Experimental Instructions

This is an experiment in the economics of pricing decisions. You are entitled to a $5.00 USD show-up fee which will be paid to you at the end of the experiment. In addition, a clear understanding of these instructions will help you to increase your chances of earning an appreciable amount of money that will be paid to you in cash, in private, at the end of the experiment. During the experimental session, **you are not allowed to talk, laugh or exclaim out loud**. Please, **remain silent during the entire session**. If you have any questions, or need assistance of any kind, raise your hand and an experimenter will help you out. All written information is for your private use only. Do not share information with other participants. Be sure to keep your eyes on your screen only. **Turn off your electronic devices (such as phones, tablets, etc.) now** and put them away during the experiment. Violations of these rules may force us to stop the experiment. Anybody that violates any of these rules will be asked to leave the laboratory and **will not be paid**. We appreciate your cooperation.

Agenda

1. We will go over the instructions.
2. There will be a quiz with 10 questions to make sure everybody understands the experimental instructions. **You will earn 0.20 USD for each question you answer correctly.** All questions will be displayed on your computer's screen. You will have one chance to answer the questions. The correct answers will be displayed in the page following the quiz. Studying the questions you got wrong might help improve your performance during the experiment.
3. After the quiz, you will be working with a fictitious currency called Points. **Points will convert to cash at the end of the experiment at the rate of 31 points = 1 US Dollar**. The next section of the experiment is divided in two parts:
   - First, there will be a set of training trading periods that will allow you to practice without incurring financial risk.
   - Next, there will be a set of effective trading periods. Your performance in these periods will determine your final earnings.
4. You will be asked to answer a post-experimental survey.

Description of the Experiment

In this experiment there will be sellers and buyers. You and every subject in the room are assigned to the role of a seller. You **will not** interact with any other human subject participating in this experiment. You will interact only with the computer assigned to you. Your computer takes on the role of a buyer. You will perform trades. You will retain your role of seller during the entire session. The decisions you make do not affect in any form the results of other participants in the room.

In this market, there are two products: **product A and product B**. The seller will design packages containing quantities of these products. The seller will also specify the prices of each package. These packages are then offered to one potential buyer. The seller and the buyer can obtain earnings from trades. Trades will occur within **trading periods**. There will be many trading periods throughout the course of this experimental session.

In general, the seller's earnings increase with price. Also, the seller's earnings diminish with the quantities of the products contained in the package. This is because it is costly to produce quantities of any product. On the other hand, the buyer's earnings increase with the quantities. However, the earnings made by the buyer decrease with the price paid for the package. **In short, the buyer benefits from high quantity at low prices, while the seller benefits from high prices at low production cost.**

The buyer has a preference for product A and a preference for product B. The buyer can have either a "high" or a "low" preference for each product. How much each product affects the buyer's earnings depends on his type. In general, the buyer benefits from purchasing both products; however, the buyer benefits more from purchasing larger quantities of the product for which he has a "high" preference. There are four possible types of buyers:

Type-HH buyer: This buyer has "high" preference for both products A and B.
Type-HL buyer: This buyer has "high" preference for product A and "low" preference for product B.
Type-LH buyer: This buyer has "low" preference for product A and "high" preference for product B.
Type-LL buyer: This buyer has "low" preference for both products A and B.

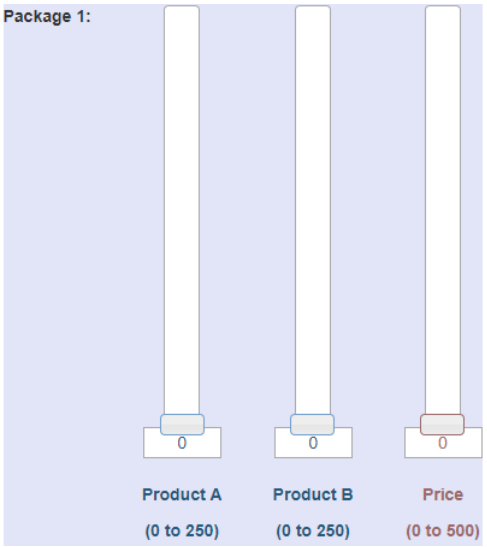
In a given period, the type of the buyer will be one of the listed above. **The seller will never be informed about the type of buyer she or he is trading with**. After the seller has designed the menu of packages, the buyer will be presented with the options. **The buyer can decide to either buy <u>one</u> package or not to buy any package at all**. The package agreed upon will determine the earnings for the trading period.

How is the buyer type assigned?
During each trading period you will encounter one buyer. The buyer will be randomly assigned to be of a certain type. This is true for every single trading period. At the beginning of the period, the buyer will be assigned his type according to the following probabilities:

Probability of type-HH: 10%
Probability of type-HL: 40%
Probability of type-LH: 40%
Probability of type-LL: 10%

Note that **the buyer type is not fixed across periods**. You will not know for certain the type of buyer you are trading with. You will only know that the buyer is assigned a type according to the probabilities listed above. The computer will behave like a buyer who knows his type.

Specific Trading Instructions. Each period will be divided into the following phases:

1. **Pricing/packaging phase**. You will be asked to design your menu of packages.
   - *Menu choice*: You will be asked to decide whether to offer one, two, three or four packages. You can also choose not to offer any package at all.
   - *Quantity - Price choice*: For each package you decided to offer, you will need to specify: 1) quantity of product A, 2) quantity of product B, and 3) the price you would like to charge for the package. The quantity of both products can be any integer number between 0 and 250. The price of the package can be any integer number between 0 and 500. If you decide not to offer a package for the period, this step will be skipped. This is an image of the interface used to input the quantities and the price for a package.
   - 

   - You can set the desired levels of product A, product B and price by either adjusting the corresponding vertical slider, or by typing into the box right below the corresponding slider. To interact

with one of the vertical sliders, you only need to click and hold on its handle, then move your mouse up or down to adjust the handle to the desired level. You can also click on any part of the slider to quickly set the handle at the desired level. You can also use the arrow keys on your computer's keyboard to move the handle one unit at a time. Additionally, below each slider there will be a rectangular box. You can type the desired number of units into the box.

