

Dept of Urban Studies and Planning 11.128/11.248
Dept of Economics 14.49
Distributed: Session 4

Problem Set 1
Due in Class, Session 6

1. In the matrix below, each coefficient a_{ij} refers to the number of units of product j produced in country i in one person-day of labor.

	Shoes	Wheat
U.S.	4	6
Spain	2	2

- (a) Assume both economies are at full employment so that producing more of one good requires reallocating labor from the other good. In a world without trade, if the U.S. wants four more shoes, how many bushels of wheat will it have to give up? If Spain wants four more shoes, how many bushels of wheat will it have to give up?
- (b) Calculate a trade proposal in which the U.S. offers X bushels of wheat to Spain in exchange for 4 shoes. Your calculated offer should be such that the U.S. loss of wheat is less than if it produced the 4 extra shoes domestically and that Spain is left with at least as many shoes and at least as much wheat as it had before trade—i.e. both countries are better off.
- (c) In the spirit of the Simon chapter, develop a parallel example where humans and machines take the place of the U.S. and Spain and show how specialization increases total output in the economy.

2. In Table 2 of Alan Krueger's article "Have Computers Changed the Wage Structure?" he shows that, after controlling for the effects of age, education, etc., persons who work with a computer earn a premium of about .18 in the natural log of their wage (the dependent variable of the regression). This translates into about a 20% premium in their actual wage.

- (a) How would the advertising people who develop Dell commercials like to interpret this coefficient?
- (b) Give several reasons why the Dell interpretation in (a) may be wrong.

- (c) Explain why, in Table 2, the coefficient on “uses computer at work” drops in value from .276 (in column 1) to .17 (in column 2) when controlling for things like education, experience, gender, etc.
- (d) Given plenty of resources, how would you design an appropriate experiment to estimate the correct value of the coefficient (i.e. the *causal* parameter) Krueger has estimated?
3. Since you have all done at least a little programming, you know it is reasonable to think of a computer as a machine that executes rules.
- Some of these rules are arithmetic rules – i.e. $6 \times 3 = 18$.
 - Others are logical rules – i.e. If $[x(i) \geq 15.0]$ Go to 35.
- (a) Using rules, write out as completely as you can the process of issuing an airline boarding pass to a passenger – in other words, the software that drives the kiosks for self-service check-in at most airports.

- (b) In footnote 6 of “The Corporation.....”, Simon writes:

“This example will seem entirely fanciful only to persons not aware of some of the research now going on into the possible automation of psychiatric processes.”

The most famous example of a computerized psychiatrist is *Eliza*, a program to mimic a Rogerian psychoanalyst written in the 1970s by Joe Weizenbaum, now an emeritus professor in Course VI.

Go to: <http://www.manifestation.com/neurotoys/eliza.php3>

and have a 10 or 15 line conversation with Eliza.

Based on your conversation describe as well as you can the structure of Eliza’s software. Then think about what you know about psychotherapy – what you have read, any first hand experience – and describe the information processing done by a human psychotherapist likely differs from the information processing in Eliza.

4. Consider the following definition of skill: “The more years of training an occupation requires, the more skilled it is.” For the occupations listed below, do the following:

- (a) Classify them as “high-skill” or “low-skill” based on this definition.
- (b) Write down another definition of skill (you can pick one discussed in class) and re-classify these occupations according to that definition. Does the classification change?

- (c) What is the likely impact of computers on the people involved in each occupation? Will a computer be a complement to human labor, or is it more likely to replace the people in these occupations?

Occupations (chosen from the Bureau of Labor Statistics professional specialty occupations):

- (i) Economist
- (ii) Psychologist
- (iii) Clergy
- (iv) Preschool and kindergarten teacher
- (v) Dentist
- (vi) Athlete
- (vii) Actor/entertainer
- (viii) Radio/TV announcer and newscaster