Instructions for Laboratory Experiment

Instructions for Player 1 – Public Treatment

Please read carefully and raise your hand if you have any questions. All questions will be answered privately.

General Rules

Welcome and thank you for participating in the experiment today. Independent of your performance in the experiment, you automatically earned **100 pesos** for participating.

You will have 17 minutes to read the instructions. While reading the instructions, you will have the opportunity to familiarize yourself with the software. None of the decisions you make in this phase will count toward your earnings. After 12 minutes, you will be asked to complete a quiz. The quiz has 4 questions and all the answers can be found in the instructions. For every correct answer you will gain 2 peso. You will not lose pesos for any incorrect or incomplete answer. You will have 5 minutes to complete the quiz.

Quiz: After you answered all the questions of the quiz, press SEND ANSWERS, otherwise your answers will NOT be sent. After 5 MINUTES, you will not be able to send your answers anymore and the quiz will be considered incomplete and you will receive zero pesos.

We will pay 100 pesos plus your earnings from the quiz regardless of anything else that happens in the experiment. In addition to this, you will also be given 80 pesos. You will have an opportunity to either double the 80 pesos or lose it based on your performance in the tasks described below. All your earnings will be paid to you in CASH at the end of the experiment. If you double the 80 pesos, your earnings will be:

$$\boldsymbol{Final\ earnings = 100\ pesos\ +\ Earnings\ from\ the\ quiz\ + 160\ pesos}$$

If you lose the 80 pesos, your earnings will be:

$$\boldsymbol{Final\ earnings = 100\ pesos\ +\ Earnings\ from\ the\ quiz}$$

The information displayed on your computer screen is private. Please do not talk with other participants, attempt to communicate, or look at other participants' computer screens at any time during the session. Your cooperation is extremely important to guarantee that the data collected is accurate.

Please turn off your cellphones before the experiment begins.

Description of the Experiment

Subjects in this experiment are randomly assigned one of three roles: ***Player1***, ***Player2***, or ***Player3***.

You are *Player1*

Your role will remain fixed for the entire duration of the experiment, as will the roles of the other players.

At the beginning of the experiment, you will be randomly and anonymously matched with two other subjects, one in the role of ***Player2***, and the other one in the role of ***Player3***. You will be matched with these two subjects for the duration of the experiment. You will then play a game several times. Each time you play a game, the game will have **30 periods**.

Payment: In each period of each game, you will be given a task. The computer will record your performance in this task in each period of every game. At the end of the experiment, the computer will randomly select **ONE** period of **ONE** game to determine your final earnings. Whether the 80 pesos will be doubled or lost will depend on your performance in this randomly chosen period and an element of luck, as described below.

THE GAME: There are two urns each containing 3 balls. The ***ORANGE*** urn contains **2 orange** balls and **1 purple** ball, while the ***PURPLE*** urn contains **1 orange** ball and **2 purple** balls.

At the beginning of each game, the computer *secretly* selects one of the two urns with equal probability. That is, each urn is equally likely to be selected. **No player observes which urn was selected.**

In each period of the game, the computer randomly draws a ball from the selected urn. After the ball is drawn, it is revealed to you and the players you are matched with (***Player2*** and ***Player3***). You and the players you are matched with all observe the same ball color (orange or purple) in every period.

The ball is reinserted in the urn after each draw so that the composition of the secret urn is always the same at the beginning of each period. After 30 periods, the game is over and a new game begins. The computer randomly selects a new secret urn at the start of each new game.

Task: In each period, every player is assigned a task which depends on the player's role. As ***Player1***, your task is to bet on the color of the secret urn.

The tasks of ***Player2*** and ***Player3*** are irrelevant for your own task and will not affect your additional earnings in any way. For this reason, we will not describe ***Player2***'s and ***Player3***'s task to you.

More precisely, as ***Player1***, you are asked to pick a number $\boldsymbol{N_1}$ between 0 and 1 (inclusive), in increments of 0.01. Your choice determines your penalty index on the task according to the following formula:

$$\boldsymbol{PenaltyIndex} = (\boldsymbol{N_1} - \boldsymbol{Z})^2$$

where $\boldsymbol{Z}$ = 1 if the computer selected the ***ORANGE*** urn, and $\boldsymbol{Z}$ = 0 if the computer selected the ***PURPLE*** urn. The closer your guess is to the color of the secret urn, the lower your penalty index will be. The next table provides some examples of your penalty index based on the color of the secret urn and possible choices made by you.

Your choice	Secret urn is ***ORANGE*** ($\boldsymbol{Z}$ = 1)	Secret urn is ***PURPLE*** ($\boldsymbol{Z}$ = 0)
0	*1*	*0*
0.10	*0.81*	*0.01*
0.20	*0.64*	*0.04*
0.30	*0.49*	*0.09*
0.40	*0.36*	*0.16*
0.50	*0.25*	*0.25*
0.60	*0.16*	*0.36*
0.70	*0.09*	*0.49*
0.80	*0.04*	*0.64*
0.90	*0.01*	*0.81*
1	*0*	*1*

Recall that none of the players, including you, knows the color of the secret urn.

Also, the penalty index is always a number between 0 and 1.

Important summary information:

- The computer draws a ball at random from the secret urn. The color of the ball is shown to all players, before any player makes his/her choice.
- The ball is re-inserted inside the urn after its color has been shown to all players.
- The same secret urn is used for all the periods of the same game.
- The computer randomly draws a new secret urn at the beginning of each new game.

How your Additional Earnings are Determined

Your additional earnings are determined based on your penalty index in **ONE** randomly chosen period of **ONE** randomly chosen game as follows. The computer randomly selects a number between 0 and 1 (inclusive) such that every number is equally likely to be selected. I.e., it is as likely to choose 0.5 as 0.346567. We refer to this number as the ***PaymentNumber***. The ***PaymentNumber*** is compared to your ***PenaltyIndex*** from the randomly chosen period of the randomly chosen game to determine your final earnings as follows:

If the ***PenaltyIndex*** is less than or equal to the ***PaymentNumber***, the 80 pesos you receive at the beginning are doubled. In this case, your overall earnings will be:

$$\boldsymbol{Final\ earnings = 100\ pesos\ +\ Earnings\ from\ the\ quiz\ + 160}$$

If the ***PenaltyIndex*** is greater than the ***PaymentNumber***, the 80 pesos you receive at the beginning are lost. In this case, your overall earnings will be:

$$\boldsymbol{Final\ earnings = 100\ pesos\ +\ Earnings\ from\ the\ qui}$$

The lower your penalty index is, the higher is your chance of doubling the 80 pesos.

