Integrative Essay

Computer science interacts with faith and the liberal arts in a myriad of ways. Before we discuss some of these ways, however, it will perhaps be helpful to briefly define computer science as a discipline. Our definition will follow the thinking of Philip Guo as outlined in his piece “What is Computer Science? Efficiently Implementing Automated Abstractions.” Elaborating on the four word definition given in the title (“efficiently implementing automated abstractions”), we find that abstraction – modeling real life situations with sufficient but not extraneous details in a way that allows a given problem to be solved – is at the core of computer science. Automation is necessary since these abstracted models are used to make actions (rather than merely describing), which involves creating step-by-step processes (algorithms) within the framework of the model that lead to solutions. In order for these automated abstractions to be useful, they must be implemented (on computers) so that proposed algorithms can be tested and their outputs used to produce results. Finally, it is important that the automated abstractions run efficiently upon implementation, because if they consume too many resources in order to run, their value is reduced or even eliminated. Having now elaborated a brief description of computer science, we can begin to explore the ways in which this discipline interacts with faith and the liberal arts.

In the account of the creation of the world given in Genesis 1, we find this passage in verses 27-28:

So God created man in his own image, in the image of God he created him; male and female he created them. And God blessed them. And God said to them, “Be fruitful and multiply and fill the earth and subdue it, and have dominion over the fish of the sea and over the birds of the heavens and over every living thing that moves on the earth.”

From the beginning of creation, God intended that humans should work and “have dominion” over the Earth. After the Fall, God’s curse (directed towards Adam) affects work (Genesis 3:19 – “By the sweat of your face you shall eat bread”), but the institution of work as a fundamental part of human life comes from the beginning of creation, not the Fall. Many people misunderstand this and believe that work is only necessary because of the Fall, and correspondingly have a negative attitude towards work; often, people view work as an unfortunate necessity – the means by which they support themselves and thus prolong their lives – while the purpose of life is to find enjoyment elsewhere in one’s “leisure time.” This is a fundamentally un-Christian view, and we will instead argue for Dorothy Sayers’s claim in her article “Why Work?” that “work is not, primarily, a thing one does to live, but the thing one lives to do.”

Perhaps the most important way in which faith and computer science reciprocally inform one another, which connects well with Sayers’s claim, is this: the serious study and practice of computer science by those who are suited for it is an act of stewardship which respects both the calling and gifting of God upon the individual. Referring back to our earlier definition of computer science we see that the discipline is inherently creative and a tangible way in which humans take dominion over the earth by using abstraction to solve problems. In this way studying and practicing computer science is an appropriate way to respond to God’s
command to Adam and through him to all of humankind to subdue and rule over the earth. Beyond this, it is a reflection of humans’ identity as image-bearers of God. Some common interpretations and/or implications of this idea which emerges from the creation story – that humans are made in the image of God – include that humans by nature are rational, creative, and relational. We see from our earlier definition that computer science requires at least the first two of these, and while one could in theory be a computer scientist in isolation, the nature of the field makes this very unlikely to occur in practice. Thus to be a computer scientist is (whether knowingly or not) to embrace and revel in the reality of being made in the image of God, and in this way to fulfill at least a small part of the purpose for which God created humanity, to bear his image and thereby glorify him.

It is also worth noting that Scripture does not regard vocational work as unrelated to faith. Rather, it says in 1 Corinthians 10:31, “So, whether you eat or drink, or whatever you do, do all to the glory of God,” and similarly in Colossians 3:23, “Whatever you do, work heartily, as for the Lord and not for men.” Computer science as a vocation is therefore “constrained” by Christian faith in that faith requires a computer scientist to “work heartily” and thus study and work in the discipline to the best of his or her ability. At the same time however, computer science as a vocation becomes an essential expression of the practitioner’s faith in the way that it is performed to the glory of God and not for primarily human purposes (“for man”). Having elaborated some of the ways in which vocational work in general and computer science in particular are appropriate responses to God’s calling on humans and at least partially fulfill his purposes for their lives, we now see that there is great truth in Sayers’s claim that work should be regarded as central to human life because of its nature and not because of what it produces.

The preceding arguments also give some clear support to another of Sayers’s claims in “Why Work?” namely the idea that “the secular vocation, as such, is sacred.” As another support for this claim, note that in Exodus 31:2-6 we find the first passage in the Bible where a person is said to have the Spirit of God:

“See, I have called by name Bezalel the son of Uri, son of Hur, of the tribe of Judah, and I have filled him with the Spirit of God, with ability and intelligence, with knowledge and all craftsmanship, to devise artistic designs, to work in gold, silver, and bronze, in cutting stones for setting, and in carving wood, to work in every craft. And behold, I have appointed with him Oholiab, the son of Ahisamach, of the tribe of Dan. And I have given to all able men ability, that they may make all that I have commanded you.

