Teaching the Subject of Repetitive Algorithms Based on Multimedia Electronic Manuals

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ABSTRACT

The article discusses the method of mastering the subject of repetitive algorithms based on multimedia electronic manuals. In the teaching of this topic, it is intended to use multimedia tools to organize the lesson process and to show the process of explanation with the help of animation.

Keywords: algorithm, properties, discreteness, accuracy, comprehensibility, mass, result, analytical, linear, iterative, branching, mixed, multimedia, animation, simulation model

The urgency of the issue. In the 9th grade of secondary schools of our republic, it is aimed to study the topics of repetitive algorithms from the science of "Informatics and information technologies". It is planned to master the concepts of algorithm and its properties, algorithm types and methods of representation, linear algorithms, branching algorithms, iterative algorithms and mixed algorithms. In the teaching of these subjects, using multimedia electronic manuals of modern computer and information technologies, it is effective to organize the lesson process.

In our republic, the topics of repeating algorithms in the subject "Informatics and information technologies" of general education schools are important for students today. Therefore, it is appropriate to develop the methods of teaching algorithms and repetitive algorithms, which are one of the important links of the science of "Informatics and information technologies", using multimedia electronic manuals, based on modern information technologies.

At first, we focused on creating a method of teaching algorithm types and linear algorithm topics using multimedia tools. Now let's look at the teaching method using multimedia electronic manuals in learning the topics of algorithm types and recurrent algorithms. In the teaching of this software, educational materials are usually explained using a textbook or a study guide based on the traditional methodology. Based on the educational material, students study the topics of algorithm types and repetitive algorithms on the computer in practical lessons. In the traditional teaching method, educational materials are presented to students in the form of text, drawings or slides.

Therefore, regardless of how many hours are allocated to teaching these software tools, students face difficulties. In contrast to the traditional methodology, we present the methodology of teaching the learning process of algorithm types and repetitive algorithms in the lessons of the "Informatics and Information Technologies" subject in the working program based on multimedia electronic manuals. In this methodology, the process of studying the subject of algorithm types and repetitive algorithms is shown and explained to the

students through sequential actions, expressing its tasks with multimedia tools [7].

Every day during a person's life, he sets himself the goal of solving large and small tasks or issues, carrying out various instructions, drawing up a plan of action or carrying out work in accordance with the drawn up plan. For example, writing down ways to solve a problem in a notebook, using its instructions (recipes) when preparing a certain dish or pastry, using its instructions when using household appliances, explaining to someone how to get to a destination, etc. [3].

Algorithm types and iterative algorithms topics were explained using multimedia tools. This process is illustrated in Figure 1.

Figure 1. Description of the process of teaching the topic of algorithm types on the basis of multimedia. (Uzbek language: Algoritm turlari mavzusini multimedia asosida o'rgatish jarayonini tasviri).

Now let's get acquainted with recursive algorithms.

Any algorithm is divided into three main types according to its logical structure, that is, the order of execution: linear, branching and iterative. If an algorithm has a repeating part, such an algorithm is called a repeating (cyclic) algorithm.

An iterative algorithm refers to a process in which repetition occurs in the algorithm based on the verification of a certain

condition or different values of some parameter.

Recursive algorithms are distinguished by the presence of instructions of the form "i=i+1", "S=S+i" or "P=P*i".

The part of the calculation process that is repeated many times is called the body of the inner loop. To perform repetitive actions, there are special algorithmic structures called loops or repeat commands.

Repetition structures allow a group of instructions to be executed multiple times. In recursive algorithms with pre-condition checking, the condition is checked first, then the body of the loop is executed if the condition is satisfied, otherwise the computation stops.

In the iterative algorithm where the condition is checked, the loop body is executed first and then the loop exit condition is checked, that is, the loop body is repeated until the set condition is fulfilled [2].

The subject of the iterative algorithm was explained using multimedia electronic manuals. As this process approaches each problem, a computer simulation model of its condition and operation is opened, as shown in Figure 2.
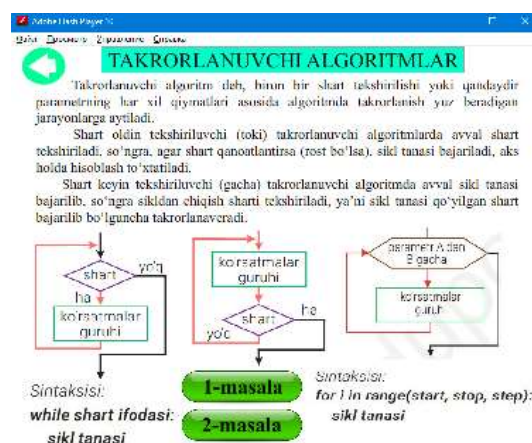

