

Name: _____

Mark: _____/12

ID: _____

COMP228 Quiz 1

Winter 2008

Answer all questions in the spaces provided.

Time Allowed: 15 minutes

1(a) The von Neumann model is distinguished by its use of control flow (control/data flow), leading to the presence of program counter (name the critical feature) in a typical von Neumann processor.

(b) The main objective of hierarchical abstraction is to hide lower layer details for ease of use.

(c) Give an example system detail that exists in the control layer but not in the machine layer:

Answer: cache/buses/ALU or functional units etc

(d) What does Moore's law say?

Answer: Density of transistors in a chip doubles every year (18 months)

2(a) Suppose a 1-byte register stores the hexadecimal digits 88_{16} . Now let us interpret this storage of two hexadecimal digits.

(i) If it is an unsigned integer, its equivalent value (in decimal) is $8 \times 16 + 8$

(ii) If it is a 2's complement integer, its equivalent value (in decimal) is -120

(iii) 'Overflow occurs if 78_{16} is added to 88_{16} .' false (true/false) [if 2's complement addition is performed, else true.]

(b) Suppose the size of a word in a computer is 32 bits.

(i) The number of ASCII characters that can be stored in a word is 4

(ii) The largest 2's complement integer that can be stored in a word is $2^{31} - 1$

(iii) If the Hamming single bit error correcting code is used, the number of parity (syndrome) bits needed for each data word (of 64 bits) is 7