the record order) destined awarded (in three TextBox, in one RichTextBox, in one PictureBox) Windows Form. In the PictureBox in the images are stored. Record navigation is done with the help of a four-Button (button) on the Windows Forms. The software is programmed in Visual Basic MS Visual Studio 2012, a database in Access 2007.*

Keywords: *Technical and IT education, technical resources in the construction industry, educational software, relational database with pictures, Visual Basic*

1. INTRODUCTION

In the sixth grade of elementary school teaching Technical resources in the construction industry should be treated primarily a demonstration of images and brief explanations to the divisions and the purpose of technical resources in the construction industry. This approach is possible with the help of the educational software that was developed for this purpose and that is displayed with the help of a video projector. The current results of the application software are great because students interested in teaching and easily adopt new material when they see pictures of technical resources in construction and accompanying text. The software consists of a Windows Form and relational database with images. Relational databases can always be modernized by inserting pictures of new models of tools and construction machines.

2. MAKING THE EDUCATIONAL SOFTWARE

2.1. Design Database

Technical resources in the construction industry is a relational database with files image that is through SQL (Structured Query Language [5]) queries associated with Visual Basic Form1 (mask) and is part of the educational software. The software is programmed in Visual Basic MS Visual Studio 2012 [6, 8], a database in Access 2007. Pictures and

technical resources in the construction industry are downloaded from the Internet [1, 2, 9, 11, 12]. Database [5] consists of two relational tables *Overview of technical resources in the construction industry* (Fig. 2) and the *Types of technical resources in the construction industry* (Fig. 3). Table *Overview of technical resources in the construction industry* (OTRICI) has the following attributes (ordinal number (on), name of the technical resource, purpose of technical resource, image file (imf), ordinal number of the type of technical resource (ontotr)). The primary key of the table is ordinal number (on). Table *Types of technical resources in the construction industry* (TTRICI) has the following attributes (ordinal number of the type of technical resource (ontotr), the type of technical resource). The primary key of this table is the ordinal number of the type of technical resource (ontotr). Table *Types of technical resources in construction* and *Overview of technical resources in the construction industry* are in relation one to more. At the logical level was performed database normalization. In a physical database referential integrity is applied. The tables are designed in Access 2007 (Fig. 1). Table *Types of technical resources in the construction industry* under the attribute *Type of technical resource* enumerated the simple division into a construction tool, construction earthmoving machines, construction machines lifting and cargo transport, construction mixer, a means of protection at work in the construction industry. This division is similar in technical literature [7] and is less detailed with respect to the division of construction machinery in the technical literature [10].

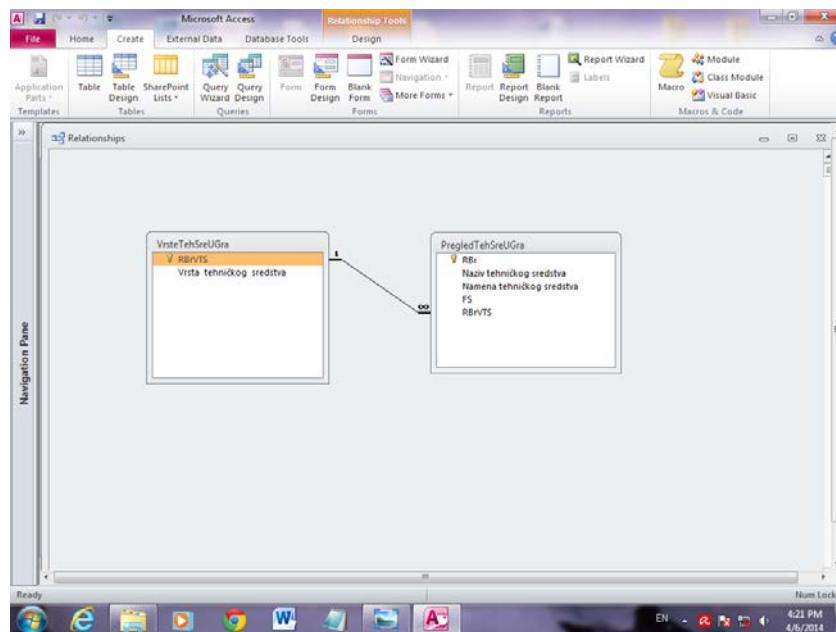


Figure 1. Relationships

RBR	Naziv tehničkog sredstva	Namena tehničkog sredstva	FS	RBR/VTS
1	Zidarski čekić	Služi za zakucavanje eksera, razbijanje manjeg kamena, za udaranje opeke prilikom zidanja.	Zidarski čekić.jpg	1
2	Macola	Služi za razbijanje zidova prilikom rušenja.	Macola.jpg	1
3	Gladilica	Služi za gladjenje maltera kod malterisanja zidova.	Gladilica.jpg	1
4	Metar	Služi za merenje dužine.	Metar.jpg	1
5	Libela	Služi za određivanje vodoravnog položaja podova.	Libela.jpg	1
6	Visak	Koristi se za određivanje vertikalnosti kod zidanja zidova.	Visak.jpg	1
7	Lopata	Služi za utovar zemlje, peska, sljunka.	Lopata.jpg	1

Figure 2. Table Overview of technical resources in the construction industry

RBR/VTS	Vrsta tehničkog sredstva
1	Građevinski alat
2	Građevinska mašina za zemljane radove
3	Građevinska mašina za dizanje i transport tereta
4	Građevinska mešalica
5	Sredstvo zaštite na radu u građevinarstvu
0	