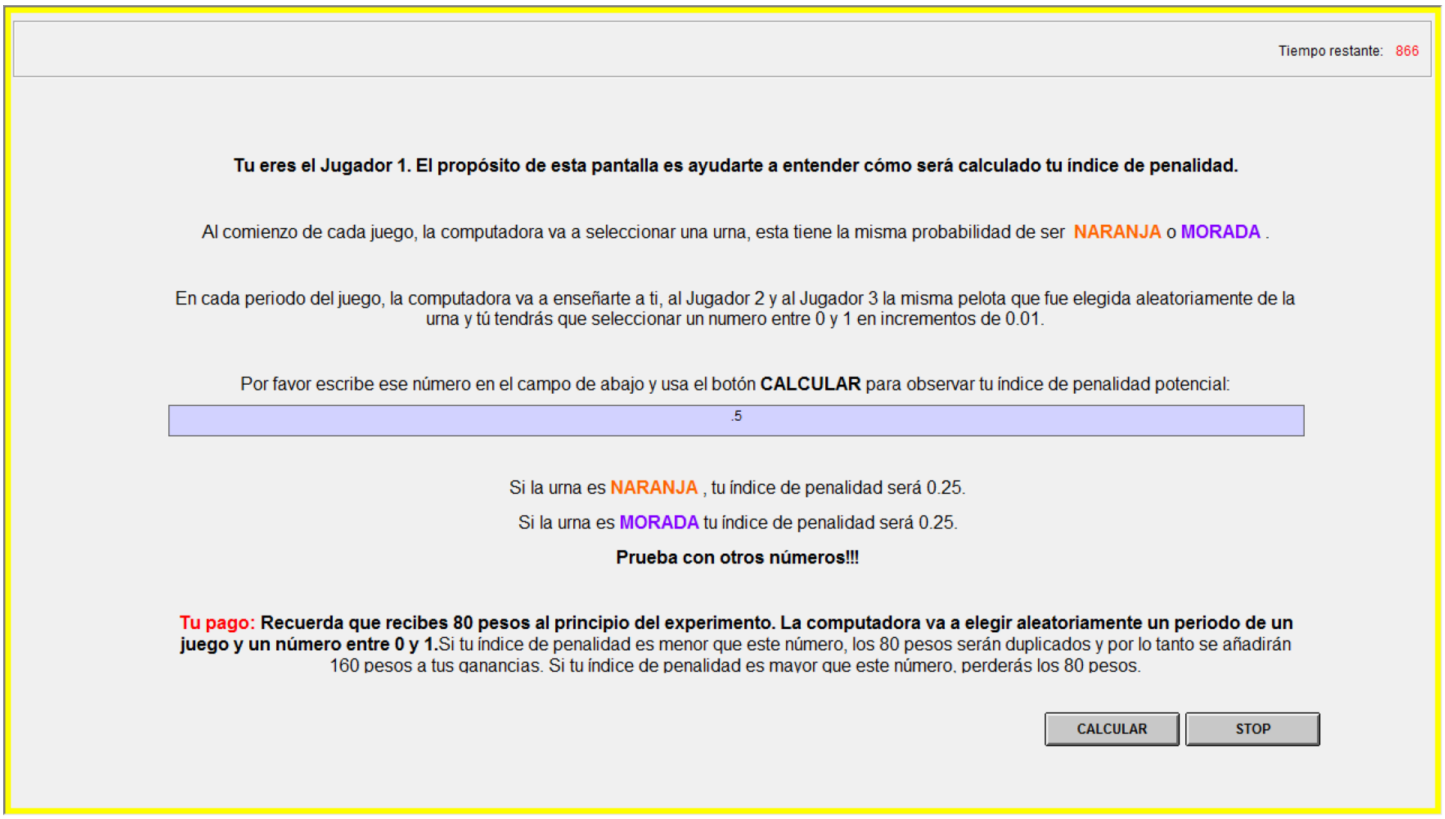
Examples: If your penalty index is zero, you double the 80 pesos with 100% chance.
If your penalty index is 0.25, you double the 80 pesos with 75% chance.
If your penalty index is 0.5, you double the 80 pesos with 50% chance.
If your penalty index is 0.75, you double the 80 pesos with 25% chance.
If your penalty index is 1, you double the 80 pesos with 0% chance.

You can either walk away with 260 pesos (plus your earnings from the quiz) or 100 pesos (plus your earnings from the quiz).

The computer selects a possibly different period and a possibly different *PaymentNumber* for each player.

Practice Before the Experiment: The Calculator

The experiment begins with the following screen.



Recall that the assignment of subjects to roles is random and anonymous. So, no other subject can observe which role you have been assigned to, and similarly you cannot observe which roles any other subject has been assigned to.

Every subject keeps his/her assigned role until the end of the experiment.

This screen allows you to familiarize yourself with the software. You can insert numbers in the calculator and it will display your penalty index given different possible choices of the secret urn by the computer.

You have 12 minutes to play with the calculator, after which you will be asked to complete a quiz.

