Appendix: Experiment Instructions

Experimental Payment

At the end of the experiment, you will receive a show-up fee of NT$200, plus the amount of NT$ converted from the experimental standard currency (ESC) you receive throughout the experiment. The ESC you receive, which differs from person to person, is determined by your decision, other participants' decision, and chance. Each participant will be paid privately, and you are under no obligation to tell others how much you earned. **Note: The exchange rate between ESC and NT$ is 1:4. (1 ESC = NT$4.)**

Part 1

Part 1 consists of two computerized tests. The first test includes three questions, and the second test includes eleven questions. Each question has only one correct answer.

You will be informed of how many correct answers you get at the end of the experiment. In the first test, you will receive 3 ESC per correct answer. In the second test, you will receive 1 ESC per correct answer.

Your payment from Part 1 will be the total payoff (in ESC) you receive from the two tests. Your payment from Part 1 and the number of correct answers you get will be displayed on the screen at the end of the experiment.

Note: You may not write during the computerized tests. If the experimenter finds you using pens and papers, you will lose all your payment from Part 1.

The Experiment Starts

The experiment starts now. Please make your decision carefully.

Part 2

Part 2 consists of two stages. Each stage includes eight rounds. Each round involves four participants. At the end of the experiment, one round in Part 2 will be randomly selected to determine your payment from this part. Any of the rounds could be the one selected, so you should treat each round like it will be the one determining your payment.

Part 2—Stage 1

The first stage has eight rounds. Each round concerns a decision situation in which four participants in different roles are grouped. You and the other participants in your group separately and independently make **choices**. Together, your choice and the other participants' choices determine your payoff in that round.

The Rules of the Decision Situation

In each round, all participants will choose among three alternatives. Your payoffs will depend on the combination of your choice and another participant's choice, as shown in the **payoff tables** below.

Member A's Payoffs

Member A's Choices \ Member B's Choices	d	e	f
a	10	4	16
b	20	8	0
c	4	18	12

Member B's Payoffs

Member B's Choices \ Member C's Choices	g	h	i
d	12	16	4
e	0	12	8
f	4	4	20

Member C's Payoffs

Member C's Choices \ Member D's Choices	j	k	l
g	20	12	8
h	6	8	18
i	0	16	4

Member D's Payoffs

Member D's Choices \ Member A's Choices	a	b	c
j	10	12	8
k	6	20	18
l	16	4	0

The payoff tables consist of four tables. Each table corresponds to a different group member's possible payoffs, as explained below.

1. **Member A**

Member A's payoffs depend on the combination of **Member A's** choice and **Member B's** choice. Given the above payoff tables, if Member A chooses a and Member B chooses d, Member A will earn 10 ESC. If instead Member B chooses e, Member A will earn 4 ESC.

Member A's Payoffs

Member A's Choices \ Member B's Choices	d	e	f
a	10	4	16
b	20	8	0
c	4	18	12

2. **Member B**

Member B's payoffs depend on the combination of **Member B's** choice and **Member C's** choice. Given the above payoff tables, if Member B chooses e and Member C chooses h, Member B will earn 12 ESC. If instead Member C chooses i, Member B will earn 8 ESC.

Member B's Payoffs

Member B's Choices \ Member C's Choices	g	h	i
d	12	16	4
e	0	12	8
f	4	4	20

3. Member C

Member C's payoffs depend on the combination of **Member C's** choice and **Member D's** choice. Given the above payoff tables, if Member C chooses h and Member D chooses k, Member C will earn 8 ESC. If instead Member D chooses j, Member C will earn 6 ESC.

Member C's Payoffs

Member D's Choices

Member C's Choices	j	k	l
g	20	12	8
h	6	8	18
i	0	16	4

4. Member D

Member D's payoffs depend on the combination of **Member D's** choice and **Member A's** choice. Given the above payoff tables, if Member D chooses k and Member A chooses c, Member D will earn 18 ESC. If instead Member A chooses a, Member D will earn 6 ESC.

