

Instructions

Introduction

Welcome to this experiment. In this experiment you can earn money. The monetary unit in this experiment is E\$ (experimental dollars), where 1 E\$ is worth 0.15 AUS\$. How much money you earn depends on your decisions and on the decisions of the other participants. Each participant makes her/his decisions by her-/himself at a computer terminal. Communication between participants is not allowed. Please use the computer only for entering your decisions. Please only use the decision forms provided, do not start or end any programs, and do not change any settings.

Situation

In the experiment you are a bidder in a sequence of six auctions. In each of those auctions you are one of altogether 14 bidders in your group. The composition of this group does not change throughout the experiment.

At the end of the experiment one of those auctions will be randomly selected for payoff. Additionally, you receive a lump sum of E\$150 for your participation in the experiment. If you made a loss in the auction selected for payoff, i.e. if the price you pay for the goods you purchased is higher than your value for these goods, then your loss will be deducted from this lump sum. However, your payoff will be at least E\$33, or AUS\$ 5 (i.e. your "show-up fee"). Thus, you cannot lose money in this experiment.

In the auctions several units of two different items A and B will be auctioned off. In particular, in each auction 100 units of item A and 80 units of item B are auctioned to the 14 bidders in your group. Both items will be auctioned *simultaneously*.

Before the start of each auction you will be informed of how much the items are worth to you. For each auction you will receive a table that looks like the one below. For each "bundle" of units of A and B, the table states the value of this bundle for you. The values are given in E\$.

Please note that the numbers in the table are just an example. In the experiment you will receive a different table for each of the six auctions. Tables also differ between the participants.

All tables have the following properties:

- The more units of an item you purchase, the more the bundle is worth.
- If you purchase more units of an item, additional units may decrease in value.
- Item A is more valuable than item B, i.e. for each bundle, the value of an additional unit of A is at least as high as an additional unit of B.

Your profit in each auction is the value of the units of A and B you purchase (i.e. the value stated in the table), *minus* the price you have to pay for these units (i.e. the price per unit of A times the quantity you buy of A plus the price per unit of B times the quantity you buy of B).

Seat No.	X	Bundle Values										Auction X
Value (E\$)		Quantity Item B										
		0	1	2	3	4	5	6	7	8	9	10
Quantity Item A	0	0	22	44	66	88	107	126	145	164	183	201
	1	27	49	71	93	115	134	153	172	191	210	228
	2	54	76	98	120	142	161	180	199	218	237	255
	3	81	103	125	147	169	188	207	226	245	264	282
	4	108	130	152	174	196	215	234	253	272	291	309
	5	132	154	176	198	220	239	258	277	296	315	333
	6	156	178	200	222	244	263	282	301	320	339	357
	7	180	202	224	246	268	287	306	325	344	363	381
	8	204	226	248	270	292	311	330	349	368	387	405
	9	228	250	272	294	316	335	354	373	392	411	429
	10	250	272	294	316	338	357	376	395	414	433	451
	11	272	294	316	338	360	379	398	417	436	455	473
	12	294	316	338	360	382	401	420	439	458	477	495
	13	316	338	360	382	401	420	439	458	477	495	513
	14	338	360	382	401	420	439	458	477	495	513	531
15	360	382	401	420	439	458	477	495	513	531	548	

Example

Assume, in an auction you purchase 2 units of A and 3 units of B. The prices are E\$22 for each unit of A and E\$20 for each unit of B. Thus, you pay $2 \times E\$22 + 3 \times E\$20 = E\$104$ for this bundle. According to the table above, the value for this bundle is given in row "2" (Quantity of item A) and column "3" (Quantity of item B), and is equal to E\$120. Consequently, your profit from this auction is $E\$120 - E\$104 = E\$16$. If this auction is randomly selected for payoff, you will receive $E\$16 \times 0.15 \text{ AUS\$/E\$} = \text{AUS\$ } 2.40$. Additionally you receive E\$150 (AUS\$ 22.50) as a lump sum, such that your total payoff will be AUS\$ 24.90.

For your convenience, you will also receive a second table, which, for each bundle of A and B, shows your value of an *additional* unit of A or B, respectively. These values represent the difference between two neighbouring fields in the first table (the one with the total bundle values).

