

EDUCATIONAL SOFTWARE FOR PREZENTATION AND IMPLEMENTATION DATA STRUCTURES AS ORIENTED GRAPHS

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Abstract

The informative society needs important changes in educational programs. The informational techniques needs a reconsideration of the learning process, of the programs, manuals structures, a reconsideration of the methods and organization forms of the didactic activities, taking into account the computer assisted instruction and self instruction. This paper presents a software package, which can be used as educational software. The oriented graphs, which have applicability in many fields, are presented. The paper presents a graphical interface written in Java, and also the classes, which modeled the data structure

Keywords

Educational software, informational techniques, oriented graphs.

1. INTRODUCTION

In the condition of informatics society whose principal source in the social-economic development is to produce and consumption the information, the complex and fast knowledge of the reality for rational, opportune, effective decisions is a desideratum which generate the necessity to form some superior level habituation in information manage for the whole population.

The use of the computers, which are machines which model and manipulate the information, and software programs in the initial and continuous forming is directly related with some habituation ask for young population and generally to the all people, for integration in the society and yours future profession.

The computers and their programs offer to the users powerful capabilities for the information manipulation:

- Image and text visualize on the screen which can be manipulate later;
 - Memory storage of an important quantity of information, his accessing and selection of a part of them;
 - Possibility to realize a great volume of computation;
 - Possibility of equipment control and fast decisions;
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- Computer based training.

This facilities offer to the microcomputers higher educational capabilities versus other technologies used in education and provide learning controlled based on many parameters: intellectual aptitude, level of knowledge, abilities, rhythm of work.

2. COMPUTER BASED TRAINING AS A DIDACTIC METHOD

The informatics society makes sensitive modification in education programs. In this scope, the school must prepare programmers, maintenance technicians, etc.

In the same time it is necessary that the teacher make ready to use the computer in education process.

These informational techniques impose to reorganize the contents of the education process, of the programs, course books and manuals, to reconsider the methods and organization forms of didactic activities, which follow to be center on individualization of the teaching process.

As a method of the informational didactic, the computer-based training is based on the programmed teaching.

B. F. Skinner was promulgating the linear programming idea: division of the content in small steps and his successive presentation, followed by the self-control.

N. Crowder work out a new programming type: the branch programming which is characterized by: division of the content in small steps, his successive presentation according to the student needs and corrective feedback, use of author language.

The programmed teaching consist in information presentation in small units, logic structured, units that compose a program, the teaching program.

The user will have possibility that after each sequence to have a knowledge about the measure of understanding the give information. The programmed teaching method organize the didactic action applying the cybernetic principles to the teaching-learning-evaluating activities level, considering like a complex and dynamic system, composed as an elements ensemble and inter-relations and develop his personal principles valid on the strategic level in any cybernetic organization form of teaching.

On the other hand, programmed teaching assume some principles which the teaching program must respect:

- The small steps principle consists in progressive penetration, from simple to complex, in a subject content which logic divided in simple units series lead to minimal knowledge, which later will form an ensemble. This principle regards the subject division in contents/information units that give to user the chance to succeed in his teaching activities;

- The principle of personal rhythm of study regard mannerism observance and capitalization of each user of the program which will be able to make the sequences of knowledge learning or control, in a personal rhythm appropriate to his psycho-

intellectual development, without time limits. The user can progress in the program only if he accomplished the respective sequence requirement;

- The active participation principle, or active behavior, regard user effort trend into selection, understanding and applying the necessary information in elaboration of a correct answer. On each step the user is liable to an active participation to resolve the step job;

- The inverse connection principle, regard positive or negative inputs of user competence, refer to the success or breakdown in task performed;

- The immediate and directly control of the task work precision with the possibility to progression to the next sequence, in case of success;

- The success principle, which presume that the succeed percentage of experimental programs must be approximate 90%.

- The repetition principle, based to the fact that the programs are based on return to the users initial knowledge.

The combined programming interposes the linear and branch sequence according to teaching necessities.

After linear and branch programming the computer aided generative teaching has appear, where the exercises are gradually present, with different difficulty steps and answers on the students questions.

