James Johnston

Week 2 activities 123

Read Chapter 1 and 2 in \The First Draft Report on the

EDVAC" by John von Neumann and answer the following

questions:

1

State and describe in you own words the partitions, modules or subdivisions of a digital computer described by Dr. Neumann.

In section 2.9 Dr. Neumann compares M, R and he explains why they are needed. Technology has advanced a lot since 1945, do we still need M and R? Justify you answer with details.

3

Could modern computers solve mathematical equations using methods other than numerical method? or is it still restricted to numerical methods? Support your answer with details

Silicon manufacturing process: How does silicon manufacturing process/technology affect performance, power and reliability factors of a microprocessor.

(Read chapter 1 section 1.4 and 1.5 in from \Computer

Architecture: A Quantitative Approach")

3

Encoding: In this lecture we saw how decimal numbers are encoded using binary number. Modern personal computer support many languages and are capable of displaying graphics. How are alphabets and pictures represented in a computer?

Are there standards that governing how alphabets from various languages are represented? Support your answer with details.

Failure Analysis: In the DE0-Nano demo, the result of a simple subtractions came out to be a unexpected number, in the demo you saw 2 - 5 = 65533. Is this an error? if it is an error, investigate and explain where the error has occurred. Is it a software or a hardware error? Support your answer with details. Also, suggest a possible solution to x this error. 1

5

Power: What are the advantages and disadvantages of lowering VDD in digital electronics?

Size: What is the effect of capacitance and is it possible to reduce or even eliminate capacitance in a digital circuit ?