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Research Article

EDUCATION OF THE SCIENTIFIC GENERALIZATION CAPACITY OF STUDENTS IN COMPUTER SCIENCE LESSONS

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ABSTRACT

The article describes how to find a solution to a problem and how to develop the ability to generalize. In the process of studying the topics of the course on the basics of mathematical logic and algorithmization, identifying similarities in tasks, finding a recurring formula, and correctly drawing a general conclusion are mentioned.

KEYWORDS

Algorithm, problem, problematic issue, scientific generalization, problem-based education.

INTRODUCTION

The development of creative activity-skills in students requires special attention. This makes it difficult to work with such students. The reason is that it is necessary to spend a lot of time working with them (especially at the beginning), to create conditions (for example, to organize small workshops) so that they can share their results with each other.

Cultivating creative ability in a person is based on the development of independent thinking. This can be done in the following directions: scientific generalization - induction; ability to apply scientific results to specific issues-deduction; and finally, to be able to feel the contradictions between scientific generalizations and natural processes.

"It is known from experience that students have more opportunities to develop independent thinking and, therefore, develop creative abilities by solving problems in computer science, mathematics, and physics classes. In the teaching of computer science, mathematics, physics, this work can be started already in the 1st and 2nd years" [8].

Analysis of literature on the topic (Literature review).

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The process of students' acquisition of new knowledge is the identification of new unknown situations-problems in solving problems. Learning management in the learning process is, above all, managing the process of discovering new things through problem solving. The discovery process can be conditionally divided into two stages. At the first stage, the student solves the problem in the simplest way with the help of a teacher, a book or other means. At the next stage, in the process of analyzing the solution of the studied problem, students are motivated to invent and solve new problematic questions and assignments, to discover innovations. This condition is, of course, a complex psychological process that is extremely unique and unique to humans. The achievement of the teacher is also in the ability to arouse such enthusiasm in the student.

A lot of psychological and pedagogical research works are devoted to the study of these cases, for example the works of Yu.A.Zimina, D N.A.Menchinskaya, Z.I.Kalmykova, T.V.Kudryavtsev, A.M.Matyushkin.

According to N.A. Menchinskaya, "human development takes place in the educational process, which includes the student's personal active cognitive activity determined by external and internal conditions" [7; p. 448].

In the experiments of N.A. Menchinskaya, Z.I. Kalmykova, T.V. Kudryavtsev, A.M. Matyushkin, it was found that the direct effect of knowledge acquisition was achieved faster in the group of students who received ready-made instructions, but the students who were trained in problem-based methods were superior in solving modified problems. showed [7; p. 448].

- Analysis and results. In this article, we will focus on how to develop scientific generalization in students by developing an issue. For this, we will give an example from the subject "Mathematical Logic and Algorithm Basics".

Create an algorithm for calculating the sum.

$$\beta = \frac{\sum_{i=1}^{10} A_i}{A_{\max}} - \frac{\sum_{i=1}^{20} B_i}{B_{\max}} + \frac{2\sum_{i=1}^{15} C_i}{C_{\max}}$$

Solving. Before creating the algorithm, it is necessary to determine the similarities in the example. That is, we will try to create an algorithm for calculating the sum, referring to the general formula.

It can be seen that the algorithm for calculating three sums is the same, and the algorithm for finding the maximum of arrays is the same. Accordingly, we will construct two general algorithms for finding the sum and the maximum.

$$S = \sum_{i=1}^{k} F_i$$

We will make an algorithm for the sum.

Algorithm 1.