Let us illustrate the use of this second table using the same example as before. According to the first table, a bundle of 2 units of item A and 3 units of item B is worth E\$120. The "Additional value" table now tells you how much worth one more unit of item A or one more unit of item B would be. For example, a bundle of 2 units of item A and 4 units of item B, i.e. a bundle with one more unit of item B, is worth E\$142. Thus, the value of the fourth unit of item B is E\$22. This value can be found in row 2 and column 3 of the "Additional value" table, in the upper right corner. Analogously, the value in the lower left corner of row 2, column 3 of the "Additional value" table tells you the value of the third unit of item A (E\$27), if you purchase 3 units of item B.

Value (E\$)		Quantity Item B					
		0	1	2	3	4	5
Quantity Item A	0	0	22	44	66	88	107
	1	27	49	71	93	115	134
	2	54	76	98	120	142	161
	3	81	103	125	147	169	188
	4	108	130	152	174	196	215
	5	132	154	176	198	220	239

Value of additional units (E\$)		Quantity Item B							
		0	1	2	3	4			
Quantity Item A	0	27	22	27	22	27	22	27	19
	1	27	22	27	22	27	22	27	19
	2	27	22	27	22	27	22	27	19
	3	27	22	27	22	27	22	27	19
	4	24	22	24	22	24	22	24	19

Auction procedure

Each auction runs over several bidding rounds. Each auction starts in the first bidding round with a price of E\$1 for each unit of item A and E\$1 for each unit of item B. During the auction these prices increase in price steps of E\$1 per unit.

In each bidding round you submit bids in which you state how many units of both items you would like to purchase at the prices of the current bidding round. Thus, a bid consists of two quantities: the number of item A units and the number of item B units which you demand at the current prices.

The following rules apply for submitting quantity bids:

- You can demand a maximum of 15 units of item A and 10 units of item B.
- Starting with the second bidding round you can at most demand as many units of A and B together (i.e. the sum of A and B units) as you demanded in the previous bidding round. This "current total bidding limit" will be displayed at the top of your bidding screen.
- Given those limitations, you can freely distribute your "current total bidding limit" between bids for item A and bids for item B.
- Your "current total bidding limit" will be reduced automatically if in a bidding round you demand less units than in the previous bidding round. Thus, your "current total bidding limit" will decrease over the course of the auction, but will never increase.

At the end of a bidding round the system checks the quantities demanded for both items by all bidders in your group.

- If the group demand for an item is larger than the number of units offered (100 units for item A and 80 units for item B, respectively), then the price for the item is increased by E\$1 in the next bidding round.
- If the group demand for one item is smaller than or equal to the number of units offered, then the price of that item does not change in the next bidding round.
- If the group demand for each of the two items is smaller than or equal to the number of units offered, then the auction ends.

These rules imply that from one bidding round to the next either the prices for both items increase by E\$1, or the price of one item increases by E\$1. The auction ends if none of the two prices increase. In that case, the group demand for items A and B at their current prices is smaller than or equal to the number of units offered (100 or 80 units, respectively). The units of both items will be allocated according to the following rules:

- If for an item the group demand at the last price is exactly equal to the number of units offered, then each bidder receives the number of units he or she asked for at the last price, and pays the last price for each unit.
- If for an item the group demand at the last price is smaller than the number of units offered, then each bidder first receives the number of units he or she asked for at the last price. The remaining number of units (the “excess supply”) will be allocated proportionally to the unfulfilled demands at the last price at which the group demand was still higher than the number of units offered (second-to-last price). Thus, if you reduced your demand for an item between the second-to-last bidding round and the last bidding round, then you might be allocated a number of units between your demand in the last round and your demand in the second-to-last round. However, the price for each unit of the item will be the price of the second-to-last round.
- Additionally, the software will make sure that you are not allocated more units in total than your current total bidding limit. If you shift your demand between items such that you would be allocated more units in total than your current total bidding limit allows, the software will only partially execute this shift. If this happens, the software will inform you that your shift could only be partially executed.

Please note, that if already at the start price of E\$1 the group demand for an item is smaller than the number of units offered, then the auction is determined to have failed for that item, and no bidder will be allocated any units of that item.

Examples

In the following examples we assume that the current price for item A is E\$9, and the current price of item B is E\$7. As in all auctions in this experiment, 100 units of item A and 80 units of item B are offered.