2. **Purchase phase**. If the seller decided to offer at least one package, the computerized buyer will be presented with the menu of options and will have the following alternatives: either purchase one of the packages or reject them all. The buyer cannot buy more than one package per trading period.

   The buyer compares packages with respect to the earnings he would obtain from buying them. **The buyer will choose the package that yields the highest earnings for him**. If the buyer does not buy any package, he earns zero points. The buyer will not buy a package that would result in negative earnings for him. If two or more packages yield the same earnings to the buyer, and they are tied as the most beneficial for the buyer, he will choose the option that appears first in the menu (for example: imagine you offered four options. Suppose that, from the buyer's point of view, packages one and two are tied, and both generate more earnings than packages three and four; then the buyer chooses package one). If the most beneficial package to the buyer results in exactly zero earnings, he will purchase it. In short, **the buyer will purchase the package that maximizes his earnings**.

At the end of the period, you will be presented with a screen displaying the following information: the characteristics of the packages you offered; which package was purchased, and your period earnings. It is recommended to document your performance in the earnings-tracking sheets we provided to keep track of your strategies and performance.

How are earnings calculated?

Prior to making an offer, you will have access to an on-screen calculator where you can compute, for a given quantities-price combination, the following: the earnings that the seller would obtain if the package were purchased; the seller's cost of production, and the earnings that each type of buyer would gain. This calculator appears during the pricing/packaging phase. So you can try different package designs before submitting an offer. The following is how the calculator would appear on-screen:

- **Enter quantities and price information (integers only):**

  Product A: Enter quantity (from 0 to 250):

  Product B: Enter quantity (from 0 to 250):

  Price: Enter price (from 0 to 500):

  Compute

  Potential outcomes if this package were purchased:

  Seller's earnings if purchased:

  Seller's cost of production:

  Type-HH buyer earnings:

  Type-HL buyer earnings:

  Type-LH buyer earnings:

  Type-LL buyer earnings:

In each period, if the seller decides not to offer any package or if the buyer rejects all options in the menu, then both seller and buyer earn zero points. If you are curious as to how payoffs are affected by quantities and price, keep in mind that **the buyer benefits from high quantity at low prices while the seller benefits from high prices at low production cost.**

For those of you interested in even more details, we explain the equations that define the earnings. Suppose you offered one package containing q_A units of product A and q_B units of product B. Your earnings in points are:

$$\text{Points earned from one sold package} = price - \left(\frac{(q_A)^2+(q_B)^2}{500}\right)$$

Notice that "cost" is determined by the last term. The buyer earnings depend on his type. Notice that you may lose points from selling a package for which the cost of production is higher than its price.

The buyer's earnings are determined by the sum of the valuations gained from consuming each product minus the price he pays:

$$\text{Type-HH earnings} = \left(15 \times \sqrt{q_A}\right) + \left(15 \times \sqrt{q_B}\right) - price$$
$$\text{Type-HL earnings} = \left(15 \times \sqrt{q_A}\right) + \left(10 \times \sqrt{q_B}\right) - price$$
$$\text{Type-LH earnings} = \left(10 \times \sqrt{q_A}\right) + \left(15 \times \sqrt{q_B}\right) - price$$
$$\text{Type-LL earnings} = \left(10 \times \sqrt{q_A}\right) + \left(10 \times \sqrt{q_B}\right) - price$$

Note from the above that the buyer has a much higher valuation for the good he has a "high" preference for compared to the good he has a "low" preference for ($15 \times \sqrt{q}$ versus $10 \times \sqrt{q}$).

How many trading periods will there be?
The trading part of the experiment will be divided in two parts:

1. **First part**: There will be **6 non-paying periods**. We will call these "training" periods. This part provides trading opportunities for you to become familiar with the trading screens and to develop strategies without financial consequences.

2. **Second part**: The second part begins following the training periods. **There will be 11 periods in this part**. We will call these periods "effective" trading periods. Each effective trading period can potentially influence your final earnings. Four out of the eleven effective trading periods will be randomly chosen. **The sum of points that you earned in these four randomly selected trading periods will be converted into cash** and paid to you at the end of the experiment.

How do the paying effective periods get selected?

Labeled from 1 to 330, the experimenter has a list with all possible combinations of four effective periods. These are listed with no particular order. On the laboratory's projection screen, you can see a computer interface that randomly chooses numbers between 1 and 330, all equally likely. The experimenter will activate this interface three times. The number that appears the third time will indicate the label of the combination of paying effective trading periods. This label will be displayed on the projection screen during the entire session. On the list, the experimenter will mark the combination associated with the selected label. He will put the list into a yellow envelope, close the envelope, and leave it on the desk below the projection screen. **Only the experimenter is allowed to open the envelope**. The set of paying effective periods will remain secret until the end of the experiment. Only at the end of the experiment, right before you are paid, the experimenter will privately show you the list of all combinations and the selected combination. Then, the experimenter will proceed to sum the earnings obtained in the randomly selected periods in order to determine your final payoff. If the sum of the four randomly selected effective periods is negative, your trading earnings will be set to zero.