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DIVERGENT VERSUS CONVERGENT THINKING IN PROGRAMMING

Creativity is certainly of crucial importance for programmers as in the course of creative problem-solving process multiple ideas and solutions for a problem are born. In fact, the benefits of developing creativity are directly related to the ability to solve problems. Creative problem solving and creativity in general were mentioned in a recent Forbes article that talks about the key skills employers will need after the pandemic, and describes creativity as an "always in-demand skill" that helps «make businesses stand out» [1]. The concept of creative thinking is closely connected to the notions of convergent and divergent thinking. Guilford defined both types of logical thinking, deduction and induction, as convergent (directed in one direction) thinking [2]. Convergent or logical thinking is focused on the search for a single correct or optimal solution. It can use many premises, facts, and arguments, but the result will always be only one answer. And if no single correct solution can be found? Then logic states that the problem is unsolvable.

Convergent thinking has to do with analysis, evaluation, and decision-making. It's a process in which we consider many ideas, evaluate, analyze pros and cons, and finally make a decision. So, in essence, convergent thinking is a process of rationally selecting ideas to find the best solution, which cannot be overestimated in programming. On the other hand, divergent thinking has a spontaneous, free, nonlinear nature. It uses a broad and unconventional approach. J. Guilford believed that divergent thinking is the basis of creativity. The value of this thinking lies in the ability to adapt to the situation and to produce a large number of ideas of equal importance, among which the best one will be chosen.

In contrast to convergent thinking, divergent thinking "goes wide", in different directions from the key problem and offers numerous variants of solutions. Having analyzed all these variants and, if necessary, having combined them, a person can get an original or even ingenious result.

Each of us is capable of using both convergent and divergent thinking depending on the situation. However, when solving problems and completing projects, we tend to lean towards one or the other. Some people are naturally prone to divergent thinking. These are the kind of employees who like to advance new ideas. And they are the ones who contribute most to solving very difficult problems because they formulate original ideas that prove to be innovative and useful.

But if you're too committed to a certain type of thinking, it can lead to serious difficulties such as — generating useless ideas and leading nowhere. An overabundance of convergent thinking entails a lack of new ideas and the so-called analytical stupor.

In the 1960s, Edward de Bono introduced the term "lateral thinking" or thinking "out of the box» [3]. The terms «lateral" and "divergent" are often used synonymously. And this is understandable: both types of thinking imply non-standard approaches and the generation of a pool of equally valuable ideas to solve a problem. They manifests themselves in the need to leave the beaten path of standard solutions, to find something new, to prove original ideas, etc. Their distinctive feature is semantic flexibility. It is the ability to see new properties of things and phenomena, to look at an object from a different point of view, from a different perspective. This is a special perception that allows a person to see what others do not notice.

Another feature of lateral thinking is flexibility — the ability not to get hung up on one way of decision or activity, but to adjust to the requirements of the task; to switch attention and change priorities, which might lead to unexpected generation of ideas as a result of multidimensional and multidirectional way of thinking.

While convergent thinking leads a person along the shortest, most reliable and proven road, the divergent thinking opens new and unexplored ways. And it is on these ways that a programmer can find something unique.

References

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