- *If at those prices the group demand for item A equals 110 units, and the group demand for item B equals 92 units, then the auction continues, and the prices for both items will increase by E\$1. Thus, the prices in the next bidding round will be E\$10 for item A and E\$8 for item B.*
- *If, instead, the group demand for item A equals 110 units as before, but the group demand for item B is only 75 units, then only the price for item A increases by E\$1. The auction continues, and the prices in the next bidding round will be E\$10 for item A and E\$7 for item B.*
- *If the current group demand is exactly 100 units for item A and 80 units for item B, i.e. if the group demand exactly equals the number of units offered, then the auction ends in this bidding round. Each bidder receives the number of units he asked for, and pays a price of E\$9 for each unit of item A, and a price of E\$7 for each unit of item B.*
- *Assume that the group demand for item A equals 100 units as before, but the group demand for item B is only 75 units. Thus, for item A the group demand exactly equals the number of units offered, but the group demand for item B is lower than the*

supply. The auction ends in this bidding round, and each bidder receives exactly as many units of item A as he or she asked for, and pays a price of E\$9 for each of those units. As the group demand for item B is lower than 80 units offered, the price for each unit of B will be the price of the second-to-last bidding round, E\$6. Bidders will receive first the number of units they demanded at a price of E\$7 (but pay for them only the price of E\$6). The remaining 5 units of item B (the excess supply) will be allocated proportionally to the (yet unfulfilled) demands of the bidders in the second-to-last bidding round, at the same price of E\$6.

The screen shot below shows the screen of the bidding software. In the upper part of the screen you see some information about the current state of the auction. In particular, your current total bidding limit and the current prices of both items are displayed. In the row below you see two input fields. Here you enter your demand for both items at the current prices. You must confirm your input by clicking the “Submit bid” button. Your bid will then be displayed in the lower part of the screen. In that part you also see the value of the bundle you are currently bidding on, and the total cost for that bundle if you would purchase it at the current prices. You can correct/update your bid by submitting new bidding quantities until the time of the bidding round runs out.

The screenshot displays the bidding software interface for "AUCTION 1 of 1". At the top, it shows the user's "My current total bidding limit (in units)" as 25. Below this, the current state for two items is shown:

- Item A:** Quantity offered: 100, Current price: 1. "My demand" is set to 15.
- Item B:** Quantity offered: 80, Current Price: 1. "My demand" is set to 10.

A central "Submit bid" button is present. Below the input fields, there are two "Auction History Table" sections, one for each item, with columns for Price, My demand, and Group demand. In the center, a timer indicates "Time left until next price level" as 0 : 0 7. At the bottom, "Information about my current bid" is displayed:

- 15 units of A at a price of 1
- 10 units of B at a price of 1
- My value of this bundle: 519
- Cost of this bundle at current prices: 30

Please note: In the first bidding round you have 1 minute to submit your bid, in the second round 45 seconds, and in the third and all following rounds 30 seconds. If you do not submit a bid within this time, the program will submit a bid on your behalf. In the first bidding round the program would ask for 15 units of item A and 10 units of item B, in all following rounds the program will just repeat the bid from the previous bidding round. Thus, it is important that you submit your bid in time, in order to avoid the program bidding on your behalf for quantities larger than you would want to purchase. The remaining time of a bidding round is displayed in the middle of the screen, below the button “Submit bid”.

The main part of the screen is divided into two tables, one each for item A and B. Those tables display, for all previous bidding rounds, the price, your own demand at this price, and the group demand at that price.

Altered bid submission in auctions 3 to 6

The first two auctions in this experiment will proceed as described above. In the auctions 3 to 6 there will be a change of procedures that does not affect the auction itself, but only the way in which you enter your quantity bids. Before the third auctions starts we will show you a short movie in which the change in bid submission will be explained. After auction 2 we will ask you to put on the audio headset in order to be able to listen to the audio of the movie.

Concluding remarks

After the last auction has finished, please remain seated and do not communicate with other participants. For paying you, we will call you individually by your seat number. After you have been paid, please leave the room. Please return all instructions and other handouts to the experimenter at the payoff counter.

Before the experiment starts, we will ask a number of comprehension questions on the computer screen. Please enter your answers. The actual experiment will start immediately thereafter.