Math 535, Homework 3, due Dec 16

(1) (a) Find a triangulation of the dunce cap.

(b) Find a partitioning of your triangulation, or show that it is not partitionable.

(c) Calculate the f-vector and h-vector for your triangulation.

(2) For arbitrary k and n, show there is a simplicial complex with depth k and dimension n.

(3) Show that the independence complex of a chordal graph is shellable.
Hint: Using the simplicial vertex characterization of a chordal graph (see e.g. Wikipedia), show that the complex is vertex-decomposable.

(4) Show that the combinatorial Alexander dual (defined in homework 1) of the independence complex of the complement of a chordal graph is shellable.