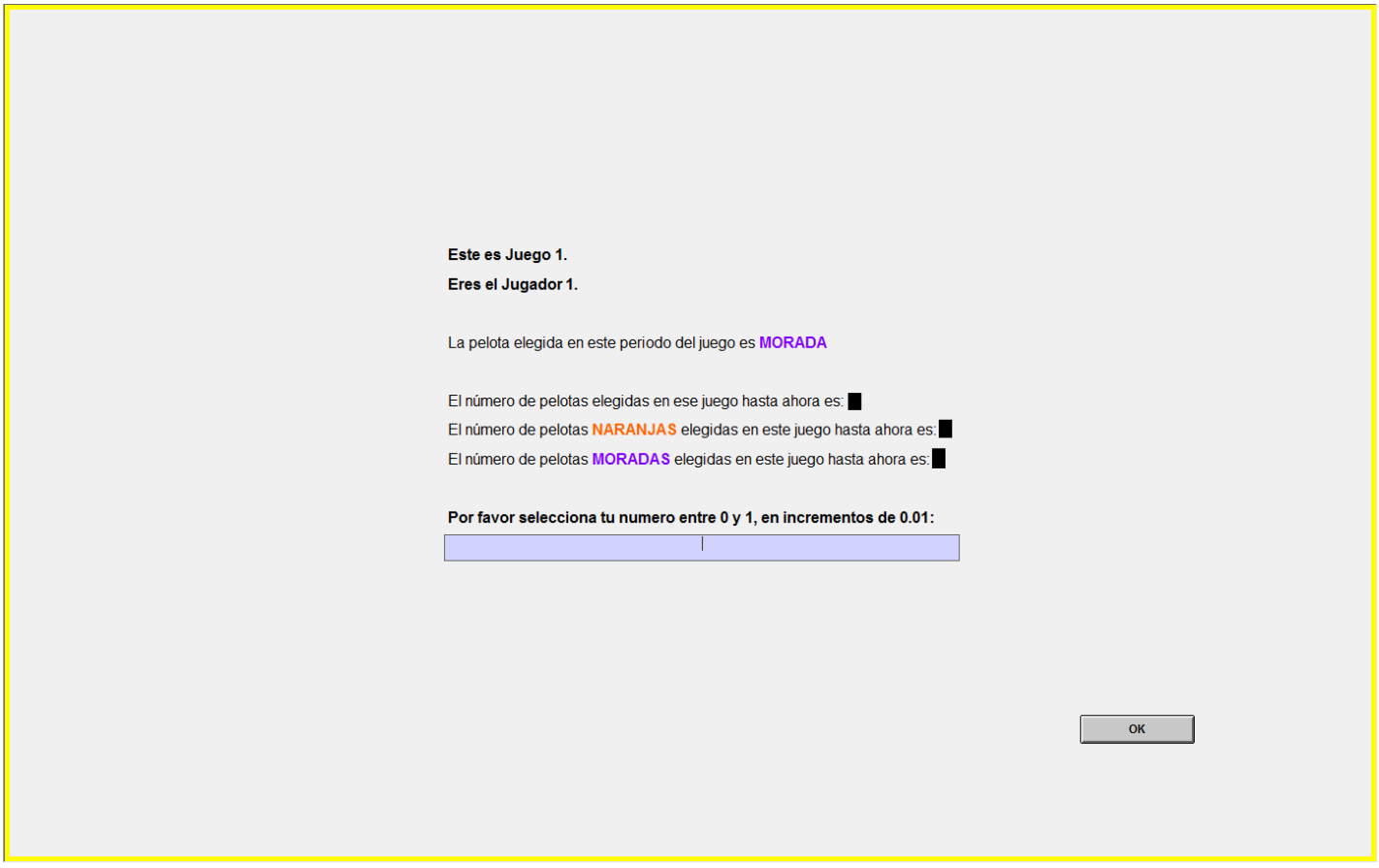
After the quiz, the experiment will begin.

Description of a Game

Recall that at the beginning of a game the computer randomly selects a new secret urn between ***ORANGE*** and ***PURPLE*** so that each earn is equally likely to be selected.

A ball is randomly drawn from the secret urn each period of the game. The color of the ball is shown to <u>all</u> players.

In each period of a game, you see a screen similar to the following one.



The initial screen shows you information about the color of the ball that the computer has drawn from the secret urn for this period. It also reminds you about how many balls of each color have been drawn so far.

For example, suppose that the round is currently in period 8 and the color of the ball drawn for this period is orange. If the history of balls drawn so far is orange, orange, purple, orange, purple, purple, purple the counter displays 4 orange balls (including the current orange ball), and 4 purple balls, for a total of 8 balls.

The screen asks you to choose a number between 0 and 1, in increments of 0.01. After you have entered your number, press OK in order to submit your choice.

The number that you entered will be used to determine your penalty index as previously described, based on the color of the secret urn.

Player2 and ***Player3*** observe a similar screen which reveals the color of the ball that the computer has randomly drawn from the secret urn.

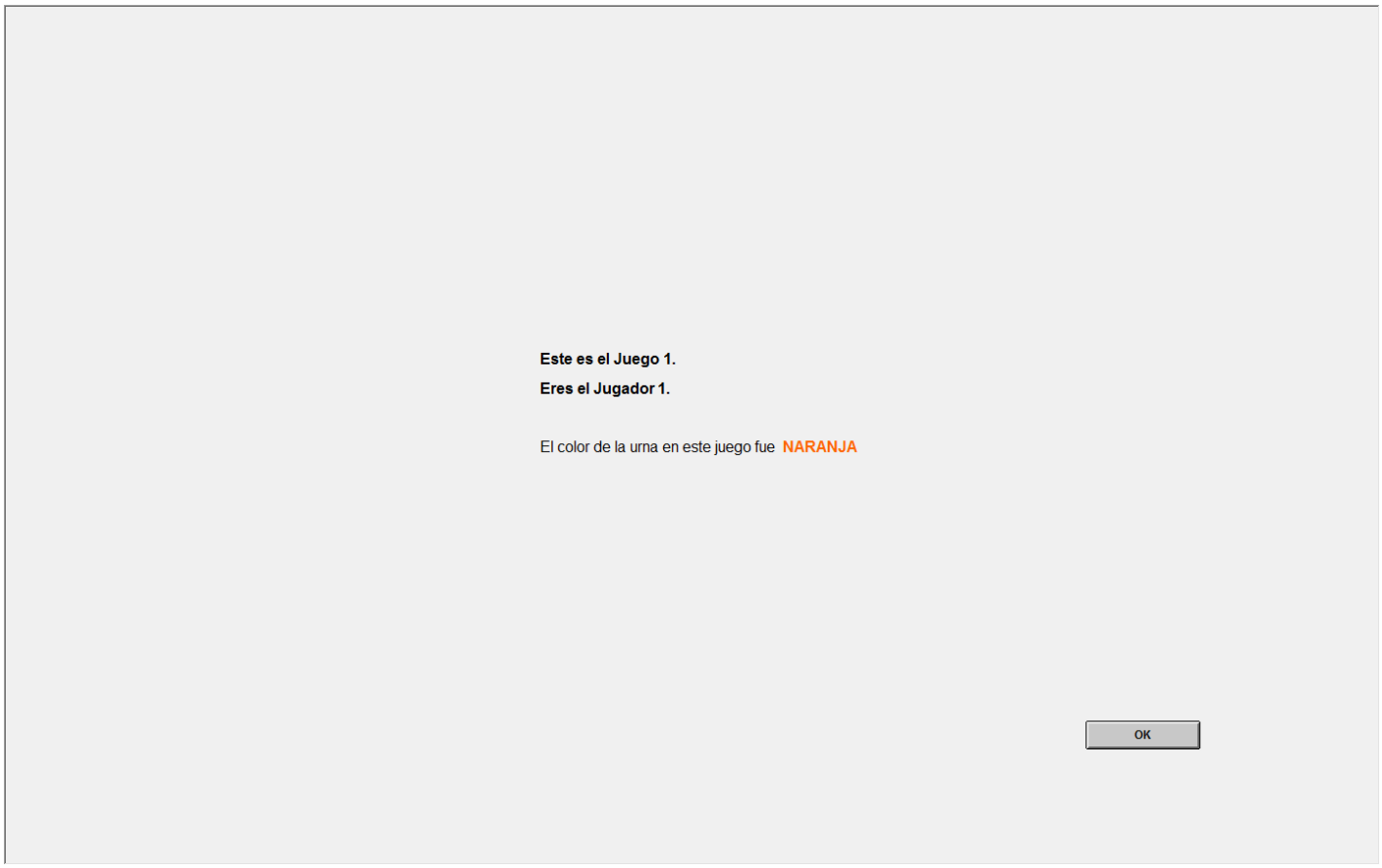
Once all three players have made their choice, the period ends and we proceed to the next period. Recall that a game lasts for 30 periods.

