

## Appendix A: Instruction Text File for Graphical User Interface: Periods 1 to 20.

normal text - OS[7,4]

*italic text* - denotes text that was changed for the other three treatments.

### INSTRUCTIONS

This is an experiment in the economics of strategic decision making. Various agencies have provided funds for this research. If you follow the instructions and make appropriate decisions, you can earn an appreciable amount of money. At the end of today's session, you will be paid in private and in cash.

It is important that you remain silent and do not look at other people's work. If you have any questions, or need assistance of any kind, please raise your hand and an experimenter will come to you. If you talk, laugh, exclaim out loud, etc., you will be asked to leave and you will not be paid. We expect and appreciate your cooperation.

You will be making choices on a Logitech mouse, which is located on the mouse pad in the middle of your table. You may move the pad to the right or left if this would be more comfortable. Hold the mouse in a relaxed manner with your thumb and little finger on either side of the mouse. Rest your wrist naturally on the table surface. When you move the mouse, let your hand pivot from the wrist. Use a light touch. Your cursor (a white arrow on your screen) should move when you slide the mouse on the mouse pad. If it does not, raise your hand.

To participate, you must be able to move the cursor onto an object and click any one of the mouse buttons. We will call pointing at an object and then clicking your mouse "clicking on" an object displayed on the screen. Click on the page down icon located below to display the next page.

### GENERAL

In this experiment you will participate in a market of *seven* people. At the beginning of period one, each of the participants in this room will be randomly assigned to a group of *size seven* and will remain in the same group for twenty periods. That is, you will remain grouped with the same *six* other participants for the next twenty periods.

In each period, every participant will pick a value of  $X$ . The values of  $X$  you may choose are any one of the 101 integers 0, 1, 2, . . . , 98, 99 or 100. The value you pick for  $X$  and the value of the *4th* order statistic of the  $X$ 's, (jointly determined by ALL *SEVEN* participants, including yourself), will determine the payoff you receive for that period.

Click on the page down icon to display the next page for a discussion of how to calculate the *4th* order statistic.

### THE *4th* ORDER STATISTIC

The *4th* order statistic is determined as follows. Each period the choices made by all *seven* participants will be ordered from the smallest to the largest in numerical order. The *4th* order statistic for that period is the *fourth* from the smallest of the ordered choices.

To find the *fourth* order statistic, first (i) arrange the numbers in ascending order and then (ii) counting from the smallest, find the *fourth* number of the ordered numbers and that is the *4th* order statistic.

For example, to find the *4th* order statistic for the following *seven* numbers

252, 292, 270, 208, 259, 270, 281

Arrange the numbers in ascending order - -

c1	c2	c3	c4	c5	c6	c7
208,	252,	259,	270,	270,	281,	292
1	2	3	4	5	6	7

Then, counting from the smallest, find the *4th* number of the ordered numbers, and that is the *4th* order statistic. In this example the *4th* order statistic is 270. The *4th* order statistic is also identified by '*c4*' over the number 270 and '*4*' under the number 270.

#### MAIN SCREEN

We will now view the main screen. You will use the main screen to make your choices each period. While you view the main screen I will read the description of the main screen contained in the next four pages. You can review the text that I am reading at any time during the experiment by returning to the instructions. Click on the word "MAIN" located on the second line down from the top of the screen now. (The second line is the light blue line on your screen).

The top line of the main screen displays the current period number, the title of the screen and your current balance. The second line has the word "PROCEED", the abbreviation "INSTR" and the word "RECORD" on it. During the session you will be able to return to these instructions by clicking on "INSTR." You will also be able to view the history of play by clicking on "RECORD", which I will explain in a moment.

The remainder of the screen contains: (1) Two blue bars and a 'blue box' that will help you understand how your choice and the *4th* order statistic influences your earnings each period, (2) A historical record of your past choices, the past *4th* order statistics and your earnings for each period of this session, and (3) A bar that represents all *seven* participant's ordered choices and highlights the *4th* order statistic in light blue.

Please look at the monitor at the front of the room while I demonstrate how to use the two blue bars and the 'blue box' to calculate hypothetical earnings and how to enter your choice each period.

Click on the blue bar labelled *4th* ORDER STATISTIC and notice that the mouse cursor is replaced by a yellow vertical line and that a yellow vertical line also appears in the 'blue box'. Immediately below the 'blue box' the current value that you have chosen for the hypothetical *4th* order statistic appears as a yellow number. Directly below the value for the hypothetical *4th* order statistic are three yellow question marks, ???'. The question marks are there to remind you that you DO NOT select the *4th* order statistic. During the experiment the *4th* order statistic will be jointly determined each period by ALL *SEVEN* participants in your group.