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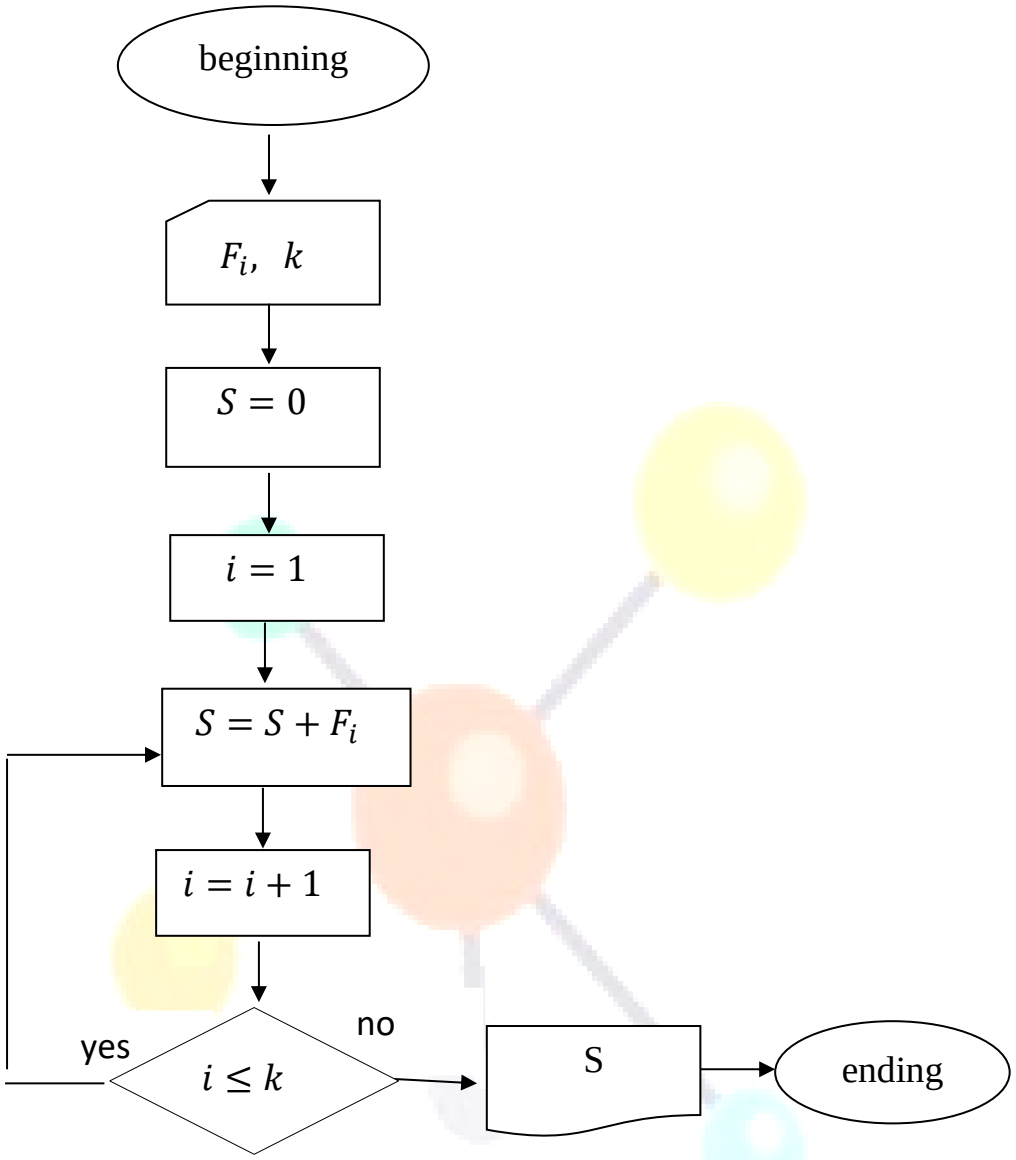

Now we will create an algorithm to find the maximum of the given arrays:

Algorithm 2.

