



# EEE4084F – Digital Systems

15 May 2013

## Quiz 4 – Take-home assignment



**Lectures:** 16, 17, 18, 19, 20;

**Textbook:** Ch24, pages: 463-469; 473; 475-47

Quiz Prepared by Jason Esselaar

Marking strategy: Good writing and logical answers will get higher marks

### Question 1: HPEC Trends:

1.1. From the late 1980's to mid 2000's HPEC trends changed, identify what characterized each new trend and the factor(s) that led to this change. [6]

1.2. Briefly explain what is meant by a Distributed Net-Centric Architecture. [4]

### Question 2: Reconfigurable Computing

2.1. Define what is meant by Reconfigurable Computing. [1]

2.2. Identify and briefly explain the different RC Architectures. [4]

### Question 3: Amdahl's Law

|                            | <b>A</b> | <b>B</b> | <b>C</b> |
|----------------------------|----------|----------|----------|
| <b>Parallelizable Code</b> | 50%      | 85%      | 20%      |

3.1. Given access to devices that can make use of 1, 4 and 16 cores, and knowing the percentage of parallelizable code in functions A, B and C. Determine speed up factor achieved by Amdahl's Law. [4]

3.2. Having calculated the speedup using Amdahl's Law, do you believe this to be an accurate result? Justify your answer. [3]

**Question 4:** RC Building Blocks

4.1. Give examples of Volatile and Non-Volatile memory and mention the drawbacks and advantages of each, then explain what the term Volatile means. [4]

4.2. Describe 2 configurations of Direct Memory Access (DMA) and briefly explain the implications of DMA on a CPU. [4]

**Question 5:** Benchmarking and Automatic Conversion

5.1. Whetstone, Dhrystone and CoreMark are tools for benchmarking processors, briefly explain what any two of these tools and explain how results obtained from these tools are useful. [3]

5.2. Briefly mention 2 of the challenges encountered when converting from C to VHDL. [2]

**Total: 35**