Important: You never observe your penalty index in any of the periods.

Information at the End of a Game

At the end of a game, all players observe a screen which reveals the color of the secret urn. However, you do not observe any information about your, or other players', penalty index in any of the periods.

For you, this screen may look like the following.



Please note that the experiment automatically continues to the next game after 30 SECONDS. If you push the OK button before the time has expired, you will be immediately prompted to the initial screen for the next game.

Instructions for Player 2 – Public Treatment

Please read carefully and raise your hand if you have any questions. All questions will be answered privately.

General Rules

Welcome and thank you for participating in the experiment today. Independent of your performance in the experiment, you automatically earned **100 pesos** for participating.

You will have 17 minutes to read the instructions. While reading the instructions, you will have the opportunity to familiarize yourself with the software. None of the decisions you make in this phase will count toward your earnings. After 12 minutes, you will be asked to complete a quiz. The quiz has 4 questions and all the answers can be found in the instructions. For every correct answer you will gain 2 peso. You will not lose pesos for any incorrect or incomplete answer. You will have 5 minutes to complete the quiz.

Quiz: After you answered all the questions of the quiz, press SEND ANSWERS, otherwise your answers will NOT be sent. After 5 MINUTES, you will not be able to send your answers anymore and the quiz will be considered incomplete and you will receive zero pesos.

We will pay 100 pesos plus your earnings from the quiz regardless of anything else that happens in the experiment. In addition to this, you will also be given 80 pesos. You will have an opportunity to either double the 80 pesos or lose it based on your performance in the tasks described below. All your earnings will be paid to you in CASH at the end of the experiment. If you double the 80 pesos, your earnings will be:

$$\boldsymbol{Final\ earnings = 100\ pesos\ +\ Earnings\ from\ the\ quiz\ + 160\ pesos}$$

If you lose the 80 pesos, your earnings will be:

$$\boldsymbol{Final\ earnings = 100\ pesos\ +\ Earnings\ from\ the\ quiz}$$

The information displayed on your computer screen is private. Please do not talk with other participants, attempt to communicate, or look at other participants' computer screens at any time during the session. Your cooperation is extremely important to guarantee that the data collected is accurate.

Please turn off your cellphones before the experiment begins.

Description of the Experiment

Subjects in this experiment are randomly assigned one of three roles: ***Player1***, ***Player2***, or ***Player3***.

You are *Player2*

Your role will remain fixed for the entire duration of the experiment, as will the roles of the other players.

At the beginning of the experiment, you will be randomly and anonymously matched with two other subjects, one in the role of ***Player1***, and the other one in the role of ***Player3***. You will be matched with these two subjects for the duration of the experiment. You will then play a game with ***Player1*** several times. Each time you play a game, the game will have **30 periods**.

Payment: In each period of each game, you will be given a task. The computer will record your performance in this task in each period of every game. At the end of the experiment, the computer will randomly select **ONE** period of **ONE** game to determine your final earnings. Whether the 80 pesos will be doubled or lost will depend on your performance in this randomly chosen period and an element of luck, as described below.

THE GAME: There are two urns each containing 3 balls. The ***ORANGE*** urn contains **2 orange** balls and **1 purple** ball, while the ***PURPLE*** urn contains **1 orange** ball and **2 purple** balls.

At the beginning of each game, the computer *secretly* selects one of the two urns with equal probability. That is, each urn is equally likely to be selected. **No player observes which urn was selected.**

In each period of the game, the computer randomly draws a ball from the selected urn. After the ball is drawn, it is revealed to you and the players you are matched with (***Player1*** and ***Player3***). You and the players you are matched with all observe the same ball color (orange or purple) in every period.

The ball is reinserted in the urn after each draw so that the composition of the secret urn is always the same at the beginning of each period. After 30 periods, the game is over and a new game begins. The computer randomly selects a new secret urn at the start of each new game.

Task: In each period, every player is assigned a task which depends on the player's role. ***Player1***'s task is to bet on the color of the secret urn. As ***Player2***, your task is to bet on which number ***Player1*** has chosen.

The task of ***Player3*** is irrelevant for your own task and will not affect your additional earnings in any way. For this reason, we will not describe ***Player3***'s task to you.

More precisely:

- ***Player1*** is asked to pick a number N_1 between 0 and 1 (inclusive), in increments of 0.01. ***Player1***'s choice determines his/her penalty index on the task according to the following formula:

$$PenaltyIndex = (N_1 - Z)^2$$

where $Z = 1$ if the computer selected the ***ORANGE*** urn, and $Z = 0$ if the computer selected the ***PURPLE*** urn. The closer ***Player1***'s guess is to the color of the secret urn, the lower ***Player1***'s penalty index will be. The next table provides some examples of penalty index for ***Player1*** based on the color of the secret urn and possible choices made by ***Player1***.

Player1's choice	Secret urn is ***ORANGE*** ($Z = 1$)	Secret urn is ***PURPLE*** ($Z = 0$)
0	*1*	*0*
0.10	*0.81*	*0.01*
0.20	*0.64*	*0.04*
0.30	*0.49*	*0.09*
0.40	*0.36*	*0.16*
0.50	*0.25*	*0.25*
0.60	*0.16*	*0.36*
0.70	*0.09*	*0.49*
0.80	*0.04*	*0.64*
0.90	*0.01*	*0.81*
1	*0*	*1*

- **YOUR TASK:** As ***Player2***, your task is to pick a number N_2 between 0 and 1 (inclusive), in increments of 0.01. Your choice determines your penalty index on the task according to the following formula:

$$PenaltyIndex = (N_2 - N_1)^2$$

where N_1 is the number chosen by ***Player1***. When choosing N_2, you do not know which number N_1 has been chosen by ***Player1***. The closer your guess is to the number chosen by ***Player1***, the lower your penalty index will be. The next table provides some examples of your penalty index based on some possible choices made by both you and ***Player1***.