Member D's Payoffs

Member A's Choices

Member D's Choices	a	b	c
j	10	12	8
k	6	20	18
l	16	4	0

The following table summarizes the alternatives that each member may choose from and whose choices a member's payoff may depend on.

Role	Member A	Member B	Member C	Member D
Alternatives	a, b, c	d, e, f	g, h, i	j, k, l
Payoff Determined by	A and B	B and C	C and D	D and A

The Appearance of Payoff Tables

As previously described, the payoff tables consist of four tables. Your payoffs will always be listed in the **leftmost** table on the screen. Your choice (g, h, or i in the example below) will determine the row of the leftmost table. Depending on your role, the choice of one of the other members (Member D in the example below) in your group, will determine the column of the leftmost table.

Your (Member C's) Payoffs

Member D's Choices

Your (Member C's) Choices	j	k	l
g	12	16	4
h	0	12	8
i	4	4	20

Member D's Payoffs

Member A's Choices

Member D's Choices	a	b	c
j	10	12	8
k	6	20	18
l	16	4	0

Member A's Payoffs

Member B's Choices

Member A's Choices	d	e	f
a	10	4	16
b	20	8	0
c	4	18	12

Member B's Payoffs

Member C's Choices

Member B's Choices	g	h	i
d	20	12	8
e	6	8	18
f	0	16	4

Example: given the above payoff tables, you are assigned as Member C. The payoffs of Member C (you), D, A, and B are listed in the tables from left to right.

The payoffs of the other three members in your group will be listed in the other three tables in order, as summarized in the table below.

Your Role	Member A	Member B	Member C	Member D
Order of Payoff Tables	A/B/C/D	B/C/D/A	C/D/A/B	D/A/B/C

The Members Matched with You and Their Strategies

When you start each new round, you will be grouped with three other participants who are in different roles. The three other participants will be **computers** that are programmed to take the following strategy:

1. The computers aim to earn as much payoff as possible for themselves.
2. A computer believes that every participant will try to earn as much payoff as one can.
3. A computer believes that every participant believes "the computers aim to earn as much payoff as possible for themselves."

Note:

1. A computer's payoff (ESC) will **not** be converted into NT$ to be paid to any human participants.
2. A computer will **not** randomly make a choice among the three alternatives.
3. A computer will **not** know your choice before it makes a choice.

Experiment Procedure

In each round, the payoff tables corresponding to that round will be displayed on the screen. After you have made your choice, you need to click on the button "Confirm." The payoff tables may change from round to round, so you should always look at the payoffs carefully at the beginning of each round.

There is a time limit of 180 seconds for you to make a choice in each round. There will be a counting down clock showing how much time is left for this round. The clock is located on the upper right corner. If you fail to make a decision within the time limit, you will earn 0 in that round.

Note that you will be informed of your payment, the round chosen for payment, what choice you made in that round, and the choices of your matched group-mates only at the end of the experiment. You will not learn any other information about the choices of other participants in the experiment.

At the beginning of the experiment of Part 2, you will be randomly assigned to be either Member A, B, C, or D. Once decided, your role remains the same **throughout Part 2**.

Understanding Questions

There are five understanding questions for you to ensure that you understand the experiment. Note that **your answers to the understanding questions do not affect your final payment.** Raise your hand if you have any questions about the experiment or understanding questions; the experimenter will come and answer them.

The Experiment Starts

The experiment starts now. There are right rounds! Note: each round **could** be randomly selected to determine your payment of the experiment; thus, please make your choice carefully.

Part 2—Stage 2

The second stage has eight rounds. Each round concerns a decision situation in which you and the other participants in your group separately and independently make **choices**. Together, your choice and the other participants' choices determine your payoffs in that round.

The rule and procedure of this stage are the same as the previous stage, but **your group members will use a different strategy**, which is described below.

The Members Matched with You and Their Strategies

At this stage, you will not be grouped with computers but **the choice data from human participants in the previous stage**. Specifically, the experimenter will randomly draw three human participants and adopt their choices in the previous stage as your group members' choices.