By moving your mouse left and right you can select any value between 0 and 100 for your choice of the hypothetical *4th* order statistic. Click the mouse a second time to select a value for the hypothetical *4th* order statistic and to restore the cursor.

Now click on the blue bar labelled YOUR CHOICE. Your mouse cursor is replaced by a green horizontal line and a green horizontal line also appears in the 'blue box'. Immediately to the right of the 'blue box' your current choice and your earnings associated with your current choice of X and the current hypothetical *4th* order statistic appears in green. By moving your mouse up and down you can read off the earnings associated with all of your feasible choices and the currently selected hypothetical *4th* order statistic. Click the mouse a second time to select a value for your choice and to restore the cursor.

Now click again on the blue bar labelled *4th* order statistic. By moving the mouse left and right you can read off the earnings associated with all of the possible values for the *4th* order statistic and your currently selected choice of X. However, remember that during the experiment the *4th* ORDER STATISTIC is jointly determined by the values of X chosen by ALL *SEVEN* participants. Your actual payoff will only correspond to a hypothetical payoff if the actual *4th* order statistic corresponds to the hypothetical *4th* order statistic. Now click the mouse to select a value and to restore the cursor.

Now click on the blue square. Notice that moving the mouse here lets you change both YOUR CHOICE of X and the hypothetical value of the *4th* ORDER STATISTIC. Click the mouse a second time to select a value and to restore the cursor.

In summary, the difference in the three active boxes is in what they control. Clicking on the horizontal bar allows you to change the hypothetical value of the *4th* order statistic,

while leaving the value of your choice unchanged. Clicking on vertical bar allows you to change the value of your choice by moving its green line up or down with the mouse while leaving the hypothetical value of the *4th* order statistic unchanged. Clicking on the blue box allows you to change both values simultaneously.

The four columns on the right side of the screen contain the period number, under the label 'Per', a history of your past choices, under the label 'Your Choice', the value of past *4th* order statistics, under the label '*4th* Order Statistic', and your earnings for each past period, under the label 'Your Earnings'. When the history fills all of the available lines, only the most recent lines will be displayed. You may use the page up, page down, line up and line down icons at the bottom to review the earlier records.

At the bottom of the main screen is a representation of the ordered participant's choices, in order from smallest to largest (*c1, c2, c3, c4, c5, c6, c7*). The *4th* order statistic is highlighted in light blue and enclosed with a light 'blue box'. The number *4* is also highlighted in blue.

When you are ready to enter a choice for a period you do so by clicking on "PROCEED", located on the second line of the main screen. Click on "PROCEED" now and notice that the message 'DO YOU WANT TO PROCEED' in appears in yellow. To proceed you click on the word "YES", in green at the right side of the line. If you want to change your choice at this point you would click on the word "NO", in red. Click on "NO" now and notice that the choice you had entered is canceled and you must now make another choice to proceed.

Now click on the blue square. Click the mouse a second time to select a value and to restore the cursor. Click on "PROCEED" now. If you click on "YES" your choice for the period will be entered. Please click on "YES" now to return to the instructions.

#### WAITING SCREEN

During a session a waiting screen will appear after you have made a choice. While you are waiting, you can use the two blue bars and the 'blue box' to perform hypothetical calculations that will help you understand how your choice and the *4th* order statistic influences your earnings each period, similar to the calculations that you can make on the main screen. NOTICE: the vertical line, your choice and earnings and the horizontal line and hypothetical value for the *4th* order statistic are ALL IN YELLOW. This color coding is to remind you that you have already made your choice and are currently waiting for other participants to make their choices. NOTICE: the second line DOES NOT contain PROCEED.

In addition to making hypothetical calculations, you may also view the instructions and the record screen by clicking on "INSTR" or "RECORD." When all participants have made a choice for the current period you will be automatically switched to the outcome screen. The choice displayed on the WAITING SCREEN is the choice that you made during the demonstration of the main screen. You will automatically return to the instructions in twenty seconds. Click on "WAITING" now.

#### OUTCOME SCREEN

During a session, after everyone has made their choices, the outcome screen will appear. The outcome screen summarizes what happened each period for ten seconds. Your choice and period earnings will be highlighted in green. The *4th* order statistic, jointly determined by all *seven* participants in your group, will be highlighted in red. At the bottom of the OUTCOME SCREEN the value of the *4th* order statistic for the current period will also be shown in light blue with a light blue outline. The number '*4*' is also highlighted in light blue.