Your choice \ ***Player1***'s choice	**0**	**0.10**	**0.20**	**0.30**	**0.40**	**0.50**	**0.60**	**0.70**	**0.80**	**0.90**	**1**
0	*0*	*0.01*	*0.04*	*0.09*	*0.16*	*0.25*	*0.36*	*0.49*	*0.64*	*0.81*	*1*
0.10	*0.01*	*0*	*0.01*	*0.04*	*0.09*	*0.16*	*0.25*	*0.36*	*0.49*	*0.64*	*0.81*
0.20	*0.04*	*0.01*	*0*	*0.01*	*0.04*	*0.09*	*0.16*	*0.25*	*0.36*	*0.49*	*0.64*
0.30	*0.09*	*0.04*	*0.01*	*0*	*0.01*	*0.04*	*0.09*	*0.16*	*0.25*	*0.36*	*0.49*
0.40	*0.16*	*0.09*	*0.04*	*0.01*	*0*	*0.01*	*0.04*	*0.09*	*0.16*	*0.25*	*0.36*
0.50	*0.25*	*0.16*	*0.09*	*0.04*	*0.01*	*0*	*0.01*	*0.04*	*0.09*	*0.16*	*0.25*
0.60	*0.36*	*0.25*	*0.16*	*0.09*	*0.04*	*0.01*	*0*	*0.01*	*0.04*	*0.09*	*0.16*
0.70	*0.49*	*0.36*	*0.25*	*0.16*	*0.09*	*0.04*	*0.01*	*0*	*0.01*	*0.04*	*0.09*
0.80	*0.64*	*0.49*	*0.36*	*0.25*	*0.16*	*0.09*	*0.04*	*0.01*	*0*	*0.01*	*0.04*
0.90	*0.81*	*0.64*	*0.49*	*0.36*	*0.25*	*0.16*	*0.09*	*0.04*	*0.01*	*0*	*0.01*
1	*1*	*0.81*	*0.64*	*0.49*	*0.36*	*0.25*	*0.16*	*0.09*	*0.04*	*0.01*	*0*

Recall that none of the players, including you, knows the color of the secret urn.

Also, the penalty index is always a number between 0 and 1.

Important summary information:

- ***Player1*** does not observe N_2.
- ***You*** do not observe N_1.
- The computer draws a ball at random from the secret urn. The color of the ball is shown to all players, before any player makes his/her choice.
- The ball is re-inserted inside the urn after its color has been shown to all players.
- The same secret urn is used for all the periods of the same game.
- The computer randomly draws a new secret urn at the beginning of each new game.

How your Additional Earnings are Determined

Your additional earnings are determined based on your penalty index in **ONE** randomly chosen period of **ONE** randomly chosen game as follows. The computer randomly selects a number between 0 and 1 (inclusive) such that every number is equally likely to be selected. I.e., it is as likely to choose 0.5 as 0.346567. We refer to this number as the ***PaymentNumber***. The ***PaymentNumber*** is compared to your ***PenaltyIndex*** from the randomly chosen period of the randomly chosen game to determine your final earnings as follows:

If the ***PenaltyIndex*** is less than or equal to the ***PaymentNumber***, the 80 pesos you receive at the beginning are doubled. In this case, your overall earnings will be:

$$\boldsymbol{Final\ earnings = 100\ pesos\ +\ Earnings\ from\ the\ quiz\ + 160}$$

If the ***PenaltyIndex*** is greater than the ***PaymentNumber***, the 80 pesos you receive at the beginning are lost. In this case, your overall earnings will be:

$$\boldsymbol{Final\ earnings = 100\ pesos\ +\ Earnings\ from\ the\ qui}$$

The lower your penalty index is, the higher is your chance of doubling the 80 pesos.

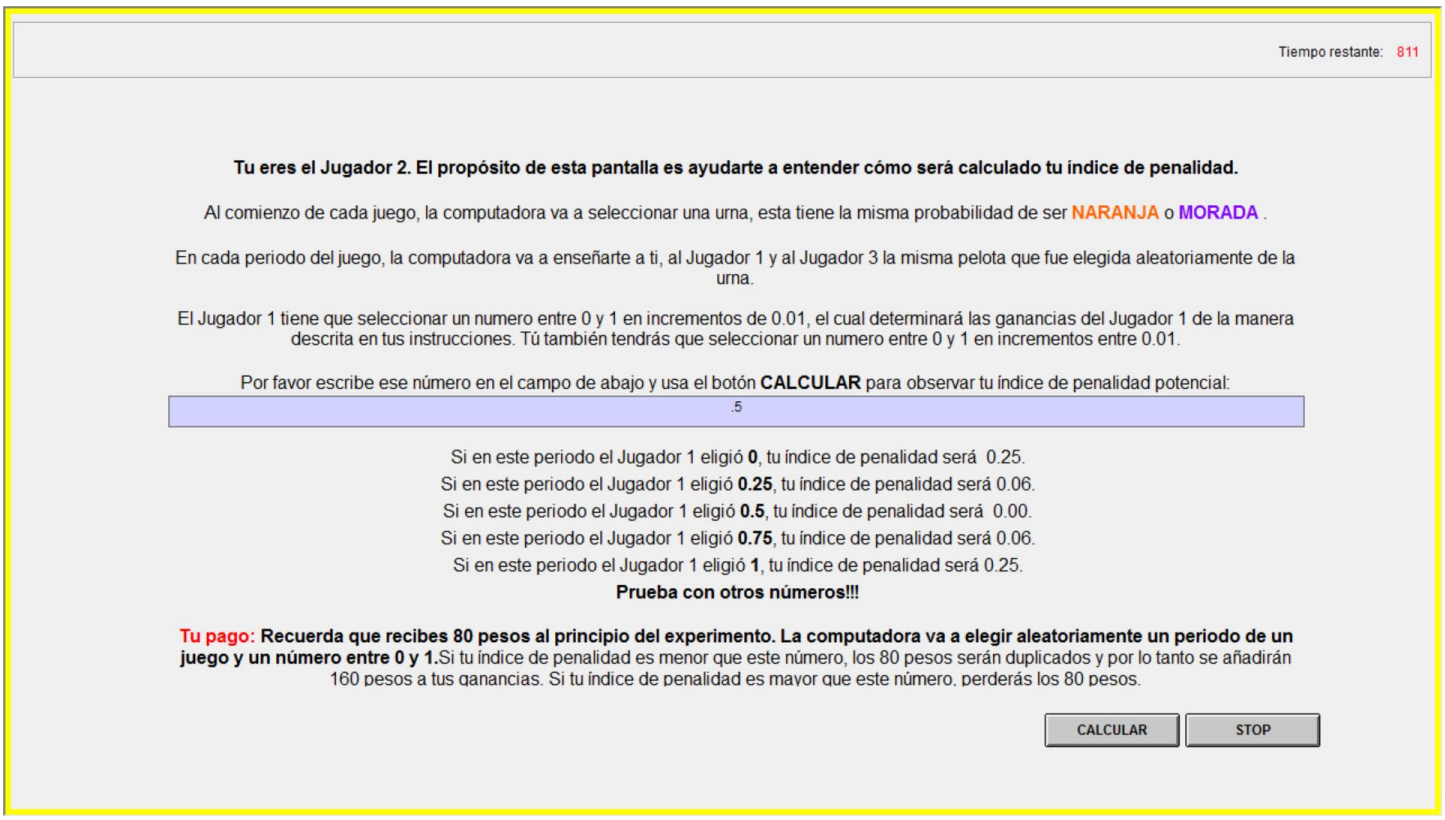
Examples: If your penalty index is zero, you double the 80 pesos with 100% chance.
If your penalty index is 0.25, you double the 80 pesos with 75% chance.
If your penalty index is 0.5, you double the 80 pesos with 50% chance.
If your penalty index is 0.75, you double the 80 pesos with 25% chance.
If your penalty index is 1, you double the 80 pesos with 0% chance.

