***CSCE686 Homework Sp 2019***

***HW4c:******(due 4/25)******“Groups of two are acceptable”***

**c)** (*40pts)* **Design** *&* **Improve** the AFIT *graphprogram* fortheMIS algorithm.

*“Educational Objective: develop an understanding and ability to use the mapping PD (MIS) into AD (gs-dfs/bt) via our top-down design process using Christofides’ algorithm design and implementation from our gs-dfs/bt algorithm specification.” “A software engineer in a closet should now understand the total development from PD/AD integration to pseudo code to code step by step.”*

c.1 Incorporate *at least* the ordering heuristic and the pivoting heuristic {Andrade, Christofides Bron Kerbisch), Pelillo, …} into the *graphprogram* MIS by explicitly following our top down PD/AD search element design approach. Show this PD/AD design explicitly integrating step-by-step these creative heuristics top-down into pseudo code*.* Extend the use of the standard search elements into the given *graphprogram* code as well as the step notation from the pseudo code to code with your new heuristics.

**OR**

Develop thePD/AD design using the ordering and pivoting heuristics for a MIS/Clique algorithm implemented in a different programming language. Of course, include standard search elements throughout the design development as appropriate (including code implementation).

c.2 Test and compare MIS results with/without Heuristics over some relatively small, medium and large PD graphs (From Problem 3 and/or DIMACS,BHOSLIB, …). Consider planar, non-planar, perfect, circle, bipartite, permutation, and chordal graphs. For medium PD, generate search graph.

c.3 Report: Discuss the above top-down design, implementation, and testing efforts concisely! (for testing follow Barr)

c.4 (extra credit) Compare computational results of c.2) to those of   
 other MIS/Clique algorithms as found in various papers (*MIS/’Clique   
 Paper*s - see CSCE MIS\_Clique paperdirectory and other   
 References).