Figure 2. Illustration of the process of training a recurrent algorithm based on a computer simulation model. (Uzbek language: Takrorlanuvchi algoritmni kompyuter imitasion modeli asosida o'rgatish jarayonini tasviri)

A question on the topic of recursive algorithm. Create an algorithm and program for calculating the product of odd numbers from 5 to 11, i.e. *P=5*7*9*11.*

One of the issues on the topic of iterative algorithm was explained using multimedia tools. This process is shown in Figure 3, Figure 4 and Figure 5. Clicking on the toggle button opens each step.

Figure 3. Illustration of the process of solving a problem related to an iterative algorithm. (Uzbek language: Takrorlanuvchi algoritmga tegishli masalani yechish jarayonini tasviri)

Figure 4. Illustration of the process of solving a problem related to an iterative algorithm. (Uzbek language: Takrorlanuvchi algoritmga tegishli masalani yechish jarayonini tasviri)

Figure 5. Illustration of the process of solving a problem related to an iterative algorithm.

(Uzbek language: Takrorlanuvchi algoritmga tegishli masalani yechish jarayonini tasviri)

Similarly, the remaining types of the algorithm and the process of solving problems related to them are explained one by one with the help of a computer simulation model. When presenting educational materials in the educational section of multimedia electronic manuals in general education schools, special attention is paid to the level of understanding by students.

The presented educational materials should be simple, convenient, illustrative and explanatory information recommended for good learning for learners, as well as the necessary definitions, key phrases, key words in the educational materials. additional opportunities are created when addressing them [5].

In conclusion, it can be said that the use of a computer simulation model in teaching Algorithm types and linear algorithm topics of "Informatics and Information Technologies" not only increases the efficiency of students' learning, but also increases their opportunities for independent work. It can be seen that the presentation of "Informatics and information technologies" subject in the form of multimedia in general education schools on the basis of software tools of information technology is one of the urgent problems.

Presentation of information in the form of multimedia on the basis of modern information technologies, without raising the level of figurative thinking and intellectual development, leads to a change in the ratio between multimedia and traditional teaching [6].

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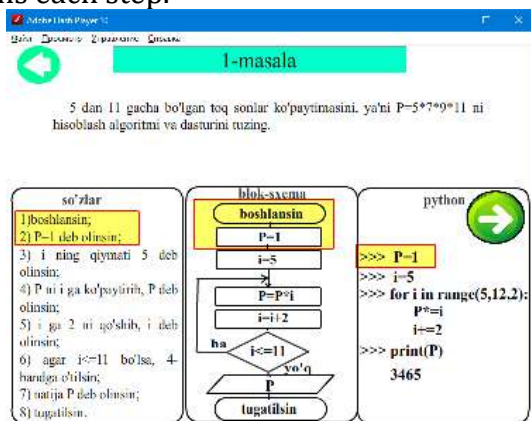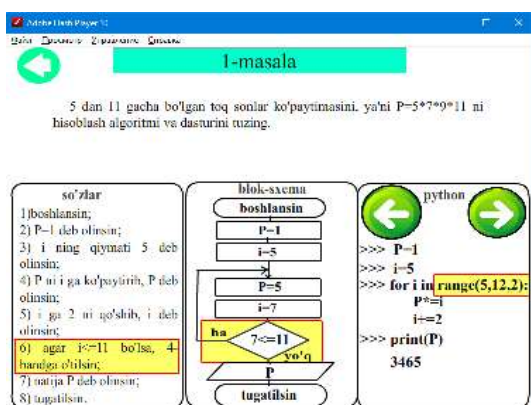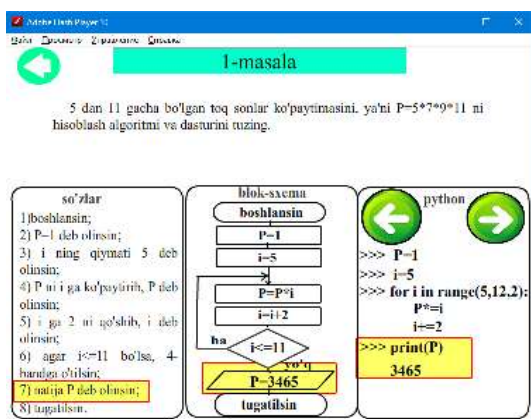
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