You can either walk away with 260 pesos (plus your earnings from the quiz) or 100 pesos (plus your earnings from the quiz).

The computer selects a possibly different period and a possibly different *PaymentNumber* for each player.

Practice Before the Experiment: The Calculator

The experiment begins with the following screen.



Recall that the assignment of subjects to roles is random and anonymous. So, no other subject can observe which role you have been assigned to, and similarly you cannot observe which roles any other subject has been assigned to.

Every subject keeps his/her assigned role until the end of the experiment.

This screen allows you to familiarize yourself with the software. You can insert numbers in the calculator and it will display your penalty index given different possible choices of ***Player1***. These choices are just meant to explain how the software works and in no way reflect the choices that the subject in the role of ***Player1*** could be making during the experiment.

You have 12 minutes to play with the calculator, after which you will be asked to complete a quiz.

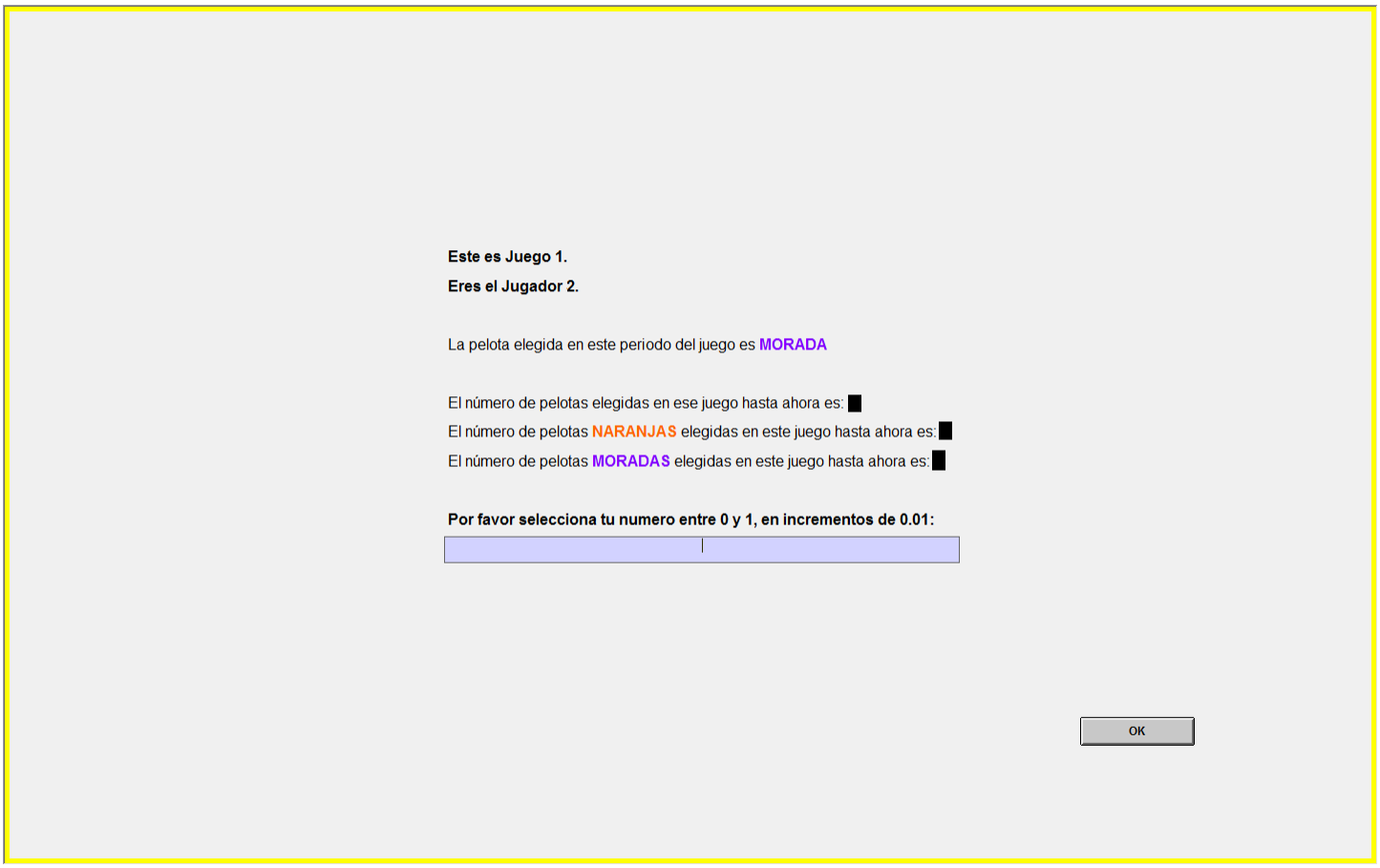
After the quiz, the experiment will begin.

Description of a Game

Recall that at the beginning of a game the computer randomly selects a new secret urn between ***ORANGE*** and ***PURPLE*** so that each earn is equally likely to be selected.

