Stony Brook University

Paper Review 2
Issued: 10/17/16; Due: 10/24/16

Bacon, D., Rabbah, R., & Shukla, S. (2013). FPGA Programming for the Masses. ACM Queue, 11(2).

Assignment: Read the paper, and carefully answer the following questions in your own words. ***To receive credit, questions must be answered in your own words. Do not plagiarize by copying text from the paper or other sources.***

This assignment has a ***three-page maximum.***

1. The introduction of the paper discusses general-purpose processors (GPPs), FPGAs, and ASICs. Describe these systems and explain their similarities and differences based on information in the paper and your own knowledge. Explain why an FPGA can reach higher performance than a processor, in spite of the large difference in clock frequency.

2. In the paper, the authors show examples of C code and Verilog code for a system that converts temperatures from Celsius to Fahrenheit. Their example (Figures 1 and 2) shows that the C version requires only 7 lines of code, while the Verilog implementation requires 23 lines of code. Do you think this is a fair comparison?

3. In that example, the authors use floating point numbers to represent Celsius and Fahrenheit temperatures. Does it make sense to use floating point for a hardware implementation of this problem? Why or why not? Think back to our discussions about arithmetic datatypes from class 13 (10/12).

4. The paper describes high-level synthesis by explaining five categories of frameworks: (1) HDL-like, (2) C-based, (3) CUDA/OpenCL, (4) High-Level Language-based, and (5) Model-based. Briefly explain what each of these categories means, and how a designer specifies a system in each type of tool.

5. We do not have an answer to the question of which of these types of frameworks is best. Each balances ease of design with low-level control and quality of results. Later, we will discuss some of these types of frameworks in more detail and examine their tradeoffs. **For now, answer the following question: which of these technologies seems the most promising and interesting to you? Why?**

Please turn in your responses on Blackboard as one of the following file formats: .pdf, .doc, .docx, .odt, .txt, or .rtf.

In-Class Presentation Option
Instead of completing a written assignment, up to four groups (2 students in each group) may prepare a presentation and lead a discussion of a section of the paper in class on 10/24.

Sections to choose from:

1. Introduction (from the start of the paper to just before the "Programming Challenges" section).

2. Programming Challenges section.

3. First part of High-Level Synthesis section: from start of section to end of "CUDA/OpenCL-Based Frameworks."

4. From "High-Level Language-Based Frameworks" to end of paper

On Piazza, sign up to present a section by going to the message with title "Paper presentation signups for 10/24". To sign up, reply with which section you would like, your name, and your partner's name. *Only one group may sign up per section.*

Please email me your slides (PowerPoint) by 11AM on the day of class.