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Introduction to Computer Science
Spring 2014

Midterm Exam – Paper A
09/04/2014
Time: 180 minutes
Student: _____

Section I – 70 points

1. Convert into the decimal system the binary number 1110011. (10 points)
2. Convert into the binary system the number 332. (10 points)
3. Convert into the decimal system the binary number 1011.001. (10 points)
4. Perform the following addition: 110101 + 111001. (10 points)
5. Suppose you are using the floating point notation with 8 bit, 1 bit for the sign, 3 bits for the exponent and 4 for the mantissa. You are using the three-bit excess notation for the exponent.
   Compute the decimal value of the number 01001001. (10 points)
6. Perform the following subtraction: 11010111 – 100111. (10 points)
7. Perform the following multiplication: 10111 x 10111. (10 points)

Section II – 20 points

1. Sketch and describe how pipelining works. (5 points)
2. Sketch and describe the MIMD architecture. How many program counters do we have at a certain moment in time? (5 points)
3. Discuss multi-tasking and the relationship with time-sharing. (5 points)
4. Describe the use of the parity bit. (5 points)

Section III – 10 points

1. How many processes can a processor execute at any moment in time? Discuss this issue in relationship with multi-tasking.
2. Explain why it is not sufficient to compare processors based only on the clock speed.