Note:

1. The human participants matched with you will **not** receive additional payoff or incur any cost for your choice.
2. The human participants matched with you will **not** actually interact with you. Their choices have been confirmed in Stage 1.
3. The human participants matched with you will **not** be the previous you. They will be randomly drawn from the other human participants with equal probabilities.
4. The human participants matched with you confronted the **same** payoff tables as you did in Stage 1, but in **different** roles.
5. The human participants matched with you will be drawn **only** from the corresponding members' data.
   (For example, if you are Member A, then the experimenter will randomly draw a human Member B, a human Member C, and a human Member D, using their choices in Stage 1 as your matched Member B, Member C, and Member D's choices.)

There is a time limit of 180 seconds for you to make a choice in each round. There will be a counting down clock showing how much time is left for this game. The clock is located on the upper right corner. If you fail to make a decision within the time limit, you will earn 0 in that round.

Understanding Questions

There are six understanding questions for you to ensure that you understand the experiment. Note that **your answers to the understanding questions do not affect your final payment.** Raise your hand if you have any questions about the experiment or understanding questions; the experimenter will come and answer them.

The Experiment Starts

The experiment starts now. There are right rounds! Note: each round **could** be randomly selected to determine your payment of the experiment; thus, please make your choice carefully.

Part 3

Part 3 consists of two stages. Each stage includes three rounds. Each round involves two participants. At the end of the experiment, one round in Part 3 will be randomly selected to determine your payment from this part. Any of the rounds could be the one selected, so you should treat each round like it will be the one determining your payment.

Part 3—Stage 1

The first stage has three rounds. Each round concerns a decision situation in which you and the other participant matched with you separately and independently make **guesses**. Together, your guess and the other participant's guess determine your payoffs in this round.

The Rules of the Decision Situation

In each round, you will choose one integer between 1 and 100, called your guess. The participant with whom you are matched will also make a guess, choosing one integer between 1 and 100. In addition, you and the participant with whom you are matched will be assigned a number $p$in each round. Your payoff will depend on your guess, the guess of the other participant with whom you are matched, and the number p. The payoff is calculated based on the following formula:

$$\text{Your payoff} = 0.2 \times (100 - |\text{Your guess} - \text{The guess of the other participant with whom you are matched} \times p|)$$

The Payoff Formula

In each round, we measure how close your guess is to "the guess of the other participant with whom you are matched $\times\, p$." . For example, if the other participant's guess was 80 and the p = 4/5, then we measure how close your guess is to 80 × 4/5 = 64. If you guessed 70 then the absolute difference between your guess and 64 was 6. We call this number (6) the **error** in your guess.

The error in the other participant's guess will also be calculated. In the above example, the other participant's error is equal to 80 – (70 × 4/5) = 24.

You will be paid based on how small your error is, and smaller errors mean larger payoffs. When payoffs are calculated, only the (absolute) error matters, not "the other participant's guess × p" is greater or less than your guess.

If your error is some number E, then your payoff in ESC will be 0.2 × (100 – E). In the above example your error was 6. Therefore, you would earn 0.2 × (100 – 6) = 18.8 ESC; the other participant's error was 24, so he would earn 0.2 × (100 – 24) = 15.2 ESC. The error ranges between 0 and 100, so your maximum payoff in one round is 20 ESC and your minimum payoff is 0 ESC.

The Members Matched with You and Their Strategies

When you start each new round, you will be matched with another participant. The other participant will be a **computer** that is programmed to take the following strategy:

1. The computer aims to earn as much payoff as possible for itself.
2. The computer believes that every participant will try to earn as much payoff as one can.
3. The computer believes that every participant believes "the computer aims to earn as much payoff as possible for itself."

Note:

1. A computer's payoff (ESC) will **not** be converted into NT$ to be paid to any human participants.
2. A computer will **not** randomly guess an integer between 1 and 100.
3. A computer will **not** know your choice before it makes a choice.