During the experiment, after the period 1 outcome screen has been displayed for ten seconds, you will automatically advance to period 2. Your main screen for period 2 will appear and you may then make a choice for period 2 whenever you are ready. After the outcome screen for period 2 has been displayed for ten seconds you will automatically advance to period 3. This will continue for twenty periods.

The outcome screen is not active and, therefore, your mouse cursor will not be present while the outcome screen is displayed. Click on "OUTCOME" now. The value displayed on the outcome screen for YOUR CHOICE is the selection that you made earlier during these instructions. Two different values of the 4<sup>th</sup> order statistic will each be displayed for ten seconds during this demonstration. I have arbitrarily chosen the values of 25 and 75 for the 4<sup>th</sup> order statistic during these instructions. You will automatically return to the instructions in twenty seconds.

#### RECORD SCREEN

The record screen records the period outcomes and updates your earnings balance. The record screen contains all of the information contained in the past history on the MAIN SCREEN and the WAITING SCREEN plus an additional column labelled Balance that has your balance at the end of each period. At the beginning of the first period your balance is zero. At the end of each period your current period earnings will be added to your balance. At the end of this experiment you will be paid your ending balance, (the sum of all of your period earnings), in cash.

Click on the word "RECORD" located on the second line down from the top of your screen now. As the experiment proceeds the records for the earlier periods will scroll off the top of the record screen. You may review the earlier records by clicking on the page up, page down, line up and line down icons located at the bottom of the record screen. Click on RETURN to leave the RECORD SCREEN.

#### QUESTIONNAIRE

We will now pass out a questionnaire to make sure that all participants understand how to use the two blue bars and the 'blue box' and to make sure that all participants know how to calculate the 4<sup>th</sup> order statistic and their earnings. Please fill out the questionnaire now. Do not put your name on the questionnaire. Raise your hand when you are finished and we will collect it. If there are any mistakes on any questionnaire, I will go over the relevant part of the instructions again.

#### SUMMARY

\*\*\* At the beginning of period one, each of the participants in this room will be randomly assigned to a group of size *seven* and will remain in the same group for twenty periods.

\*\*\* In each period, every participant will pick a value of X. The value you pick for X and the value of the 4<sup>th</sup> order statistic of the X's, (jointly determined by ALL *SEVEN* participants, including yourself), will determine the payoff you receive for that period.

\*\*\* You make a choice by (i) selecting a value between 0 and 100 for X using the blue bars and/or the 'blue box', (ii) clicking the mouse a second time, to select your choice and restore your cursor and then (iii) clicking on "PROCEED" and "YES" to enter and confirm your choice for the current period.

\*\*\* Remember that you can view the instructions or the record screen by clicking on the appropriate word on the light blue bar.

\*\*\* Your balance at the end of the session, if positive, will be paid to you in private and in cash. If your balance is negative you will be paid zero.

Click on the page down icon located below to display the next page.

We have completed the instructions. Again, it is important that you remain silent and do not look at other people's work.

If you have a question, please raise your hand, and an experimenter will come to assist you. If there are no questions, period one of the experiment will begin.

OS[7,4] Questionnaire

4th ORDER STATISTIC

	0	17	33	50	67	83	100	
Y O U R  C H O I C E	0	<sup>(1)</sup> _____	0.34998	0.30198	_____	<sup>(2)</sup> _____	-0.44202	<sup>(3)</sup> _____
	17	0.24798	0.40200	0.45192	0.40398	0.25200	_____	-0.34002
	33	_____	0.35592	0.49800	0.54798	<sup>(7)</sup> _____	0.34800	0.09198
	50	-0.15000	_____	0.44598	0.60000	0.64998	0.60198	0.45000
	67	<sup>(4)</sup> _____	-0.04800	0.28992	<sup>(6)</sup> _____	0.70200	0.75192	_____
	83	-0.94002	-0.38208	_____	0.40398	0.65592	0.79800	0.84798
	100	<sup>(5)</sup> _____	-0.83802	-0.31002	0.15000	_____	0.74598	0.90000

4th ORDER STATISTIC

	0	17	33	50	67	83	100	
Y O U R  C H O I C E	0	0.30000	0.34998	0.30198	0.15000	-0.10602	-0.44202	-0.90000
	17	0.24798	0.40200	0.45192	0.40398	0.25200	0.01392	-0.34002
	33	0.10398	0.35592	0.49800	0.54798	0.49392	0.34800	0.09198
	50	-0.15000	0.20598	0.44598	0.60000	0.64998	0.60198	0.45000
	67	-0.50802	-0.04800	0.28992	0.54798	0.70200	0.75192	0.70398
	83	-0.94002	-0.38208	0.04800	0.40398	0.65592	0.79800	0.84798
	100	-1.50000	-0.83802	-0.31002	0.15000	0.50598	0.74598	0.90000

### QUESTIONNAIRE (Cont'd)

- (1) Assume the following choices of X are made by the seven participants in a group.

