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| Instructor | ***Luke Papademas*** | Due Date | **6/9** |

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| Part | **1** | **2** | **3** | **4** | Total |
| *Maximum Points* | **25** points | **25** points | **25** points | **25** points | **100**G101010 pointsG |
| ***Your Score*** |  |  |  |  |  |

**Textbook Reading Assignment**

Thoroughly read Chapter(s) 1 in your Computer Architecture and Organization textbook.

**Part 1 Glossary Terms - An Introduction to Computer Architecture and Organization**

Define, in detail, each of these glossary terms from the realm of computer architecture and organization, in general. If applicable, use examples to support your definitions. Consult your notes or course textbook(s) as references or the Internet by visiting Web sites such as:

[**http://www.ask.com**](http://www.askjeeves.com) or [**http://www.webopedia.com**](http://www.webopedia.com/)

**(a) Cloud Computing**

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| **A distributed computing architecture whereby services are provided to users via web servers. Cloud computing architectures (such as Amazon and Google Cloud) provide SLAs to the users to determine the features and options available to the users. Cloud computing platforms can provide Saas, IaaS, PaaS, or all three depending on the provider. They also tend to provide elasticity, meaning that users can scale up or down depending on the resources required to perform their tasks.** |

**(b) ENIAC**

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| **Electronic Numerical Integrator and Computer invented by John Mauchly and J Presper Eckert. It is a vacuum tube computer recognized as the first all electronic digital computer.** |

**(c) High - Level Language**

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| **A high level language is the 5th level of the computer level hierarchy. It is just below the user level and consist of languages such as C, C++, Fortran, Lisp, and Pascal. These languages are translated using compilers.** |

**(d) nano**

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| **A prefix that represents 10^-9 (base 10) or 2^-40 (base 2).** |

**(e) Rock’s Law**

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| **A theory developed Arthur Rock that builds off of Moore’s Law and states that the cost of capital equipment to build semiconductors will double every four years. The law indicates that we can continue to build better chips, but asks will we be able to afford to build them?** |

**Part 2 Exercises - An Introduction to Computer Architecture and Organization**

Provide a brief but complete answer for each of these exercises.

**(1)** In what ways are hardware and software different? In what ways are they the same?

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| **The principle of equivalence states that any task done by software can be done by hardware, and any task done by hardware can be done using software. This is true when we look at the computer level hierarchy. For example, control units (Level 1) can be hardwired or microprogrammed and both will serve the same function. However, a hardwired implementation of a control unit is faster than a programmed control unit because it is a physical component.** |

**(2)** By what order of magnitude is something that runs in nanoseconds faster than something that runs in milliseconds?

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| **A nanosecond is 1 X 10^6 times faster than a millisecond.** |

**Part 3 Exercises - An Introduction to Computer Architecture and Organization**

**(1)** Suppose you are ready to purchase a new computer for personal use. First, take a look at advertisements from various magazines and newspapers and list terms you do not quite understand. Look these terms up and give a brief written explanation. Decide what factors are important in your decision as to which computer to buy and list them. After you select the system you would like to buy, identify which terms refer to hardware and which refer to software.

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| Gigahertz – this is the clock frequency, which means that the processor sends electrical pulses simultaneously to all components each second to maintain system synchronization.  LPDDR3 – low power double data rate RAM.  eSATA – a port used for external drives and other components such as cameras and keyboards  NFC Enabled – near field communication, meaning that two electronic devices can communicated with each other when they are near each other  The factors important to me when purchasing a computer are overall speed and components that support intensive processing. I use my computers for streaming and programming and do not like when background processes interfere with my tasks.  In the advertisement, terms that refer to hardware include:  Storage Type, Hard Drive Type, Hard Drive Capacity, System Memory, Graphis, and Processor Speed. Terms that refer to software include: HP Recovery Manager, HP Support Assistant, McAfee LiveSafe, and HP Audio Switch. |

**(2)** Suppose a transistor on an integrated circuit chip were 2 microns in size. According to Moore's Law, how large would that transistor be in 2 years?   
 How is Moore's law relevant to programmers?

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| **Moore’s Law states that the density of chips doubles every 18 months. So, in 2 years, the transistor would be 0.667 microns in size.**  **Moore’s Law is relevant to programmers because as the density of chips increases, performance also increases, and therefore programmers must design programs to utilize the improved performance of the chip.** |

**Part 4 Exercises - An Introduction to Computer Architecture and Organization**

**(1)** Under the von Neumann architecture, a program and its data are both stored in memory. It is therefore possible for a program, thinking a memory location holds a piece of data when it actually holds a program instruction, to accidentally ( or on purpose ) modify itself.

What implications does this present to you as a programmer?

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| **Self modifying code provides benefits, such as allowing program execution to run faster by adjusting the code assembly instructions. It can also enable a programmer to build intelligent systems that respond to various inputs and outputs during runtime. However, it could also result in unintended consequences that cause incorrect outputs.** |

**(2)** What are the challenges facing organizations that wish to move to a Cloud platform? What are the risks and benefits?

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| **One of the major challenges of moving on premises architecture to the cloud is the amount of data migration that tends to occur. Large organizations may have petabytes or more of data, and that migration can take a long time. In addition, developing a strategy to migrate to the cloud is extremely important. Organizations must self reflect to understand if a full move to the cloud is right for them. They must ask themselves if there are benefits to continuing to manage systems on premises, instead of allowing a third party to manage the infrastructure, is right for them.**  **There are benefits to moving to the cloud. One of them is cost. Many cloud providers allow for elasticity which means an organization can pay for increased processing power during peak times, and downgrade performance when extra processing power is not needed. This enables cost savings. Additionally, infrastructure, software, and platforms can be managed by outside vendors and service can be guaranteed through an SLA.**  **Risks of moving to the cloud include no longer having physical control over your infrastructure and data. Disaster recovery and security are placed into the hands of an outside vendor, and while SLAs are designed to enforce availability and integrity of your data, there are additional hurdles that prevent you from performing recovery of your data if an issue arises.** |