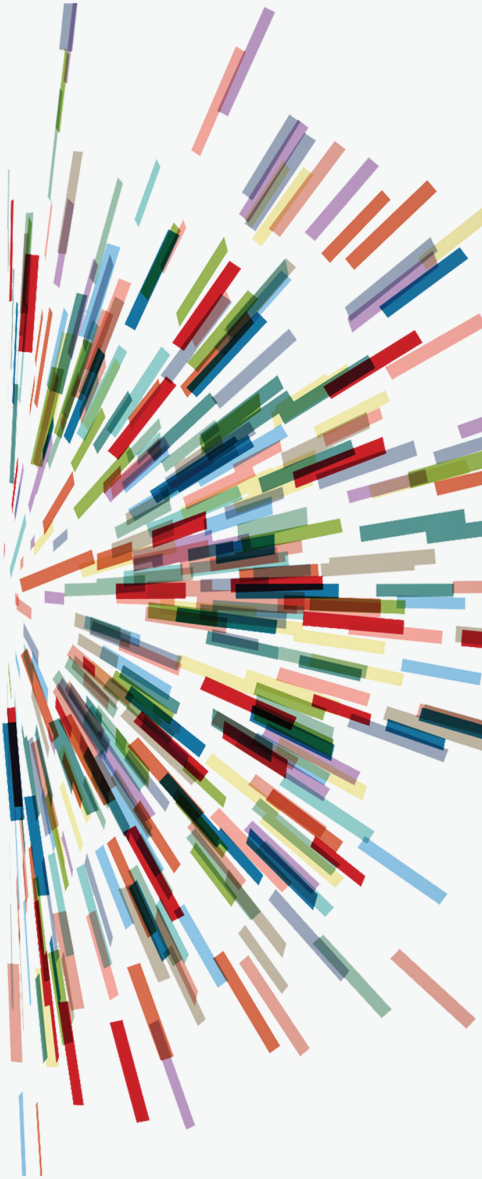
COMPUTER SCIENCE

Discovering God's Glory
in Ones and Zeros

JONATHAN R. STODDARD



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FOREWORD

I am delighted to introduce Jonathan Stoddard and recommend his work. Jonathan received a BA in information and computer science from Covenant College in 2004. Covenant College is a Christian college where the faculty encourage students to think about how to integrate their Christian faith with each field of academic study and with their future callings. Jonathan began to think about the relationship of God to computer science during this time. I had the privilege of seeing his thinking blossom further when he was my student in a course on the theology of science at Westminster Theological Seminary in 2012.

I enjoy the study of computers and programming myself, and I hoped for some years that God would enable someone with more knowledge and experience than myself to write about this area from a God-centered and biblically informed viewpoint. I wanted an exposition of computer science that would give God the glory as the One who is the source of logic, and would take into account the central role of God's speech as he created and now governs the world by his wisdom and might. Jonathan has accomplished this goal, and I trust that his work will encourage and enlighten all who have an interest in computers, computer science, and the growing role of information and computational technology in the modern world.

Vern S. Poythress

Many are familiar with the phrase, "Actions speak louder than words." Our experience tells us that it is easier for someone to say something than it is for the act to be carried out in reality. Certainly words have power, but there is often a disconnect between the words we speak to others and the actions they carry out. Any of us who have children know how frustrating this can be. Imagine if your words were always effective. When you spoke, it automatically resulted in appropriate action. Wouldn't life be easier?

God enjoys such creative power with his words. The creation account in Genesis 1 highlights this power. The narrative is carried on by the phrase, "And God said . . ." After God's creative speech, we are told, "And it was so." God's words result in action. There is no disconnect between God's speech and the resulting action. All that God created "was good." God did not need to wrestle atoms into submission, but all the material of the universe was perfectly obedient to his word. As humans we often feel like our words have little power. Parents may feel like we need to tell a child something several times before it sinks in. Even when our instructions are followed, they are rarely followed to perfection.

But the computer programmer has a unique ability to understand the power of words. Most computer programs are created with a programming language. Such languages have grammar and syntax. When the programmer writes the commands, they are followed perfectly by the computer. Like God, the words of the programmer have creative power.

