COMP 326/526 Assignment 3 Fall 2014

Issued: October 20, 2014 Due: November 3, 2014

Typed Hardcopy in Class

1. Loop Unrolling [46 marks]

Consider the following loop:

loop: l.d f4,0(r1) l1

l.d f6,0(r2) l2

mul.d f4,f4,f0 m1

mul.d f6,f6,f2 m2

add.d f4,f4,f6 a1

s.d f4,0(r1) s1

daddui r1,r1,#-8 sub1

daddui r2,r2,#-8 sub2

bnez r1,loop br

Note: Our default is that FP arithmetics have 4 x-boxes.

a) [10 marks] Using the names 'l1' to 's1' for the first six instructions

in the body of this loop, draw the flow-dependence graph for just these

instructions. Label each arrow with the dependence gap between the

producer and the consumer.

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In what follows, focus on three flow-dependence types: i) FP arith to

FP arith, ii) FP arith to FP store, and iii) FP load to FP arith. Denote