<u>Participant</u>	<u>Choice of X</u>
P <sub>1</sub>	88
P <sub>2</sub>	15
P <sub>3</sub>	40
P <sub>4</sub>	72
P <sub>5</sub>	30
P <sub>6</sub>	91
P <sub>7</sub>	21

- (a) Arrange the numbers in ascending order.

c <sub>1</sub>	c <sub>2</sub>	c <sub>3</sub>	c <sub>4</sub>	c <sub>5</sub>	c <sub>6</sub>	c <sub>7</sub>
_____	_____	_____	_____	_____	_____	_____
1	2	3	4	5	6	7

- (b) Circle the 1st order statistic in (a) above and calculate the earnings for each participant.

<u>Participant</u>	<u>Choice of X</u>	<u>Earnings</u>
P <sub>1</sub>	88	_____
P <sub>2</sub>	15	_____
P <sub>3</sub>	40	_____
P <sub>4</sub>	72	_____
P <sub>5</sub>	30	_____
P <sub>6</sub>	91	_____
P <sub>7</sub>	21	_____

Appendix B  
Instruction Text File for Graphical User Interface: Periods 21 to 40.  
normal text - OS[5,4] to OS[5,2]  
*italic text* - OS[7,2] to OS[7,4]

TREATMENT CHANGES

There will be twenty periods in this part of the session.

At the beginning of period twenty-one, each of the participants in this room will be randomly re-assigned to a group of size five and will remain in the new group for the next *randomly re-assigned to a group of size seven and will remain in the new group for the next* twenty periods.

As before, in each period, every participant will pick a value of X. The value of the 2nd ORDER STATISTIC of the X's chosen by all five participants and YOUR CHOICE of X will continue to determine the payoff you receive for that period.

*As before, in each period, every participant will pick a value of X. However now the value of the 6th ORDER STATISTIC of the X's chosen by all seven participants and YOUR CHOICE of X will determine the payoff you receive for that period. All of the labels on the Main Screen, the Waiting Screen, the Outcome Screen and the Record Screen have been changed to reflect the use of the 6th order statistic during the next twenty periods.*

NOTE: the earnings associated with the various combinations of YOUR CHOICE of X and the 2nd ORDER STATISTIC have been changed. When period twenty-one begins you can use the two blue bars and the blue box to help you understand how your choice and the 2nd order statistic influences your earnings each period.

*In addition, the earnings associated with the various combinations of YOUR CHOICE of X and the 6th ORDER STATISTIC have been changed. When period twenty-one begins you can use the two blue bars and the blue box to help you understand how your choice and the 6th order statistic influences your earnings each period.*

**THE 6th ORDER STATISTIC**

*The 6th order statistic is determined as follows. Each period the choices made by all seven participants will be ordered from the smallest to the largest in numerical order. The 6th order statistic for that period is the sixth from the smallest of the ordered choices.*

*To find the sixth order statistic, first (i) arrange the numbers in ascending order and then (ii) counting from the smallest, find the sixth number of the ordered numbers and that is the 6th order statistic.*

*For example, to find the 6th order statistic for the following seven numbers*

252, 292, 270, 208, 259, 270, 281

*Arrange the numbers in ascending order - -*

<i>c1</i>	<i>c2</i>	<i>c3</i>	<i>c4</i>	<i>c5</i>	<i>c6</i>	<i>c7</i>
208,	252,	259,	270,	270,	281,	292
1	2	3	4	5	6	7

*Then, counting from the smallest, find the 6th number of the ordered numbers, and that is the 6th order statistic. In this example the 6th order statistic is 281. The 6th order statistic is also identified by 'c6' over the number 281 and '6' under the number 281.*

*You will start a new record screen. To review the first twenty periods click on "PREVIOUS", which will be located in the upper left corner of the new record screen. Click on "NEXT" to return to the current record screen. The other functions of the record screen work as before.*

If you have any questions please raise your hand. If there are no questions click on RETURN now.