The expert system consists of self-teaching training programs, tutorial strategies, and the usage of natural language, mixed initiative and some complex representation of knowledge usage.

The simulation is a training computer programs onset characterized by the fact that the computer is like a lab witch contains typical interactive graphical programs.

The computer based programmed teaching realize learning process with a inputs flow – the command, an executive controlled system, an output flux – control and a control system functions which correct measure establish.

In such a system have tree stages of teacher perceive: teaching, evaluating and the feedback loop closing, the computer being present in all of tree stages.

3. THE COMPUTER BASED TEACHING ADVANTAGES

Based on W. Feuerzeig it is very possible that computer based teaching to produce students thinking modifications such as:

- Thinking disciplined increases, of mental precisions operation and their expression, of is precise need;

- Some general concepts early forming, such as: formal procedures, the variables, transform functions, hypothetic-deductive reasoning;

- Simplification of heuristic methods application in any kind problems solve, such as cause-effect analyze.

The intelligent tutorial programs being flexible and with capacity of each student word analyzes with explanations and motivates answer on questions, has human tutor nearly and therefore are in teaching individualization proposed.

Between computer-based training advantages it can be enumerate some phenomena animate simulation, states, etc respective problem situation possibility.

The compute based training assure:

- The instructive individualization process;
- Pass through teaching-evaluating sequences in user personal rhythm;
- Eliminate the delays in instructive process;
- Some “drudgery” teacher release, which in classic lesson was perforce to accomplish;
- Changing the relation between teacher and student, conducting to the modification wanted by the young student, to be treated not as a subject which only accept the information, but as an equal teacher partner in the own formation act.

4. PRACTICAL STUDY

From desire of improve the instructive educational process, using modern teaching methods, was realized an courseware on “Data structures” discipline, where the subject “oriented graphs” was especially developed.

The oriented graphs are data structures, which have a very large applicability, such as towns map, communications in a group of persons, electricity, etc.

This application presents the simulation part of oriented graphs. The simulation use the computer instruction program, which is characterized by the fact that computer is considered a laboratory which contain typical programs of interactive graphics. This action is a graphical representation of an oriented graph.

It can be realized the step by step interactive construction of a graph, visualization of the constructed graph, saving the constructed graph in a file or loading from a file the graph.

This application is realized in Java language. It was implemented the next classes of objects: “Node” class, “Branch” class, “Graph” class, “Draw” class and “Menu” class, which is main starting application class. From Java collection classes was used `java.io`, `java.awt` and `javax.swing`.

The most important facilities offered by this application are presented as follow. In figure 1 is present the creation and drawing of a new graph. It can be observe that in the bottom of the window the user have information referring to the way of constructing of a node, branch and the possibility to move a node.

After the end of graph construction, the user can act the “Terminare” button to can start another operations, or he can delete the constructed graphs to start another. This application offer also the possibility to save the constructed graphs, to continue the edit on an old graph or finish the work, as is presented in figure 2.

Another possibility is to scan a deep or weight graph and show the kind of branches, as is presented in figure 3.

It can be see that the user can choose the start scan button, and using “Step” button can vizualize in step by step way which are the next nodes. On bottom of the window are presented all the operations and the draw on grafical window present in black colour the scanned graphs and in yellow colour the not scanned part.

