ELE 455/555
Spring 2016

Homework 3A

Due 2/9

Beginning of Class

1A) Architectural Tradeoffs– 10pts

You must choose between a single core or dual core solution given:
     75% of your application can be parallelized across 2 cores
     Voltage and frequency are linearly related (1:1)

a) How much can you reduce the frequency in the 2 core solution (with respect to the original) and obtain the same overall performance (consider time only)

b) How much will the dynamic power be reduced (fraction of original) if you use the frequency from (a)

2A) Architectural Tradeoffs– 10pts

You speed up the add feature of your processor by a factor of 5, but this has the side effect of slowing down all other instructions by 10% Adds represent 40% of overall instructions executed

a) What speed up have you achieved

b) What is the worst case penalty (side effect) you can live with to achieve the 5x improvement in addition

3A) Architectural Tradeoffs– 10pts

Do a little poking around the web for information on the ARM 32 bit architecture. The last two bits (LSB+1, LSB) of the PC are fixed:

a) What value are they fixed to:

b) Why?

c) Why is this not true for the MIPS processor