COMPUTER SCIENCE, COMPUTER, COMPUTATIONAL COMPLEXITY

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Abstract: The first question we need to discuss is “What is computer science?” To say that “computer science” is “computer science” only means reflecting its subject matter, which is a technical device: a computing machine, a computer.
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INTRODUCTION

The technical aspect here comes first due to the fact that most difficulties relate not to the theoretical justification for doing something, but to the practical one - how it can be done easier and better. Therefore, teaching the subject "computer science" will be more effective if the curriculum for the discipline "programming" will primarily include practical training in programming and not only, but also computer practical training in sections of specialization, for example, for secondary school teachers - computer practical training in geometry and algebra and the beginnings of analysis, and a whole day of classes should be set aside for this. More practical classes! And this is the difference in teaching mathematics from teaching computer science.

MATERIALS AND METHODS

The most substantial part of informatics, which is the subject of study and mathematics, is numerical methods. Therefore, this material is mainly presented as theoretical, not prepared for practical application, due to insufficient development of fundamental ideas for solving problems. Often, using numerical methods, the computer allows us to analyze a sufficient number of particular examples to identify “model situations” of a particular phenomenon, and even if it is not possible to formulate fundamental laws, it provides progress in understanding the phenomenon. At the same time, when compiling programs and planning scientific work, we have to measure the relationship between the operating time and computer memory, between sequential and parallel calculations, between digital and analog circuits, etc.

RESULTS AND DISCUSSION

The original concept in computer science is the concept of an algorithm. It is defined descriptively in the words of colloquial language. An algorithm is a precise prescription that specifies a computational process (called algorithmic), starting with some initial data (a set of possible initial data) and aimed at obtaining a result determined by this initial data. The complexity of an algorithm's calculations is understood as a numerical function that evaluates the difficulty of applying the algorithm to the initial data (running time, the number of cycles of work when converting the initial data into the final data, etc.)

The computer scientist perceives his main function as providing programs and computers for use in old and new teaching methods, but he has a more complex task - the development and dissemination of the teaching process itself. The starting point (M. Minsky, S. Peipert, 1969) of this opinion is as follows.

1. Teaching a programming language (at least one), working with the dictionary of this language.
2. Helping people build in their minds various types of computational models.
3. The teacher must have a reasonable model of what the student's mind is.
4. When debugging his own models and procedures, the student must have a model of what he is doing and that he knows good debugging techniques and simple but decisive test examples.
5. The desire of the student to learn something new about computational models and programming when debugging programs, as opposed to the helplessness of the idea of the impossibility of learning this.

Let us present the classification scheme of the ACM journal “Computing Reviews”.

C. Principles of computer systems (processor architecture, implementation of computer systems).
D. Software (programming methods, software development, programming languages, operating systems).
F. Theory of computation (computing by means of abstract devices, analysis of algorithms and problem complexity, logic and meaning of programs, mathematical logic and formal languages).
G. Mathematical issues in the theory of computation (numerical analysis, discrete mathematics, probability theory and mathematical statistics).
H. Information systems (database management, storage and retrieval of information).
I. Methods of computation (algebraic manipulations, artificial intelligence).
J. Applications of computers (physical sciences and engineering).

CONCLUSION

Computer Science serves as a cornerstone of modern technological advancements, encompassing diverse domains such as algorithms, data structures, artificial intelligence, and computational theory. The field not only drives innovation but also addresses complex global challenges through efficient problem-solving and optimization techniques.

The term "computer" extends beyond hardware, representing a sophisticated system for processing, storing, and analyzing information. Advances in computing have revolutionized industries ranging from healthcare to finance, enabling smarter and faster decision-making processes.

Computational complexity, a critical branch of Computer Science, investigates the efficiency of algorithms and classifies problems based on their computational requirements. This area lays the foundation for understanding the limitations of computation and guides the design of more efficient algorithms.

In summary, Computer Science, with its ever-expanding scope, continues to shape the future by pushing the boundaries of what is computationally possible. It remains pivotal in developing sustainable and intelligent solutions for a rapidly evolving world.

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