Experiment Procedure

In each round, the number *p* corresponding to that round (and the payoff formula) will be displayed on the screen. After you have made your guess, you need to click on the button "Confirm." The number *p* may change from round to round, so you should always look at the number *p* carefully at the beginning of each round.

There is a time limit of 180 seconds for you to make choice in each round. There will be a counting down clock showing how much time is left for this round. The clock is located on the upper right corner. If you fail to make a decision within the time limit, you will earn 0 in that round.

Understanding Questions

There are three understanding questions for you to ensure that you understand the experiment. Note that **your answers to the understanding questions do not affect your final payment.** Raise your hand if you have any questions about the experiment or understanding questions; the experimenter will come and answer them.

The Experiment Starts

The experiment starts now. There are three rounds! Note: each round **could** be randomly selected to determine your payment of the experiment; thus, please make your choice carefully.

Part 3—Stage 2

The second stage has three rounds. Each round concerns a decision situation in which you and the other participant matched with you separately and independently make guesses. Together, your guess and the other participant's guess determine your payoffs in this round.

The rule and procedure of this stage are the same as the previous stage, but **your matched member will use a different strategy**, which is described below.

The Members Matched with You and Their Strategies

At this stage, you will not be matched with a computer but **the choice data from a human participant in the previous stage**. Specifically, the experimenter will randomly draw a human participant and adopt his/her guesses in the previous stage as your matched member's guesses.

Note:

1. The human participant matched with you will **not** receive additional payoff or incur any cost for your choice.
2. The human participant matched with you will **not** actually interact with you. His/Her guesses have been confirmed in Stage 1.
3. The human participant matched with you will **not** be the previous you. He/She will be randomly drawn from the other human participants with equal probabilities.
4. The human participant matched with you confronted the **same** p as you did in Stage 1.

There is a time limit of 180 seconds for you to make a choice in each round. There will be a counting down clock showing how much time is left for this game. The clock is located on the upper right corner. If you fail to make a decision within the time limit, you will earn 0 in that round.

Understanding Questions

There are four understanding questions for you to ensure that you understand the experiment. Note that **your answers to the understanding questions do not affect your final payment.** Raise your hand if you have any questions about the experiment or understanding questions; the experimenter will come and answer them.

The Experiment Starts

The experiment starts now. There are three rounds! Note: each round **could** be randomly selected to determine your payment of the experiment; thus, please make your choice carefully.