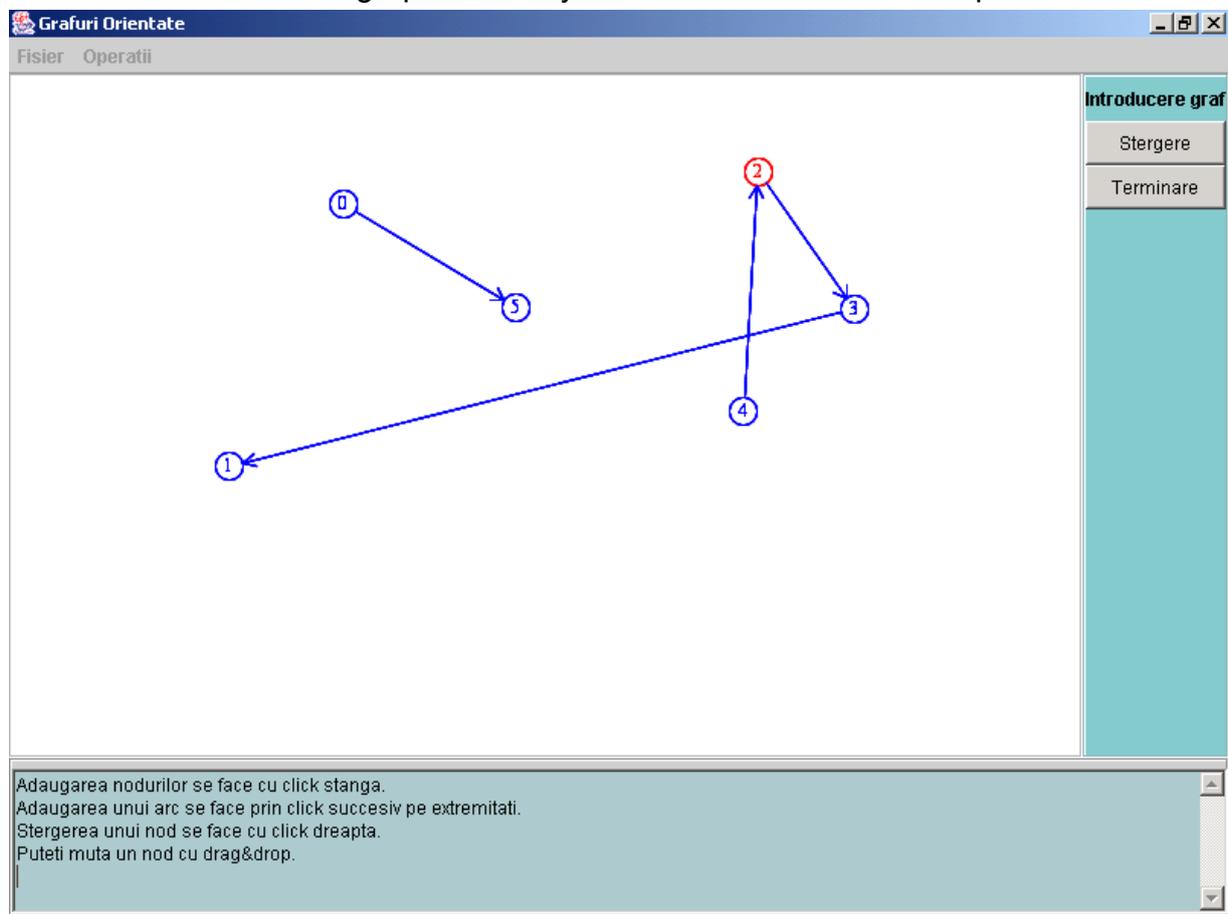


Fig. 1. The construction of an oriented graph.

