Homework #1

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COSC-250

Ever since computer were invented they have been consistently improved in design, functionality, and efficiency. An SoC is a complex circuit consisting of billions of transistors that allow computers to operate. The numbers of transistors on a SoC has been continually rising as the demand for increased computational power rises. However, with the growing number of transistors comes and increase in power consumption for the machines as well as some other difficulties that go along with it. There have been many ideas put forth to solve this issue such as a programmable processor which allows for several distinct algorithms to be ran using the same transistors. It is also important for hardware and software of systems to have a synergy to them that allows for there to not be any wasted resources used when using either. For future designs it is also beneficial to work off existing hardware and software designs rather than starting from scratch as it allows for old designs to be innovated and improved rather than just ignored which assists in avoiding errors in software and hardware design. Yet, if existing hardware and software is not effectively and efficiently design it can lead to more detrimental effects than beneficial ones. While power consumption is arguably the main issue concerning SoC designs, another obstacle is the widening gap in computational speed and memory. Computational speed has been growing extremely fast whereas memory has been growing just not to the degree at which the computational speed has exploded. Furthermore, transistors variability is also growing as they become smaller and smaller which leads to inconsistency in their behaviour which can lead to poorer quality of the SoC’s. Modern designs for SoC’s have utilized multiple processors as to better relieve the strain on the SoC by computing varying tasks through alternating processors which in turn upgrades the power efficiency of an SoC and lowers thermal output within the machine. Another important aspect when developing a SoC is versatility of what it is able to compute therefore many SoC now implement a form of reconfigurable logic which allows for the SoC to change it structure to fit the needs of what it is asked to compute. While all of these ideas are potential solutions the trend seems that by combining the attributes of the solutions create an optimized final product that is able to meet the high computational demands and meet acceptable power consumption.