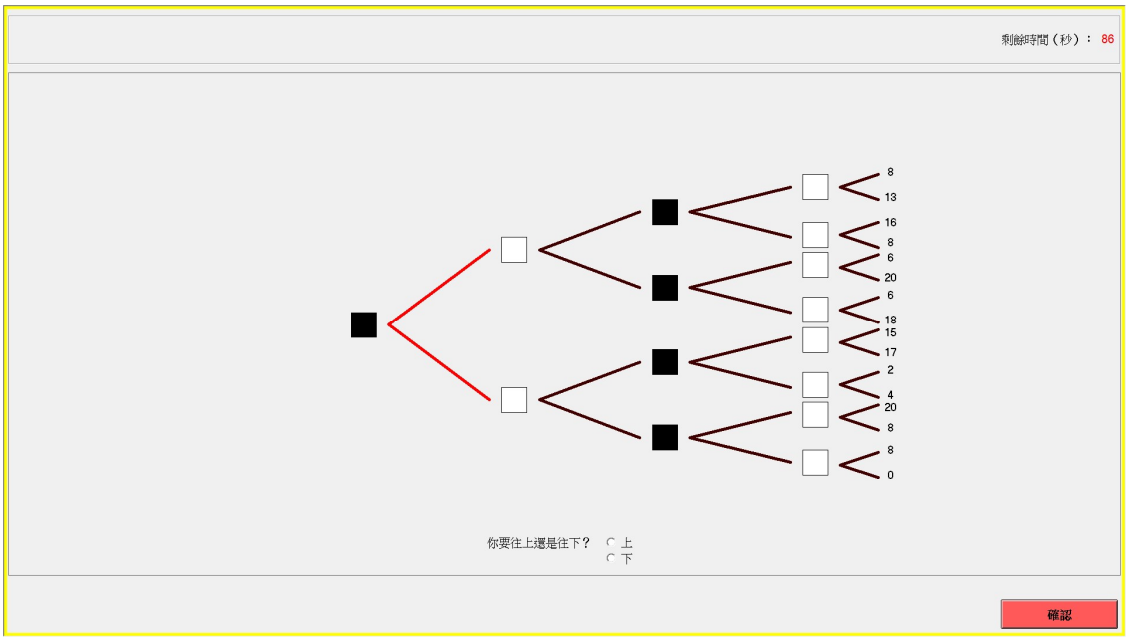
Part 4

This section concerns a **tree diagram**. This tree diagram is a short sequence of decisions to be taken by you, interlaced with moves taken by **Nature**. Nature is a random device, whose behavior will be explained below. Each sequence of decisions by you and moves by Nature leads to a payoff (ESC) for Part 4.

The Tree Diagram

The tree diagram is characterized by a sequence of **decision nodes (black squares)** and **chance nodes (white squares)**. At each node there are two subsequent paths to follow: Up and Down. At each decision node **you** will have to take a decision - in each case whether to go Up or Down. At each chance node **Nature** will determine whether Up or Down is chosen. Nature operates in a totally random way, so that Up and Down are equally likely and independent of any past moves either by you or Nature.

In total you will go through **two** decision nodes and **two** chance nodes in the following order: decision, chance, decision, chance. After the final chance node is played out by Nature you will arrive at an **end node**. As shown in the screenshot below, each end node has associated with it a payoff (ESC).

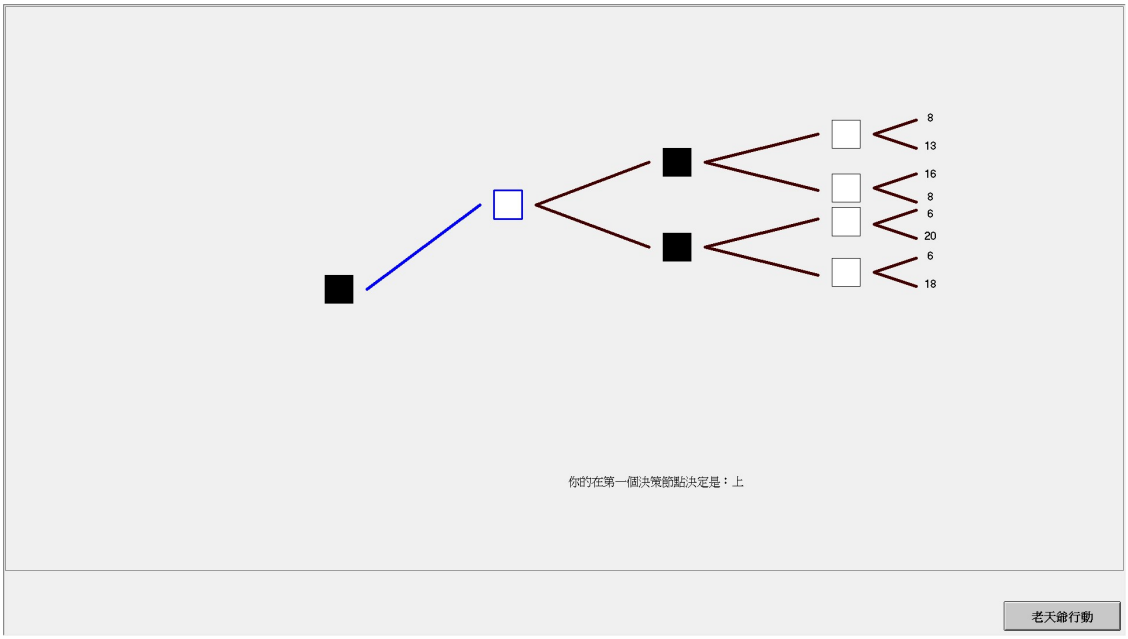


Experiment Procedure

The tree diagram will be displayed on the screen (as shown in the screenshot above). You should carefully study the tree diagram and the various possible end (payoff) nodes. You will end up at one of these payoff nodes. You will then be invited to work through the tree, starting at the left-hand node (a decision node).

