

CE161 - DIGITAL SYSTEMS ARCHITECTURE

PRACTICE SET 1 – WEEKS 2 & 3

NB: Unless otherwise specified, questions are based on materials from Stallings (2013) [ST13]
Where applicable, the book's question number is shown in parenthesis (RQ: Review Question;
P: Problem)

Overview and History

Q1 (RQ1.1) - What, in general terms, is the distinction between computer organization and computer architecture? Give an example illustrating this difference.

Q2 (RQ1.3) - What are the four main functions of a computer?

Q3 - What are the main components of a von Neumann machine? Why is this invention significant and what problems did it aim to solve?

Q4 - What is Moore's law and what are its consequences?

Q5 - What is the main difference between the computers from the first three generations? In practical terms, what improved from one generation to the next?

Number Systems

Q6 (P9.3) - Convert the following decimal numbers to their hexadecimal, and binary equivalent:

- a. 24 b. 6550 c. 454 d. 8984

Q7 (P9.4) - Convert the following binary numbers to their decimal and hexadecimal equivalents:

- a. 1101 b. 1000110 c. 111111 d. 0010110

Q8 (P9.5) - Convert the following hexadecimal numbers to their decimal, and binary equivalents:

- a. F b. 1C c. 4D d. FAC

Q9 (P9.9) - Convert the following hexadecimal numbers to their decimal equivalents:

- a. 9F b. D52 c. 67E d. ABCD

Q10 (P9.11) - Convert the following decimal numbers to their hexadecimal equivalents:

- a. 204.125 b. 255.875 c. 631.25 d. 10000.00390625

Q11 (P9.12) - Convert the following binary numbers to their hexadecimal equivalents:

- a. 1001.1111 b. 110101.011001 c. 101001110111011

Q12 - Why have binary and hexadecimal notations, respectively, become the cornerstones of computing?