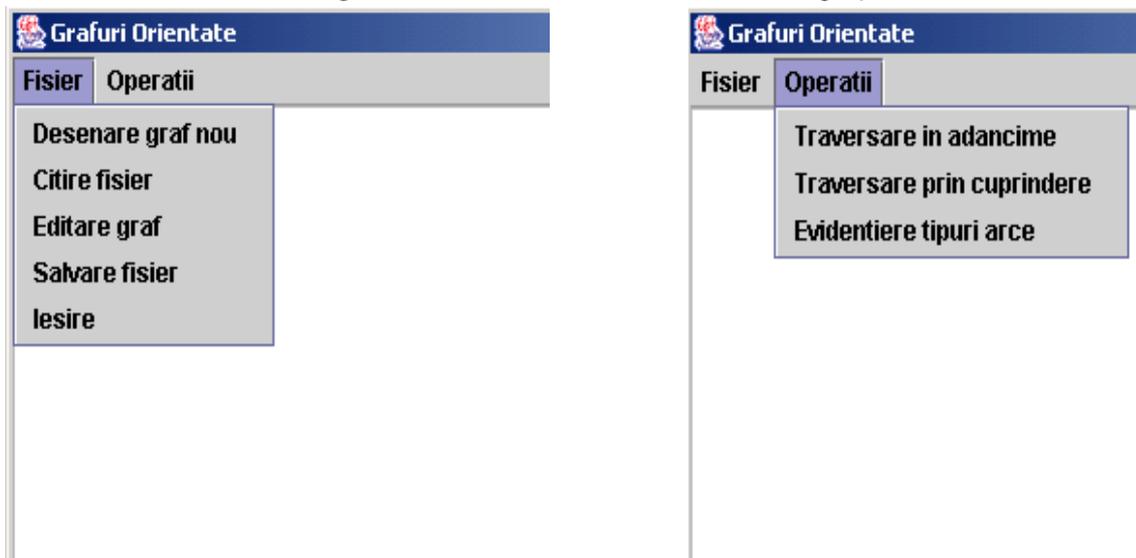


Fig. 2. Offered facilities applications by user menu.

5. CONCLUSIONS

On this application, authors take into consideration the condition which must accomplish a courseware, being make necessary steps. So, in elaboration and utilization of this application must take into consideration next criteria:

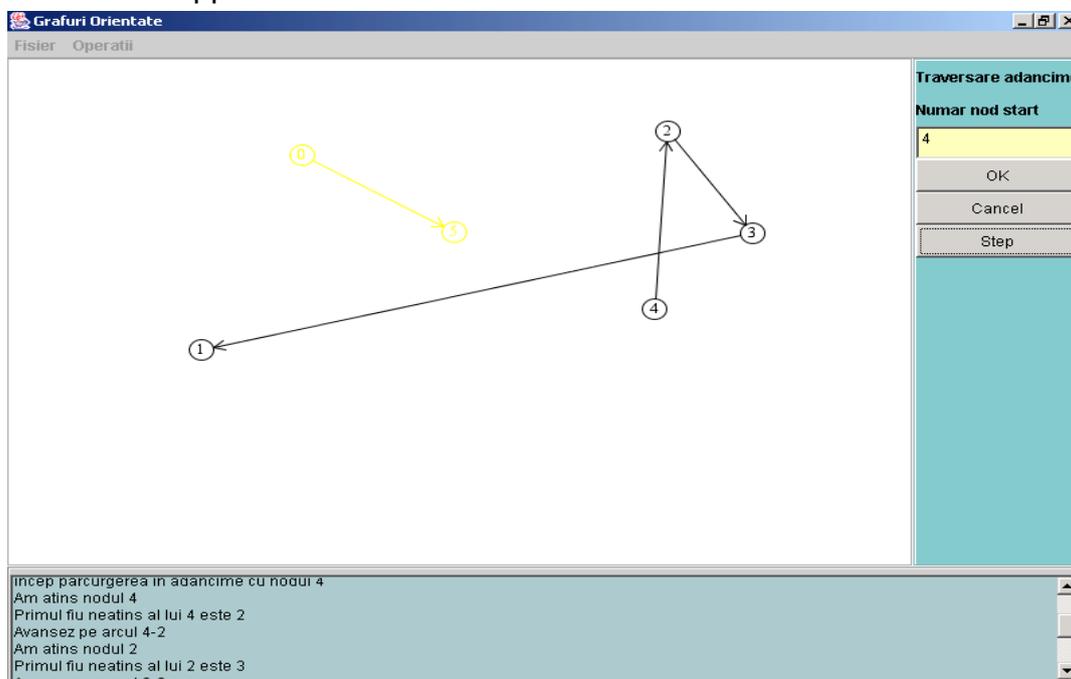


Fig. 3. The deep oriented graph scan.

- To follow up the curriculum for a specific domain;
- To accomplish some teaching and learning strategy. In this kind of selfinstruction and evaluation program it must find basic notions and representation and scanning notions. Animation and grafical modelation must represent the graphical construction way and also scanning of them;
- To exist the possibility to use parametrized variable, in conditions in which users have the possibility to input the variables value;
- To prezent a method in which the user can be informed about how can use graphical module, i.e. a interaction user-computer exist.

The prezented application accomplish this criteria, and for this we consider that is a good example of how an educational software must be realized.

6. REFERENCES

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