

CS 2210: Compiler Design

Homework #4

Due Time: midnight April 20th, 2020

1. Given the following code sequence

```
do i = 1,6
  do j = 1,5
    A(i,j) = A(i-1,j+1)+1
  enddo
enddo
```

- (a) Draw the entire iteration space.
- (b) Draw the distance vectors.
- (c) What if exchange the order of i/j? is that legal? What are the result distance vector after exchanging?
- (d) What are types of dependencies?

2. Given the follow loop nest.

```
do i = 1,n
  do j = i+1,m
    A(i,j) = A(i-1,j-2)+1
  enddo
enddo
```

- (a) Perform loop permutation and calculate the new loop bounds
- (b) Calculate the new loop index of array A
- (c) What is the distance vector? Is the transformation legal?

Note that the inner loop j iterates from i+1 to m.