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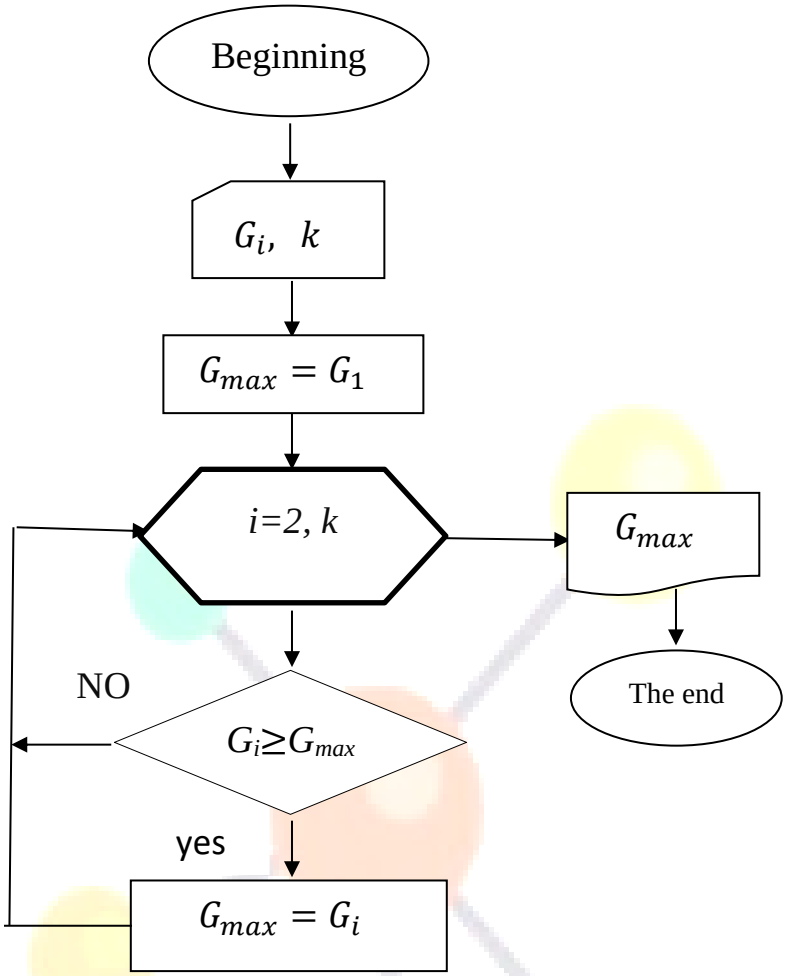

Usually, students can easily construct both of the algorithms shown above. The problem here is to generalize algorithms, that is, to construct the algorithm of the above example using these algorithms. During the course of the lesson, the teacher often explains this main part to the students with guiding questions. Now let's write the main algorithm.

Step 1.we enter $A_i,\ B_i\ and\ C_i$

Step 2. Referring to the first algorithm above, $S_1 = \sum_{i=1}^{10} A_i,\quad S_2 = \sum_{i=1}^{20} B_i$ and $S_3 = \sum_{i=1}^{15} C_i$ we calculate sums.

Step 3. Referring to the second algorithm $A_{\max}$, $B_{\max}$ ва $C_{\max}$ we find .

Step 4. We get the result:

$$\beta = \frac{S_1}{A_{\max}} - \frac{S_1}{B_{\max}} + \frac{2S_1}{C_{\max}}$$

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Step 5. That's it.

In general, when creating such algorithms, students often repeat the same work over and over without distinguishing the commonality. This takes a lot of time, and boredom in the student leads to a decrease in interest in science.

Summary. It is worth saying that in a problematic situation, thinking about a problem does not overlap with the process of solving a problem. Thinking of a problematic problem is a psychological state of the student after the problem-solving process. In the first case, this situation is a set of questions that arise in the process of solving the problem of the student. This issue is the case when, in the process of searching for answers to the questions that have arisen, the relations between them are still unclear. Every time a problem is solved, a new problem and a new question arise about a new problem. This situation can be described as the basis of problematic issues.

Now, as for the process of solving a problem, it is the process of acquiring new knowledge. Only the student works in this. The factor that drives the student to such action is the desire to discover that has awakened in him.

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