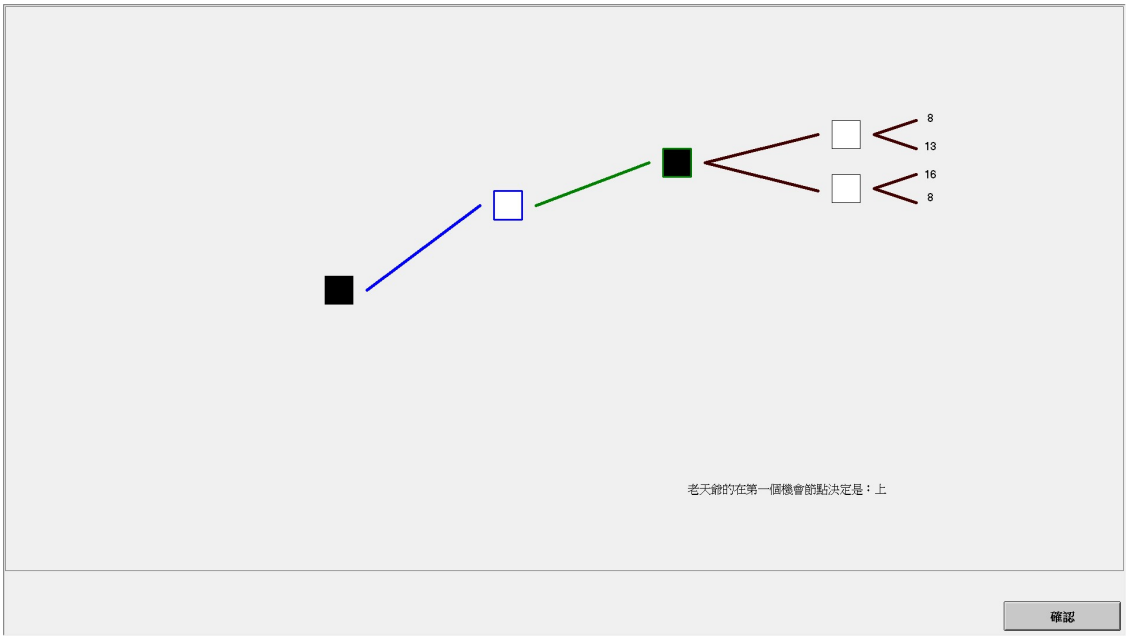
The Decision Node

At each decision node, please indicate whether you want to move Up or Down using the buttons at the bottom and then click on the button “Confirm.” Your decision will then be implemented, with the part of the tree that your decision has excluded being removed to indicate that that part is no longer available. As shown in the screenshot below, if you choose to move Up in the previous figure, then the bottom half of the tree diagram will be removed.



The Chance Node

At each chance node, please click on the button “Nature Move.” You will then be told the move by Nature, and it will be implemented, with the part of the tree that Nature’s move has excluded begin removed to indicate that it is no longer available. As shown in the screenshot below, if Nature chooses to move Up, then the bottom half of the remaining tree diagram will be removed.



Payoff Calculation

The last node will be a chance node. After the final move by Nature, you will see that only one end (payoff) node remains available. This is the payoff you receive for Part 4.

There is a time limit of 180 seconds for you to make a choice in each round. There will be a counting down clock showing how much time is left for this game. The clock is located on the upper right corner. If you fail to make a decision within the time limit, you will earn 0 in that round.

Raise your hand if you have any questions; the experimenter will come and answer them.

Understanding Questions

There are three understanding questions for you to ensure that you understand the experiment. Note that **your answers to the understanding questions do not affect your final payment.** Raise your hand if you have any questions about the experiment or understanding questions; the experimenter will come and answer them.

The Experiment Starts

The experiment starts now. Please make your decision carefully.