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THE IMPORTANCE OF LEARNING PROGRAMMING IN DEVELOPING ALGORITHMIC THINKING

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Annotation: Algorithmic thinking, that is, the ability to solve problems systematically and step by step, is important for the intellectual development of each individual and is of particular importance in today's digital society. The formation of algorithmic thinking through programming and its widespread application not only in computer science, but also in other fields are analyzed. Learning to program not only helps to better understand computer technologies, but also develops problem-solving skills in students, strengthens systematic and logical thinking. Teaching through programming is especially useful for young people in acquiring skills in creating algorithms and optimizing them. As a result, students acquire the ability to make effective decisions not only in the fields of mathematics and computer science, but also in everyday life.
Keywords: Algorithmic thinking, programming fundamentals, computer science education, problem-solving skills, systems thinking, coding, digital literacy, algorithms, visual programming, critical thinking, IT skills, logical analysis, computational thinking.

Introduction

The widespread use of digital technologies in modern society requires new approaches from the education system. Effective use of information and communication technologies, systematic problem solving and innovative thinking skills are becoming important competencies for the younger generation. It is for this purpose that the formation of algorithmic thinking is an urgent issue.

Main part

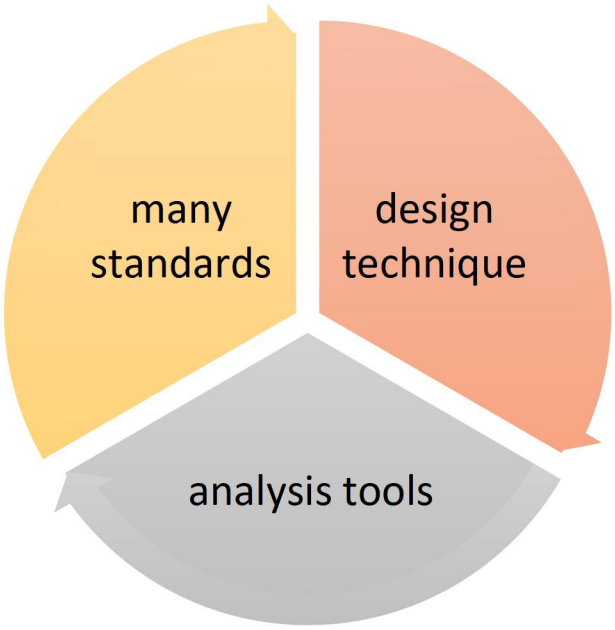
Algorithmic thinking is a systematic approach to solving a problem step by step, logically analyzing it, and achieving an effective result. Learning to program is one of the most effective ways to develop these skills. Through programming, students analyze practical problems, break them down into smaller parts, sequentially create algorithms, and use them to create solutions. This process develops not only technical knowledge, but also logical thinking, problem-solving, and a creative approach. Therefore, in the process of developing algorithmic thinking, the role, importance, and impact of learning to program on the educational process are analyzed more broadly.

The term algorithmic thinking refers to a logical, systematic approach to solving a problem step by step. This type of thinking is widely used in computer science and mathematics, but today it is also an important tool for developing general thinking. Algorithmic thinking includes such qualities as correctly defining the problem, sequentially approaching its solution, and being able to foresee the consequences of actions. In an informal sense, an algorithm is any well-defined computational procedure that produces some value or set of values, some set of values as input. Thus, we see a sequence of computational steps that transform the input and output of the algorithm.

Input: n sequence of numbers $(a_1, a_2, \ldots\ldots\ldots a_n)$.

Output: swap (reorder) $(a'_1, a'_2, \ldots\ldots\ldots a'_n)$ The input sequence is as follows $(a'_1 \leq a'_2 \leq \ldots\ldots\ldots a'_n)$ is expressed.

We can also think of an algorithm as a means of solving a well-defined computational problem. The most important part is the input/output relationship, which is the solution to the problem, and in general terms, specifies the required unknowns. An algorithm describes a specific computational procedure to achieve this input/output relationship. For example, we need to sort a sequence of numbers in a non-decreasing way:



Since many programs use algorithms as an intermediate step, the main part of the sorting is in the form of.

These aspects are formed precisely through the skill of problem solving and are directly related to algorithmic thinking. In programming, this process finds its expression in the creation of an algorithm and its step-by-step implementation. Problem solving is not only about achieving a result, but also about correctly organizing the stages of analytical thinking leading to it. Typically, this process includes the following stages:Muammoni aniqlash: muammoni to‘g‘ri tushunmasdan, uni hal qilish deyarli imkonsiz. Shuning uchun birinchi navbatda savolga aniq e’tibor qaratish va muammoning cheklovlari, maqsadi, boshlang‘ich holati tushunilishi zarur.

❖ Data analysis: all information related to the problem is collected and how it is used is analyzed. At this stage, redundant or useless information is removed (abstraction).

❖ Algorithm development: a logical solution to the problem is determined. This process - creating an algorithm - consists of dividing the problem into small steps, determining the sequence of actions required for each step, and creating an overall solution.

❖ Algorithm testing: the developed algorithm is tested in practice, that is, it is converted into a program and tested using experimental examples.

❖ Solution analysis and improvement: if the algorithm is incorrect or inefficient, it is revised and optimized. This stage is called refactoring or debugging.

In the educational process, a problem-based approach (problem-based learning) develops students' deep thinking, communication, and independent decision-making. For example: it turns the student from a passive listener into an active participant.

```
n = int(input("Son kiriting: "))
a = Rost
if n < 2:
    a = Yolg'on
for i in range(2, int(n**0.5)+1):
    if n % i == 0:
        a = Yolg'on
        break
if a:
    print("Tub son")
else:
    print("Tub son emas")
```

In this example, the student:

• analyzed the problem,

• created an algorithm based on the conditions,

• learned to optimize it.

This work highlights the theoretical foundations of algorithmic thinking, its importance in the educational process, and ways to develop this thinking through programming. Algorithmic thinking forms a person's skills in a systematic approach to problems, logical thinking, and finding effective solutions. Programming is the main tool in this process, enabling students to think analytically, plan consistently, identify and correct errors, and develop creative solutions. This topic is especially relevant in modern education in the formation of digital literacy and IT skills.

Final part

The development of algorithmic thinking is not only a concept related to computer science, but also part of the general culture of thinking. By learning to program, students learn to think independently, analyze problems step by step, and develop creative and effective solutions. These skills will help them to successfully operate not only in education, but also in real life situations.

The formation of algorithmic thinking through programming increases the adaptability of young people to the digital world, supports their intellectual development, and prepares them for the modern professional market. Therefore, the introduction of programming in education from the early stages and the systematic formation of algorithmic thinking are gaining strategic importance today.

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