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A METHOD FOR DEVELOPING ALGORITHMIC THINKING RELATED TO PROGRAMMING AMONG STUDENTS OF THE ACADEMIC LYCEUMS OF THE MINISTRY OF INTERNAL AFFAIRS

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ABSTRACT
This article presents proposals and recommendations aimed at developing programming-related algorithmic thinking among students of the academic lyceums of the Ministry of Internal Affairs.

KEYWORDS: Academic lyceums of the Ministry of Internal Affairs; students; programming; algorithmic thinking; tasks.

INTRODUCTION
In today's conditions of globalization and digitalization, the demand is steadily increasing across all sectors of society for specialists who can make rapid, accurate, and well-grounded decisions. In particular, the activities of internal affairs bodies require an algorithmic approach in processes such as processing information, analyzing situations, forecasting risks in advance, and developing optimal decisions. Therefore, the issue of shaping and developing students' algorithmic thinking in academic lyceums that train personnel for the Ministry of Internal Affairs system is of strategic importance [1].

Algorithmic thinking reflects an individual's ability to analyze a problem through a logical sequence, compare possible solution options, and develop an optimal algorithm. This type of thinking is formed especially effectively in the process of mastering programming [2]. However, practical experience shows that teaching programming in academic lyceums is often limited to learning ready-made algorithms and fragments of code. As a result, students' skills of independent thinking, algorithmic modeling of problems, and adaptation to new situations are not developed sufficiently.

Unlike graduates of general secondary schools, students of the academic lyceums of the Ministry of Internal Affairs are expected in the future to engage in professional activities that require clear responsibility, rapid action, and a high level of intellectual preparedness. For this reason, in their educational process, not only the transfer of knowledge but also the formation of a culture of thinking should be a priority task. Algorithmic thinking, in particular, creates the foundation for quickly analyzing complex situations, identifying logical relationships among information, and making justified decisions in future professional activity.

In this regard, research aimed at improving the methodology for developing students' and learners' programming-related algorithmic thinking has been conducted by U.M. Mirsanov [3], F.J. Toxirov [2], I.V. Gavrilova [4], D.G. Jemchujnikov [5], Monika Mladenović [6], and Sun-Hea Choi [7].

In the scientific studies of these scholars, it is substantiated that the process of forming and consistently developing programming-related algorithmic thinking among students and learners should be organized in direct connection with real-life and technical processes. In particular, it is emphasized that using life-based and technical-content tasks that, alongside developing abstract thinking, also strengthen practical reasoning skills, is highly effective in developing algorithmic thinking.

It is also recommended that examples and problem tasks in programming instruction be selected step by step from simple to complex. First, elementary algorithmic tasks are given, and then the transition is made to more complex, multi-stage problems that require analysis: reproductive, productive, partially exploratory, and creative tasks. Organizing this process on the basis of programmed instruction—presenting material in sequence and with logical consistency—serves to improve students' independent work skills, ensure thorough mastery of knowledge, and increase their level of algorithmic thinking [2–7].

Based on the studies of the scholars mentioned above, within the framework of this research an algorithm for developing programming-related algorithmic thinking among students of the academic lyceums of the Ministry of Internal Affairs was developed (see Figure 1).

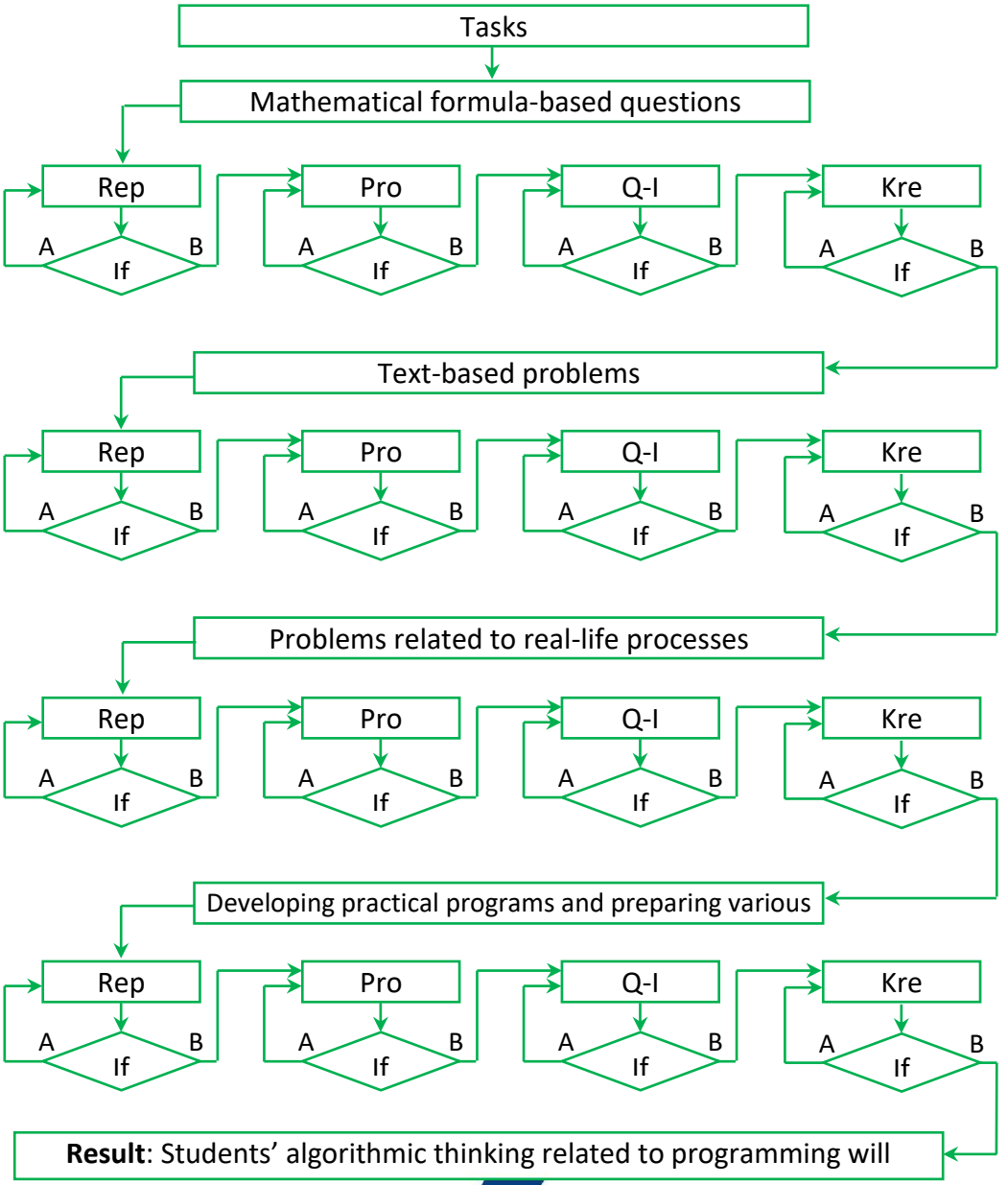

Figure 1. Algorithm for Developing Programming-Related Algorithmic Thinking among Students of the Academic Lyceums of the Ministry of Internal Affairs

In Figure 1, Rep stands for reproductive, Pro for productive, Q-I for partially exploratory, Kre for creative; A indicates that the student is unable to complete the given tasks, while B indicates that the student is able to complete the given tasks.

Thus, it is recommended to use the algorithm developed within the framework of the study to develop programming-related algorithmic thinking among students of the academic lyceums of the Ministry of Internal Affairs.

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