Homework #4 Solutions

9.6.1

Immediate Dominators:

	B1	B2	B3	B4	B5	B6
idom	Entry	B1	B2	B3	B3	B5

Dominator Tree:

B1 -> B2 -> B3 -> B4
|
---> B5 -> B6

Retreating Edges: B4->B3, B5->B2

Graph is reducible: All retreating edges are back edges.

Depth: 2 (corresponding acyclic path: B4->B3->B5-B2)

Natural loops: {B3, B4}, {B2, B3, B4, B5}

9.6.6

When n <=2, a complete flow graph on n nodes is reducible.

9.6.7

For all n, a complete, acyclic flow graph on n nodes is always reducible because there are no retreating edges and back edges.

Even with self-loops (i->i), the self-loops are all the retreating edges and at the same time back edges, so the graph is still reducible.