Is this correlation just a mere coincidence or is there a deeper connection? In this booklet I will argue that the foundation for computer science is found in the God who speaks. Some have called computer science an unnatural science because it does not

deal with naturally occurring phenomena.[1] While this is true to a degree, I do not believe computer science is completely man-made, but that it is only possible because of God's rule in the world. When we program computers, we are still thinking God's thoughts after him.[2] We have not entered into a realm that is outside of God's plan or rule.

To establish the biblical foundations for computer science, we first need to explore the analogical relationship between God and computer science. After we understand this analogical relationship, we will be able to build upon this foundation to find specific ways in which God makes computer science possible. This booklet will examine two points of contact between God and computer science: (1) computers as universal computing machines, and (2) programming languages. But there are certainly more connections to be explored!

THE ANALOGICAL RELATIONSHIP BETWEEN GOD AND COMPUTER SCIENCE

What connection is there between God and computers? We often assume one sphere deals with faith, the other with logic. Unlike natural sciences that study the world created by God's speech, men create computers. It is often assumed that when you learn about computers you are studying man's work, not God's creation. But I believe we should not see computer science and God as unrelated. In fact, without a God who speaks, computer science would not be possible.

In this section I want us to understand two important principles. First, God is the foundation for computer science. Second,

1. Matti Tedre, *The Development of Computer Science: A Sociocultural Perspective* (Joensuu, Finland: University of Joensuu Press, 2006), 347.

2. Cornelius Van Til, *A Christian Theory of Knowledge* (Phillipsburg, NJ: Presbyterian and Reformed, 1969), 16.

there is an analogical relationship between God and computer science. An analogical relationship means that though there is a relationship, we cannot make one-to-one comparisons between the two spheres. For instance, since the advent of computers some have tried to explain God using the metaphor of a computer. Kevin Kelly, a senior editor at *Wired* magazine, argues that the computational metaphor has permeated our thinking of God.[3] Such thinking can be useful as an analogy, but we will run into danger if we take our understanding of how computers work and then infer that God must work in the same way. For instance, Kelly asks the question, "Is God the Word itself, the Ultimate Software and Source Code, or is God the Ultimate Programmer? Or is God the necessary Other, the off-universe platform where this universe is computed?"[4] Such questions are interesting to ponder, but their use is limited. The fundamental problem in trying to describe God with computing terms is that one is starting with the finite. A better way to approach the relationship is to begin with God. We should first look at God's speech in Scripture to enlighten our understanding. Such connections can be difficult to make, because Scripture does not directly speak of computers. But the Reformed position is that God is the Lord of all things. Abraham Kuyper famously stated, "Oh, no single piece of our mental world is to be hermetically sealed off from the rest, and there is not a square inch in the whole domain of our human existence over which Christ, who is Sovereign over all, does not cry: 'Mine!' "[5]

3. Kevin Kelly, "How Computer Nerds Describe God," *Christianity Today* online, November 1, 2002, accessed April 20, 2012, http://www.christianitytoday.com/ct/2002/novemberweb-only/11-18-31.0.html.

4. Kevin Kelly, "God Is the Machine," *Wired* online, December 2002, accessed April 20, 2012, http://www.wired.com/wired/archive/10.12/holytech.html.

5. Abraham Kuyper, "Sphere Sovereignty," in *Abraham Kuyper: A Centennial Reader*, ed. James D. Bratt (Grand Rapids: Eerdmans, 1998), 488.

This then must also include computer science. Therefore we must seek to understand how God is the Lord over computer science.

An analogous relationship means that there is a relationship between the two areas, but there is not a one-to-one correspondence in all areas. In other words, there will be harmony and dissonance between God and computer science. I have already referred to the analogous relationship between the creative words of God and the programmer. This does not mean that God's words in Genesis 1 are an example of a high-level programming language that is then compiled into machine language and forms the source code for the physical world. Instead the analogous relationship recognizes that there is a relation between the act of God's creative speech and the creative speech of the programmer. We will work out some of the details of these relationships later on.

