CSI 5165 Combinatorial Algorithms — Winter 2021
Computer Science — University of Ottawa

Homework Assignment #3- PART 2 (50 points, weight 7.5%)
Suggested completion: Before the Easter Holiday. Due: Monday April 5 (11:55PM)

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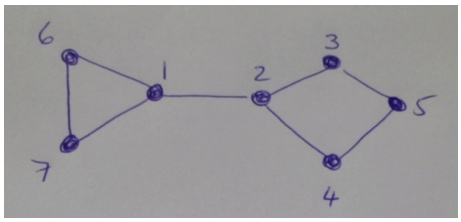
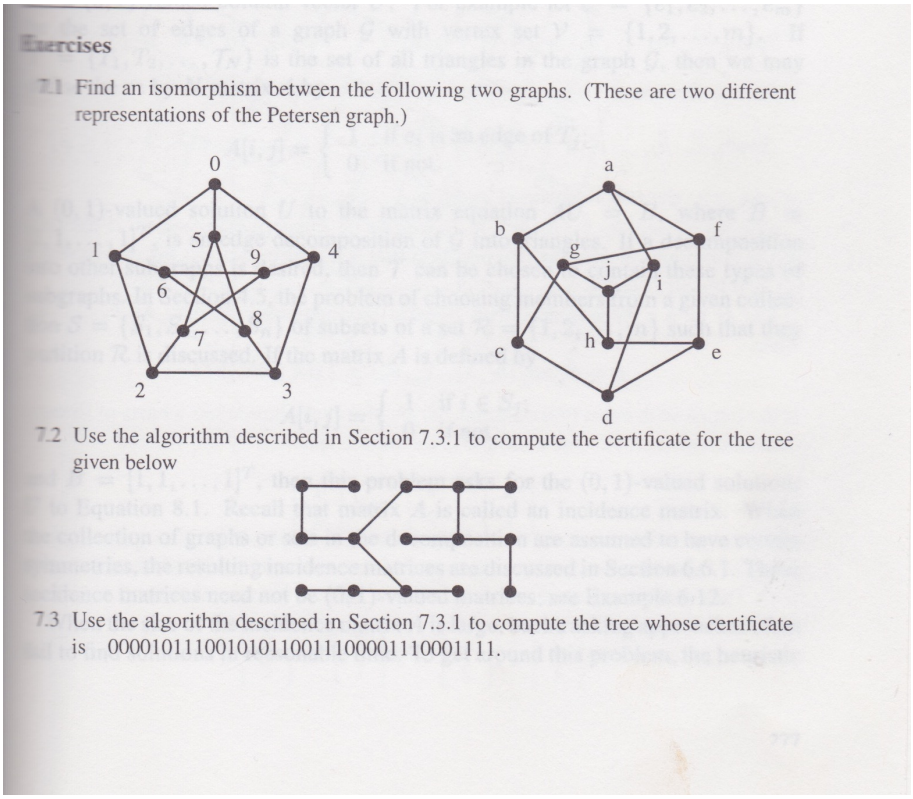
1. (10 points) **Finding isomorphism by hand**
   Do exercise 7.1 of the textbook.

2. (10 points) **Certificate for trees**
   Do exercise 7.2 of the textbook. Simulate the algorithm by hand computation, showing your tree and labels at each step.

3. (10 points) **Reverse the certificate for a tree**
   Do exercise 7.3 of the textbook. Show how the tree is built step by step.

4. (20 points) **Certificate for graphs**
   Apply Algorithm 7.8 CERT1 by hand, in order to compute a certificate for the following graph. Show your backtracking tree. Note that efore generating descendants, there is a call to procedure REFINE; if your root has 7 nodes, it is because you forgot to refine before generating descendants, and you would have a tree that is too large.





Exercises

7.1 Find an isomorphism between the following two graphs. (These are two different representations of the Petersen graph.)

7.2 Use the algorithm described in Section 7.3.1 to compute the certificate for the tree given below

7.3 Use the algorithm described in Section 7.3.1 to compute the tree whose certificate is 000010111001010110011100001110001111.