A ball is randomly drawn from the secret urn each period of the game. The color of the ball is shown to all players.

In each period of a game, you see a screen similar to the following one.



The initial screen shows you information about the color of the ball that the computer has drawn from the secret urn for this period. It also reminds you about how many balls of each color have been drawn so far.

For example, suppose that the round is currently in period 8 and the color of the ball drawn for this period is orange. If the history of balls drawn so far is orange, orange, purple, orange, purple, purple, purple the counter displays 4 orange balls (including the current orange ball), and 4 purple balls, for a total of 8 balls.

The screen asks you to choose a number between 0 and 1, in increments of 0.01. After you have entered your number, press OK in order to submit your choice.

The number that you entered will be used to determine your penalty index as previously described, based on the number chosen by ***Player1***.

Player1 and ***Player3*** observe a similar screen which reveals the color of the ball that the computer has randomly drawn from the secret urn.

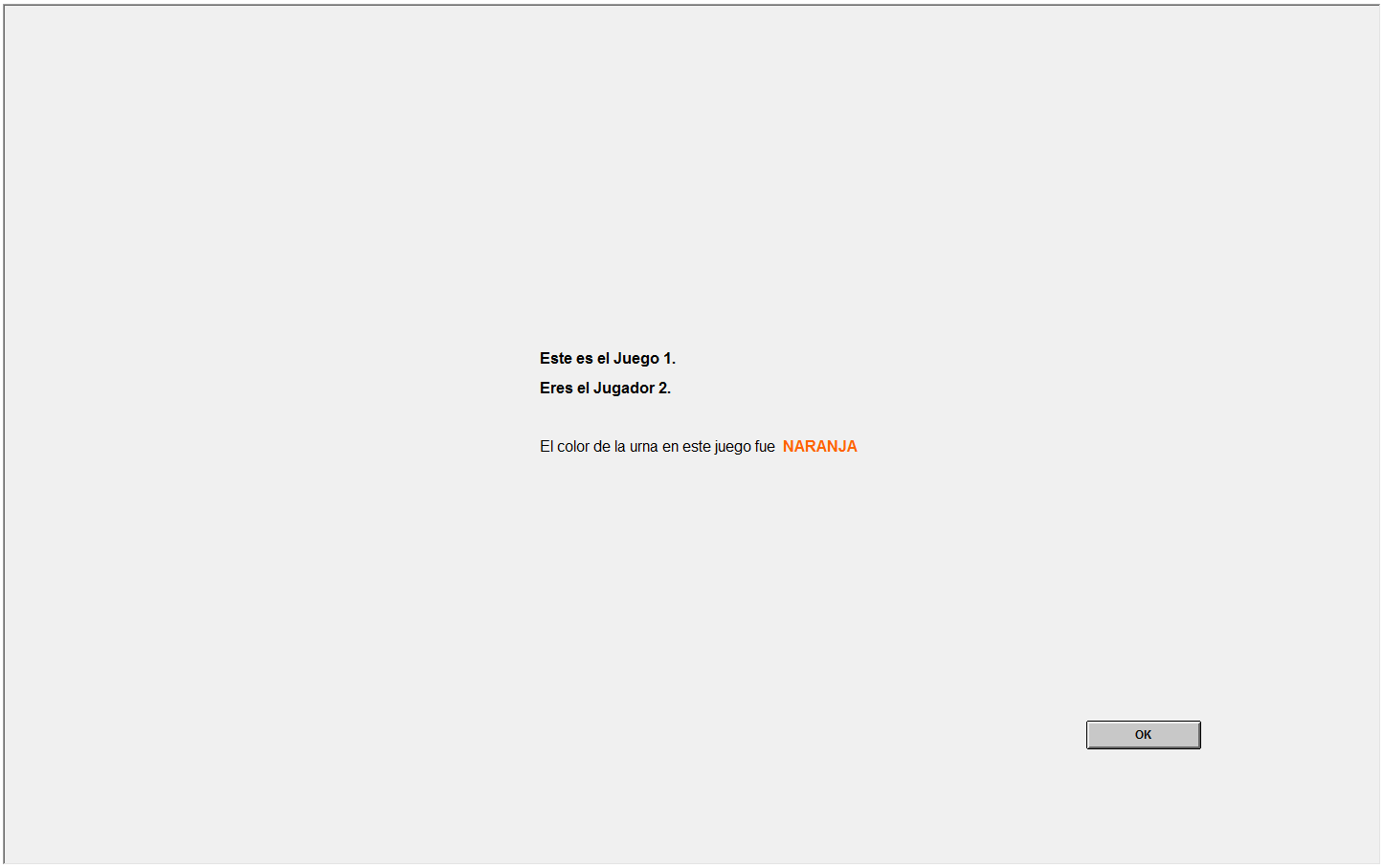
Once all three players have made their choice, the period ends and we proceed to the next period. Recall that a game lasts for 30 periods.

Important: You never observe your penalty index in any of the periods.

Information at the End of a Game

At the end of a game, all players observe a screen which reveals the color of the secret urn. However, you do not observe any information about your, or other players', penalty index in any of the periods.

For you, this screen may look like the following.



Please note that the experiment automatically continues to the next game after 30 SECONDS. If you push the OK button before the time has expired, you will be immediately prompted to the initial screen for the next game.

Instructions for Player 3 – Public Treatment

Please read carefully and raise your hand if you have any questions. All questions will be answered privately.

General Rules

Welcome and thank you for participating in the experiment today. Independent of your performance in the experiment, you automatically earned **100 pesos** for participating.

You will have 17 minutes to read the instructions. While reading the instructions, you will have the opportunity to familiarize yourself with the software. None of the decisions you make in this phase will count toward your earnings. After 12 minutes, you will be asked to complete a quiz. The quiz has 4 questions and all the answers can be found in the instructions. For every correct answer you will gain 2 peso. You will not lose pesos for any incorrect or incomplete answer. You will have 5 minutes to complete the quiz.

Quiz: After you answered all the questions of the quiz, press SEND ANSWERS, otherwise your answers will NOT be sent. After 5 MINUTES, you will not be able to send your answers anymore and the quiz will be considered incomplete and you will receive zero pesos.