It is also dangerous to describe the universe as a computer. This was the basic thesis of Stephen Wolfram's *A New Kind of Science*. In his book, Wolfram argues that computer science has opened the door for us to understand the universe as a giant computer. Underlying the universe is a master algorithm. Wolfram sees the incredible complexity in the universe not as something that is beyond comprehension, but something that can be explained by rather simple algorithms. Based upon Turing's thesis (which we will discuss later), Wolfram believes that the complexity of the universe could be broken down into small and simple computations similar to how a computer handles complex computations.[6] Kelly writes, "The new science of digitalism says that the universe itself is the ultimate computer—actually the only computer."[7] Such thinking can be a helpful point of contact when speaking to

6. Stephen Wolfram, *A New Kind of Science* (Champaign, IL: Wolfram Media, 2002), 5.

7. Kelly, "God Is the Machine."

people who are interested in computer science. In fact, because we bear God's image, we should expect this analogous relationship to exist between computers and God. A survey of the literature shows that many people start with computers and then work their way back to God. But what if, instead of first looking at computers to understand God, we start with God in order to better understand computers? While this may seem unconventional—we don't see any mention of computers in Scripture—this method respects the Creator-creature distinction.

The Creator-creature distinction means there is an essential difference between God and man. In computer terms, this distinction means that God isn't just running on a faster processor with greater bandwidth, but he is an altogether different type of being. This difference can be seen on two levels. First, God created man from the dust of the ground (Gen. 2:7). Humanity is made from the earth; God is uncreated. Second, because of the fall every part of mankind is affected by sin. The Creator-creature distinction is summed up in the Westminster Confession of Faith:

> The distance between God and the creature is so great, that although reasonable creatures do owe obedience unto Him as their Creator, yet they could never have any fruition of Him as their blessedness and reward, but by some voluntary condescension on God's part, which He has been pleased to express by way of covenant.[8]

This confession of faith highlights the fact that because the distance between God and men is so great, we can only learn about God if he first condescends to our level. This means that humans cannot use their own reason to find their way to God. This also

8. Westminster Confession of Faith, 7.1.

means that not only is Scripture necessary to learn about God, but it also provides a foundation for our understanding of creation and thus computer science as well. One thing we will find is that, when we start with God, we see a strong link between God's work of creation and the programmer's work of writing code. In other words, we will see that the programmer is imaging God.

Although we need God to first come down to the level of humanity, this does not mean observations from nature and science are worthless. On the contrary, our observations of the natural world enhance our worship of God. God has created the world, and his fingerprints are seen in creation. Psalm 19 begins with the words, "The heavens declare the glory of God, and the sky above proclaims his handiwork." One only needs to look up at the stars on a clear, dark night to see God's handiwork. If, as I argue, computer science also speaks of God, it should lead to this same response of worship. As we examine the universality of computing and the nature of programming languages, it should cause the Christian to praise God.

COMPUTERS AS UNIVERSAL COMPUTING MACHINES

When we hear the term *computer*, many of us think of a beige box with a keyboard and monitor. Yet in this paper I will use the definition put forth by Yale Patt and Sanjay Patel in their book *Introduction to Computing Systems*. A computer is something that "directs the processing of information and it performs the actual processing of information."[9] The beige box or laptop is an example of a computer, but a computer is not limited to such devices. In fact, computers are universal, meaning that when you study the fundamentals of how a computer works, at the basic level, this

9. Yale N. Patt and Sanjay J. Patel, *Introduction to Computing Systems: From Bits and Gates to C and Beyond* (New York: McGraw-Hill, 2000), 3.

What does computer science have to do with God? Jonathan Stoddard shows how computing transcends computers themselves and finds its source in the God who speaks the world into existence. The way programmers write code gives them a unique insight into God's all-powerful word. In fact, programmers image God when they use words to accomplish specific tasks in an orderly fashion. Like God, they can make their code beautiful in how effectively it carries out the task. Discover how God's attributes inform the nature of computing and how constructing software can glorify him.

"Computer science and information technology have become more and more important in our world, and we greatly need the distinctively Christian vision of the subject that Mr. Stoddard offers. Highly recommended."
—**Vern Poythress,** Professor of New Testament Interpretation and Editor of the *Westminster Theological Journal*, Westminster Theological Seminary

Jonathan R. Stoddard is Assistant Pastor of Jordan Presbyterian Church in West Jordan, Utah. He received his BA in Information and Computer Science from Covenant College and his MDiv from Westminster Theological Seminary.

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