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Platform Problems
(Due Thursday, November 29)

1. (Network Effects) Consider the network effects model discussed in class. There is a platform with N potential users. The users have different intrinsic benefits of joining the platform, and these benefits are distributed uniformly in the population between 0 and 1. If a fraction x of the potential users join the platform, those who join get an additional network benefit $f(x)=x-kx^2$, where $1/2<k<1$. Finally the platform charges a price p to join. So the net benefit to an individual from joining will be $b+f(x)-p$, where b is the individual's intrinsic benefit and x is the fraction of users who join.

    a. Suppose that all the potential users expect a fraction x^e to join. Given this expectation, what fraction of users actually will find it desirable to join?

    b. What is the Nash equilibrium level of participation on the platform, i.e. the value of x such that if everyone expects x to join, x will join?

    c. Write down the platform's revenue as a function of the price p that it charges, and solve for the price that maximizes platform revenue.

    d. Write down the total surplus that is created as a function of x (note that the price p is a transfer between users and platform, and hence not counted in total surplus), and find the surplus maximizing (or efficient) fraction of users.

    e. How does the efficient level of user compare to the profit maximizing level? At what price would Nash equilibrium participation be surplus maximizing?

Note: don't worry about integers in this problem, i.e. you can solve for the equilibrium fraction of users without worrying whether the number of users xN is an integer.

2. (Online Education Platforms) Recent news articles have argued that online education platforms such as Udacity, Coursera, Class2Go, EdX and others may fundamentally re-shape higher education. The purpose of this question is to try to apply the ideas we have discussed about the economics of platforms to analyze these businesses and how you think they might evolve. If you like, you can pick just one of these platforms, or compare and contrast several. Here are some questions that you should attempt to address in your answer.

    a. How do the platforms create value? In particular, what types of users do they bring together, and what services do the platforms provide? How might your answer change in the future?

b. How important are network effects for these platforms? In particular, what types of network effects might be at work that will be important for the platforms to be successful.

c. How might these platforms generate revenue? How could the pricing work? Does your answer match with the model described in class, or is it different?

d. What are the pitfalls that potentially could create problems for these platforms? What do you think their biggest challenges are, now and going forward?

e. What do you think the market structure eventually might look like in online education? Will there be new entrants? Will the market tip to one or a few platforms, or will there be many competing platforms?

You can feel free to expand beyond these questions – this problem is meant to be somewhat open-ended. But keep your answer to a page or two. I will post some links to news articles if you want to do some background reading to prepare your answer.