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.

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