Some might find it surprising that the first mention of a person being possessed of the Spirit of God is in regards to his skill in craftsmanship, an area which would clearly be labeled as “secular” in the traditional “secular” versus “sacred” dichotomy. We join Sayers however in arguing against this dichotomy because it does not align with the Biblical reality. God has “given all able men ability,” to use his own words (or rather an English rendering of them), and if God is the source of human ability in all things, whether in things “secular” or “sacred,” we can reasonably conclude that he intends for the ability that he gives to be used to its fullest extent in all things, subject to the bounds of morality. God calls those with skills to do the work for which their skills equip them, and equips those he calls for the work to which he calls them. Therefore the way in which people apply their skills in all areas of life – including those traditionally labeled “secular” – matters.

As Sayers says, “God is not served by technical incompetence, and incompetence and untruth always result when the secular vocation is treated as a thing alien to
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There is another aspect of stewardship which we have hitherto only mentioned briefly, namely the idea of morality, or in its application, ethics. Ethics is, or at least should be, an important consideration for anyone practicing the discipline of computer science. This is because computer science leads to new technologies and new ways of doing things, which can create situations wherein it is unclear whether certain actions should or should not be considered acceptable and for what reasons. There is not universal agreement on how ethics should be understood within the field of computer science. For example, whether values are somehow embedded in technology or whether they are created by the humans users of the technology is one area of debate, but regardless of the points of disagreement, almost anyone in the field will acknowledge that there are many significant ethical questions that have arisen and continue to arise in the field as new technologies are produced. That being the case, it is especially important that the way Christian computer scientists answer these questions is guided by Biblical morality. Clearly, since the ethical questions in the field arise out of new situations made possible by technological developments, there are not direct answers in the Bible. However, the moral foundation given by the Bible is provides a reliable starting place from which to approach any new ethical dilemma. Utilizing technologies in an ethical way according to Biblical principles is another way in which Christian computer scientists can approach their discipline with stewardship unto God in mind, and thus allow their faith to shape the way they engage in their discipline.

Having considered a few ways in which computer science interacts with faith, we will also discuss its role as one of and its connection to the rest of the liberal arts. As a brief definition of the liberal arts, we give this statement from “Computer Science and the Liberal Arts: A Philosophical Examination” by Henry Walker and Charles Kelemen: “A liberal arts curriculum promotes a broad study of multiple disciplines, develops reasoning and analysis, and invites multiple views of problem solving.” In light of our earlier definition of computer science, it is immediately obvious that the discipline corresponds well with the purposes and goals of a liberal arts education. Computer science is at its core a unique and powerful method of problem solving, and it certainly develops reasoning and analysis. Liberal arts students who learn computer science have their minds opened to new ways of thinking about and approaching problems; the kind of thought process that characterizes a good computer scientist, while not the only useful way of approaching a given problem, can still be an immense benefit and aid to practitioners of any number of disciplines. Having the skills to distinguish the essential details from the unessential when examining a problem, foundational to the concept of abstraction which computer science revolves around, can be helpful in most other disciplines and life in general. Really, liberal arts is more about preparation for all of life than for any specific career path, and the ability to abstract is a useful life skill for those who have it.

Beyond the principles of computer science, its specific practices such as programming, the ability to implement abstractions, are also extremely useful in

When those that God has equipped for and called to the field of computer science pursue the discipline intently, they are properly stewarding the skills God has gifted them with. As Joel Adams says in “Why Christians Should Study Computer Science (and other technical disciplines),” engaging in a “secular” career to the best of one’s ability is a way that a Christian can fulfill the Biblical mandate given in Romans 12:1: “Present your bodies as a living sacrifice, holy and acceptable to God, which is your spiritual worship.”

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many disciplines. Computer science is the ultimate tool making discipline, because it can produce tools that further and enable studies in many other disciplines. Computer science has in fact changed the way in which studies and research are conducted in every other scientific discipline, not only simplifying older processes but in allowing entirely new types of inquiry which would not otherwise be possible. Vast amounts of data can be processed with ease, and simulation of various situations that might otherwise be unobservable (within a reasonable time frame) allows researchers to obtain data and draw out conclusions to which they would not previously have had access. It does not overstate the power of computer science as a discipline to claim that all liberal arts students could benefit from learning its fundamental principles.

Conversely, computer science has also gained much from other disciplines. Areas of study such as artificial intelligence have drawn heavily from other fields of study such as psychology, biology, and philosophy. Though advancements in many disciplines are now predicated on the application of computer science, developments in computer science are also being driven by its interaction with other studies. Computer Science has entered into a symbiotic relationship with the rest of the liberal arts whereby developments in one contribute to developments in the other, and familiarity with one better prepares a person to engage and succeed in the other. For this reason, and because it by nature makes a very meaningful contribution to a liberal arts education, computer science should be embraced as an essential part of a proper liberal arts education, and it should be recognized that computer science thrives within a liberal arts environment.