

-CENG311 VIDEO HOMEWORK 1-

In the video lecture given by Professor Onur Mutlu some key concepts introduced were abstraction layers contained in computer systems starting from physics level flow of electrons, electronic devices, logic gates and digital circuits consisting of transistors which make up microarchitecture. One of the most important layer between software and hardware is instruction set architecture that is implemented by microarchitecture, so different instruction sets require different microarchitectures to be implemented. In upper layer there exists run time systems like OS or virtual machines, that allows programming languages to speak with hardware with this layered structure, after completing all these steps algorithm design can be translated into machine level representation. I also interested in software security and cryptography, actually computer architecture is crucial for designing crypto systems for example, generation of large prime numbers is not an easy task due to some complexity and performance issues, but with the increases in system performance we are able to generate large primes with efficient algorithms easily, thanks to advances in computer architectures, but also we can look at the situation from another aspect, with this increasing performance and computing power also cryptographic algorithms become vulnerable, for instance, Shor algorithm designed by mathematician Peter Shor currently working on MIT is able to make prime factorization of very large prime numbers very quickly according to quantum computational techniques, so this means that although improvements in computer architecture is very promising other fields of computer science should also renovate themselves parallel to these advances like cryptography example. My question to lecturer is why we need different architectures like RISC, MIPS, or ARM is any one has particular advantage over another one?