ECON 318, Assignment 16:  
Green and Scotchmer – Sequential Innovation

1. Read Section 1. Note two main things: the fact that both first and second innovators need incentives to innovate, and the difference between *ex ante* and *ex post* licensing agreements.

2. Read Section 2. There's more here than we really need. Using the notation in the article, write down the following:

   a. Monopoly profit of selling \( x \) including R&D cost.
   b. Monopoly profit of selling both \( x \) and \( y \) including R&D costs.
   c. Incremental profit of \( y \) including cost of R&D for \( y \).
   d. Competitive profit of selling \( x \) including R&D cost.
   e. Competitive profit of selling \( y \) including R&D cost.

3. Read Section 3.

   a. Paragraph 1: what is the payoff to both firms if they choose an *ex ante* agreement to share all incremental profits and R&D costs?
   b. Paragraph 2: what is the payoff to both firms if firm 2 creates \( y \) and then bargains *ex post* for a license from firm 1.
   c. Explain how (a) and (b) show that a socially valuable follow-on innovation might not occur.
   d. Partagraph 3: read the first three sentences carefully. Not all *ex ante* agreements will be as generous as the one in part (a) of this section.

4. Time to look (no actual response required here) at the proof of Proposition 1. First, we are going to assume that \( \pi_{x+y} - c_1 - c_2 = 0 \). This means that a monopolist would get normal profit from doing the combination \( x \) and \( y \). Thus, you might think that both inventions would occur. But…

   a. If the firms compete, the proof shows that firm 1 ends up with negative profit.
b. If firm 2 would enter the market with just the *ex post* agreement (part 3b above), there's no reason for firm 1 to offer anything better even *ex ante*. That's good for firm 1, but not good enough as shown in the proof.

c. Finally, suppose firm 2 would only enter the market if firm 1 would agree *ex ante* to share costs with it. This is worse for firm 1, and firm 1 does not make a profit.

5. Give an example of a follow-on innovation (you could probably re-use your packet thicket example). Which of the three categories of the proof does it fall into: non-infringing competition, *ex post* licensing, or *ex ante* licensing?

6. Look at Sections 4 and 5. These would be good value-added for the presentation.