Figure 3. Table Types of technical resources in the construction industry

2.2. Designing and programming software

The basic mask as a Windows Form is connected to the database via SQL (Structured Query Language) queries that result in view of the database, a single value attribute view for each record (the record order) destined awarded (in three TextBox, in one RichTextBox, in one PictureBox) Windows Form. In the PictureBox in the images are stored, a record navigation is done using the buttons on Windows Forms. The software is programmed in the programming language Visual Basic MS Visual Studio 2012 [8]. Which is the Windows Form1 base class consists of four Label, three TextBox, one RichTextBox, four Button (button) and one PictureBox. Buttons are used to navigate the record (the record table rows): return to the first record, left, right, and coming to the last record. Visual Basic Form1 mask is connected to the database via SQL (Structured Query Language) queries that read: „SELECT OTRICI.on, OTRICI. [name of the technical resource], OTRICI. [purpose of technical resource], OTRICI.imf, TTRICI. [the type of technical resource] FROM TTRICI INNER JOIN OTRICI ON TTRICI.ontotr = OTRICI.ontotr;“. This request results in the view of the database and obtained by the merger of two tables. View is a virtual table obtained SQL (Structured Query Language) query that can not be updated in the database and used only for the purposes of the program. To connect to a database used Microsoft.Jet.OLEDB.4.0 provider that runs only on 32-bit software, so it is in MS Visual Studio 2012 that can be converted to run on 64-bit [3]. Reverse engineering with the help of UML (The Unified Modeling Language) tool Enterprise Architect 11 (UML Modeling Tool) company Sparx Systems [4], the source code (Visual Basic) is read out and appeared UML image basic class Form1 (Fig. 4).

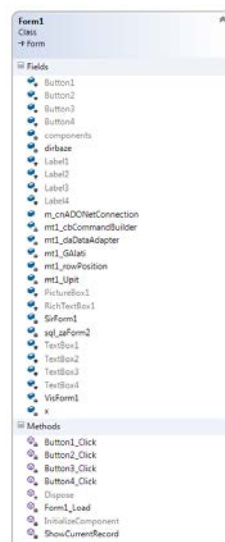


Figure 4. Class Form1 (Fields & Methods)

In Fig. 4 in class Form1 under Fields is a list of associated controls and variables declared, under the Methods list of related functions that have been implemented. Appearance Form1 work can be seen in Fig. 5. By creating this educational software produced is more convenient and clearer user interface Windows Form that represents two connected tables of relational database instead of working individually with each of the two tables of relational databases.

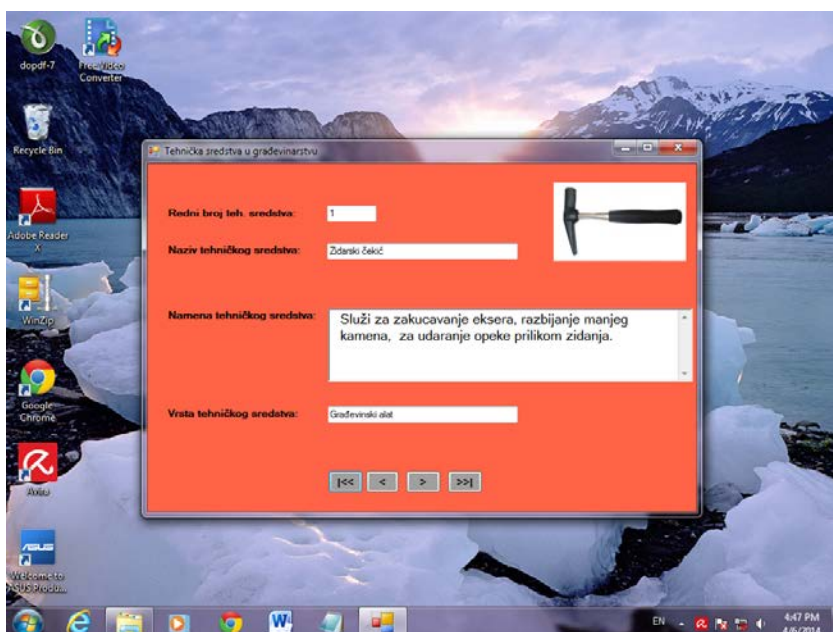


Figure 5. Form1 work

3. CONCLUSION

"Technical resources in the construction industry" is an educational software for the same teaching unit in the sixth grade of elementary school for technical and IT education. Educational software consists of a Windows Form and relational database. Relational database *Technical resources in the construction industry* consists of two tables and is a relational database with files picture. The basic mask as a Windows Form is connected to the database via SQL (Structured Query Language) queries that result in view of the database, a single value attribute view for each record (the record order) destined awarded (in three TextBox, in one RichTextBox, in one PictureBox) Windows Form. In the PictureBox the images are stored, a record navigation is done with the help of a four Button on the Windows Forms. The software is programmed in Visual Basic MS Visual Studio 2012, and the database in Access 2007. By creating this educational software produced is more convenient and clearer user interface Windows Form that represents two connected tables of relational database instead of working individually with each of the two tables of relational databases. The current results of the application software are great because students interested in teaching and easily adopt new material when you clearly see the text and images and technical resources in the construction industry.

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