1. **Tournaments**: Two players are in a “tournament”. Players one and two simultaneously pick an effort level e_1 or e_2. Costs of effort are a continuous function c(e), with c(e)=0, c’(e)>0 and c’’(e)>0. Both players have output which is just their effort e_i plus a “luck” term x_i which is uniformly distributed in the interval [-x,x]. (Each person’s luck is independent.) The person with the highest measured output—their effort e_i plus luck x_i—wins a large prize H; the loser wins a consolation prize L.
   a. Write down the chance that player 1 wins as a function of e_1, e_2, x_1 and x_2.
   b. What is the statistical distribution of the difference between the luck terms x_1 and x_2? (Hint? It has a simple form.)
   c. Using (a) and (b), write down the statistical distribution of the chance that player 1 wins for a particular choice of e_1, given the other player’s effort e_2.
   d. What is the optimal e_1 given e_2, and vice versa? Hint: Since c(e_1)=c(e_2) the solution is symmetric; both players choose the same amount of effort in equilibrium.
   e. How do the optimal efforts respond to the “amount” of luck x and the prize spread H-L?

2. (10 points, ½ page). **Fast food.** A national fast-food chain regularly adds new items to its menu. Its contracts with independently-owned franchisees, however, do not require the franchisees to add the items. The chain uses very expensive national roll-out advertising (i.e. advertising in many local markets at the same time, as on network TV shows which are broadcast widely) when it introduces new products. Why might the chain want to own a lot of stores, rather than franchise them?
3. (10 points) (10 points 1 page) **Makeup exam:** In department stores, many employees in different departments—sporting goods, shoes, electronics—work on a small sales commission, say 10%. (For most of those products, by the way, the profit is a modest percentage of the sale price.) The cosmetics counters typically work differently. Many people working there are not employees of the department store at all—they actually work for the company whose counter they staff and they exclusively sell one line. For example, if you go to the sporting goods section, a Bloomingdale’s employee will sell Callaway golf clubs, Taylormade clubs, and so forth. But if you go to the Estee Lauder counter in Bloomingdale’s, a salesperson who works for Estee Lauder will help you. Furthermore, compared to other departments in a department store, in cosmetics a lot of sales are repeat sales (the customer comes back and asks for the same salesperson). The salespeople also are usually generous with free samples (small “trial” size samples) for their regular customers.

a. Speculate about why sporting goods salespeople are employees of the department store, while cosmetics counter salespeople are employees of the cosmetics company. Feel free to use any other information or impressions you have about these products and sales practices, or to give answers which make sense conditional on facts that you are not sure about.

4. (10 points, ½ page) **Drug dealing:** At a recent NIDA (National Institute of Drug Abuse) conference, several social scientists discussed their field research on the economic organization of drug dealing (e.g., for crack cocaine). Here are some background assumptions: (1) In street-level drug transactions, individual dealers stand around a street corner and wait for customers to approach; customers usually are buying a small amount of drug (one or a few vials). (2) A large percentage of the street-level operatives who handle the drug transactions use crack themselves. (2) It is common for street-level dealers to have to throw away crack vials when police come. (3) Street-level dealers often get robbed by rivals or in other ways that they cannot verify or report (e.g. theft by police themselves).

a. Here is a stylized fact: None of the street-level dealers handle *both* the crack itself and cash. (That is, there is usually an organizational separation in which a buyer pays cash to one person and receives the crack from somebody else nearby.) Given the background facts above, speculate as to why the optimal “job design” separates handling of crack and cash by street-level dealers.

5. (10 points, ½ page) **Cars:** Ted delivers pizzas. When an order is taken by the company, it is conveyed to Ted who can decide whether to deliver the pizza or not. (He can turn it down if it will take too long to get there, if he thinks the neighborhood is dangerous, and so on.) Ted’s identical twin, Fred, works as a movie location scout. His work requires him to go to rugged and sometimes dangerous locations at strange hours (e.g., to take location photos at 3 a.m. to see how a street will look when it is being used for filming at night). Fred has no choice about where to go; if he refused to scout a location he’ll be fired.
a. Which one of Ted or Fred is more likely to own the “tool” he uses—namely, his car or truck? Explain.

b. 6. (5 points each, 1 page total)

Explain whether the following skills are *general* or *firm-specific* human capital or a combination of the two:

a. Speaking Spanish.
b. Learning code numbers for sections of a company’s work manual (which is not used elsewhere).
c. Knowing which people in the organization can really be trusted.
d. Learning to make PowerPoint software presentations in a particular color scheme, for your boss who has an unusual kind of color blindness.
e. Learning a secret recipe which your company uses, and other companies would love to have. (Assume nothing legally prevents you from using the recipe at another company if you left.)
f. You work in a talent agency (e.g. representing film stars). You learn which of the stars are trustworthy, and which of the people those stars work with—directors, accountants, family and friends—can be trusted. If you switched jobs you would run into some of these other people occasionally even if the major star continued to be tied exclusively to your old firm.