The Thinking Thing

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By

Fabricio Tosi

**Title of Your Book**

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Contents

[About the Author iv](#_Toc119975481)

[Foreword vi](#_Toc119975482)

[How to use this template? 1](#_Toc119975483)

[Second Chapter Title 5](#_Toc119975484)

[Third Chapter Title 9](#_Toc119975485)

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# Foreword

I'll talk about life and intelligence. These two topics will be the focus of the story.

The concept of intelligence could be interpreted in different ways. I won't talk about human intelligence, but rather intelligence as the ability to solve problems, overcome obstacles, adapt, learn, and in general, what we can qualify as an intelligent response to a specific situation.

A few days ago, someone told me that intelligence was related to the consciousness of one's own existence. No, I'm not talking about that kind of intelligence.

A machine can solve problems, its response is intelligent, but it's not conscious of its own existence. An anthill can solve problems that an individual ant couldn't solve on its own, the system is intelligent, the anthill finds the way, but this system is not conscious of its own existence.

In the following chapters, we'll develop an intelligent system that will solve problems, somewhat in the line of artificial intelligence. We'll talk about computer science.

The story is suitable for all people, and no prior knowledge is necessary to understand it.

And I said I'd talk about life. Life as a single entity and the relationship that could exist between life and intelligence. We'll think of life as a single thing.

Normally, when we look at the world, at reality, we see creatures, individuals. And I mean individual in the sense of an exemplar of a species, not talking about humans, but about individuals of any species. I said that we see individuals, a fish, an ant, and colonies of individuals.

In this story, we'll observe life from a higher level. Let's say that all living creatures are made up of cells. Life builds cellular structures, where the cell is the building block.

Now let's imagine individuals as cells of a larger tissue. And all of life, as a single individual. Where all individuals of all species are the cells that form it.

It requires a little imagination. Keep in mind that although we believe that the individual is independent of the rest of the environment, in reality, no individual will survive outside the ecosystem. It's like leaving a goat on the moon.

This is in terms of life as a single entity, as a single organism. I also said I'd talk about the relationship that could exist between life and intelligence. We'll see that this relationship is also close. We'll see it by developing a machine that will automatically solve logical problems. To develop this computational system, we'll use observable characteristics in life. The system will be something like a life simulator. And by simulating life, we get a computer.

Seeing it in action, I think it could help us understand a little better what happens with life.

I say this because, at least for me, life has always been quite mysterious. Why am I here? What is my mission? Why do I have to die? Why is there so much variety of living beings? Are animals more important than plants? Does all this have any purpose? Is there an intelligence that designs all living beings?

The questions I personally have about life seem to have no end.

So, let's get started. We'll create life with the sole purpose of solving logical problems. We'll do this by creating a new species of living beings tailored to the problem we want to solve. The species will evolve and give us the answer we're looking for. It'll be easy. This is possible because life has plenty of intelligence.

We'll see it step by step.

We'll start by seeing what we need to solve problems or how to process information.

The Thinking Thing

Chapter 1

# How to process information?

Computers process information to solve problems. The process begins with the declaration of a set of known data that defines the context of the problem. Operations will be performed on these data that will provide new information, which in turn will be included in the set of known data. As we add new information to the data set, the context changes state. Trivial problems may be solved immediately in a single step, but more complex problems will require a sequence of steps to find the solution. We can call the sequence of steps that must be performed to find the solution a "method," "algorithm," or "program." If we talk about sorting a deck of cards, different people may suggest different sorting "methods." And the initial data set, or context, will be the position that the cards occupy in the deck at this moment. If we want to add a list of several numbers, the initial data set will be the list of numbers we want to add. The first step will be to add the first number in the list to the second. This will give us a new piece of data, a partial result. The next step will be to add this partial result to the next number in the list. We will repeat this procedure with all the numbers in the list to get the final result. This describes the procedure we will use to solve mathematical and logical problems in general. The addition that I mentioned will be familiar to everyone. Similarly, we solve physics problems in school. We start with a set of data that describes the initial situation and perform calculations on this initial data or context in a certain sequence or steps until we find the answer. In summary, the elements that are involved in this procedure are the data, or context, the operations that we perform on the data, and the method, or sequence of steps that we must perform to obtain the desired result. We now know how to solve problems. Now let's see how we build a machine that does this automatically, solving problems by processing information. For a machine to be able to handle data, it must be able to store data on some physical device. We call this "memory." There are different types of memory; I will discuss only two of them in a general way. The first is "read-write memory," which we see in most electronic devices, and we can conceptually see it as a separate support in cells where we can access any of the cells to write, read, or erase information. In these memories, the content can be modified. The second type is "read-only memory," such as on a CD, in which the information cannot be modified once it has been recorded. It is possible to access any cell to read the information, but it cannot be erased or modified. In addition to memory, we need a mechanism that knows how to perform operations on data; we call this a "processor." And we will also need a program that provides the sequence of steps that must be performed to solve a particular problem. Let's see how we obtain these resources from life. Because, as I mentioned before, the idea is to use life as a computer, and that life processes information for us. It sounds complicated, but it is actually immediate, at least conceptually.

## DNA and Reproduction

DNA stores the information necessary to construct an individual. Therefore, it is a memory support that contains data. DNA is capable of storing a large amount of information, and we will use DNA as the memory of the system.

In the following experiments, we will consider the information contained in DNA as immutable. That is, it cannot be modified. It is a type of "read-only" memory. The information contained in an individual's DNA will remain unchanged throughout their life. So the individual will always be the same, with the same fingerprints and distinguishing characteristics, throughout their life. The information contained in an individual's DNA remains constant within the individual. However, it will be modified in reproduction to generate the child.

When an individual reproduces, their children will not be exact copies of the father. They will be very similar but not identical. There are no two identical individuals. In reproduction, the information contained in the father's DNA will have been modified to create the child. The child is a new version of the father.

The mechanism of reproduction modifies the information, processes it in some way to produce a new individual, an individual different from all that have existed so far, an improved individual. Therefore, it is not a random modification but a carefully calculated modification. We can say that it is a programmed modification, since some "method" has been applied to the father's data to achieve a specific result. Reproduction will then be the mechanism we use to process the information.

With this, what we wanted to build is already done. Life provides all the necessary resources, and we haven't had to modify anything. Life is a natural computer.

The function of an individual in this model is to maintain a set of data. We can think of an individual as a CD on which data has been recorded and cannot be modified. But we can read the information contained, process it, and record the result of the process on a new CD, the child.

In this model, if we consider that the information is processed during reproduction, this will be a single, simple step in the process. The difference between the father and the child will be minimal of all possible differences.

I have mentioned that, in general, solving a problem will require a series of steps. Normally, more than one. Therefore, the father will not find the solution to the problem, nor will the child. It will be the work of the whole family, or the whole species. The process of solving the problem will advance step by step, slowly, generation after generation. One step at a time.

In the next chapters, we will create a computer based on living creatures, or rather, on families or species of living beings where the species has been created to fit the problem. The new species is the computer, and this computer is only useful for solving this problem and no other. And where an individual represents the state of the calculation at a specific moment in time.

Note that an individual is not a computer but only the representation of a state in the calculation process. The computing machine will be made up of all individuals in the species.

But let's take it slowly, step by step. I said that an individual represents a "state" of the calculation. Let's see what we will call "states of the process

Chapter 2

# Second Chapter Title

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Chapter 3

# Third Chapter Title

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