ECE 448: Final Exam
Spring 2009
May 12, 2009

Part I (closed books, closed notes)
(30 minutes, total 7.5 points)

1. Your name:

2. List at least three advantages of FPGAs when compared to ASICs

3. The recent study regarding the comparison of the area, speed, and power of ASICs vs. FPGAs, reported in the paper assigned to you as your required reading, was performed at
   a. MIT
   b. GMU
   c. GWU
   d. University of Toronto
   e. Carnegie Melon University
   f. UCLA
   g. Stanford

4. An average ratio of the FPGA area to ASIC area for two circuits performing the same function (assuming the use of logic only in FPGAs) is equal to approximately:
   a. 2
   b. 3
   c. 10
   d. 20
   e. 30
   f. 40
   g. 50

5. A single Block RAM size in Spartan 3 is equal to:
6. What is the name (including the number) of the two most recent families of Xilinx FPGA devices in each of the following categories:

low-cost:

high-performance:

7. List at least two functions of a clock manager in Xilinx FPGAs:

8. Which of the following constructs of VHDL are non-synthesizable (more than one answer may be correct)?

   • initializations (e.g., SIGNAL a : STD_LOGIC := ‘0’;)
   • for-generate
   • multiplication of real numbers
   • selected concurrent signal assignment (with-select-when)
   • delays (e.g. a <= b after 10 ns;)

9. Group the following four objects in VHDL into two pairs of objects with similar properties (the objects within the same pair may be used in the same places in your code):

   a. constants
   b. signals
   c. ports
   d. generics

10. What is the name of the hardwired microprocessor embedded in selected Xilinx high performance FPGAs?