We will pay 100 pesos plus your earnings from the quiz regardless of anything else that happens in the experiment. In addition to this, you will also be given 80 pesos. You will have an opportunity to either double the 80 pesos or lose it based on your performance in the tasks described below. All your earnings will be paid to you in CASH at the end of the experiment. If you double the 80 pesos, your earnings will be:

$$\boldsymbol{Final\ earnings = 100\ pesos\ +\ Earnings\ from\ the\ quiz\ + 160\ pesos}$$

If you lose the 80 pesos, your earnings will be:

$$\boldsymbol{Final\ earnings = 100\ pesos\ +\ Earnings\ from\ the\ quiz}$$

The information displayed on your computer screen is private. Please do not talk with other participants, attempt to communicate, or look at other participants' computer screens at any time during the session. Your cooperation is extremely important to guarantee that the data collected is accurate.

Please turn off your cellphones before the experiment begins.

Description of the Experiment

Subjects in this experiment are randomly assigned one of three roles: ***Player1***, ***Player2***, or ***Player3***.

You are *Player3*

Your role will remain fixed for the entire duration of the experiment, as will the roles of the other players.

At the beginning of the experiment, you will be randomly and anonymously matched with two other subjects, one in the role of ***Player1***, and the other one in the role of ***Player2***. You will be matched with these two subjects for the duration of the experiment. You will then play a game with ***Player1*** and ***Player2*** several times. Each time you play a game, the game will have **30 periods**.

Payment: In each period of each game, you will be given a task. The computer will record your performance in this task in each period of every game. At the end of the experiment, the computer will randomly select **ONE** period of **ONE** game to determine your final earnings. Whether the 80 pesos will be doubled or lost will depend on your performance in this randomly chosen period and an element of luck, as described below.

THE GAME: There are two urns each containing 3 balls. The ***ORANGE*** urn contains **2 orange** balls and **1 purple** ball, while the ***PURPLE*** urn contains **1 orange** ball and **2 purple** balls.

At the beginning of each game, the computer *secretly* selects one of the two urns with equal probability. That is, each urn is equally likely to be selected. **No player observes which urn was selected.**

In each period of the game, the computer randomly draws a ball from the selected urn. After the ball is drawn, it is revealed to you and the players you are matched with (***Player1*** and ***Player2***). You and the players you are matched with all observe the same ball color (orange or purple) in every period.

The ball is reinserted in the urn after each draw so that the composition of the secret urn is always the same at the beginning of each period. After 30 periods, the game is over and a new game begins. The computer randomly selects a new secret urn at the start of each new game.

Task: In each period, every player is assigned a task which depends on the player's role. ***Player1***'s task is to bet on the color of the secret urn. ***Player2***'s task is to bet on which number ***Player1*** has chosen. As ***Player3***, your task is to bet on which number ***Player2*** has chosen.

More precisely:

- ***Player1*** is asked to pick a number $\boldsymbol{N_1}$ between 0 and 1 (inclusive), in increments of 0.01. ***Player1***'s choice determines his/her penalty index on the task according to the following formula:

$$\boldsymbol{PenaltyIndex} = (\boldsymbol{N_1} - \boldsymbol{Z})^2$$

  where $\boldsymbol{Z}$ = 1 if the computer selected the ***ORANGE*** urn, and $\boldsymbol{Z}$ = 0 if the computer selected the ***PURPLE*** urn. The closer ***Player1***'s guess is to the color of the secret urn, the lower ***Player1***'s penalty

index will be. The next table provides some examples of penalty index for ***Player1*** based on the color of the secret urn and possible choices made by ***Player1***.

Player1's choice	Secret urn is ***ORANGE*** (Z = 1)	Secret urn is ***PURPLE*** (Z = 0)
0	*1*	*0*
0.10	*0.81*	*0.01*
0.20	*0.64*	*0.04*
0.30	*0.49*	*0.09*
0.40	*0.36*	*0.16*
0.50	*0.25*	*0.25*
0.60	*0.16*	*0.36*
0.70	*0.09*	*0.49*
0.80	*0.04*	*0.64*
0.90	*0.01*	*0.81*
1	*0*	*1*

- ***Player2*** is asked to pick a number N_2 between 0 and 1 (inclusive), in increments of 0.01. ***Player2***'s choice determines his/her penalty index on the task according to the following formula:

$$PenaltyIndex = (N_2 - N_1)^2$$

where N_1 is the number chosen by ***Player1***. When choosing N_2, ***Player2*** does not know which number N_1 has been chosen by ***Player1***. The closer ***Player2*** 's guess is to the number chosen by ***Player1***, the lower ***Player2*** 's penalty index will be. The next table provides some examples of penalty index for ***Player2*** based on some possible choices made by both ***Player1*** and ***Player2***.

Player1's choice

Player2's choice	**0**	**0.10**	**0.20**	**0.30**	**0.40**	**0.50**	**0.60**	**0.70**	**0.80**	**0.90**	**1**
0	*0*	*0.01*	*0.04*	*0.09*	*0.16*	*0.25*	*0.36*	*0.49*	*0.64*	*0.81*	*1*
0.10	*0.01*	*0*	*0.01*	*0.04*	*0.09*	*0.16*	*0.25*	*0.36*	*0.49*	*0.64*	*0.81*
0.20	*0.04*	*0.01*	*0*	*0.01*	*0.04*	*0.09*	*0.16*	*0.25*	*0.36*	*0.49*	*0.64*
0.30	*0.09*	*0.04*	*0.01*	*0*	*0.01*	*0.04*	*0.09*	*0.16*	*0.25*	*0.36*	*0.49*
0.40	*0.16*	*0.09*	*0.04*	*0.01*	*0*	*0.01*	*0.04*	*0.09*	*0.16*	*0.25*	*0.36*
0.50	*0.25*	*0.16*	*0.09*	*0.04*	*0.01*	*0*	*0.01*	*0.04*	*0.09*	*0.16*	*0.25*
0.60	*0.36*	*0.25*	*0.16*	*0.09*	*0.04*	*0.01*	*0*	*0.01*	*0.04*	*0.09*	*0.16*
0.70	*0.49*	*0.36*	*0.25*	*0.16*	*0.09*	*0.04*	*0.01*	*0*	*0.01*	*0.04*	*0.09*
0.80	*0.64*	*0.49*	*0.36*	*0.25*	*0.16*	*0.09*	*0.04*	*0.01*	*0*	*0.01*	*0.04*
0.90	*0.81*	*0.64*	*0.49*	*0.36*	*0.25*	*0.16*	*0.09*	*0.04*	*0.01*	*0*	*0.01*
1	*1*	*0.81*	*0.64*	*0.49*	*0.36*	*0.25*	*0.16*	*0.09*	*0.04*	*0.01*	*0*

- **<u>YOUR TASK</u>:** As ***Player3***, your task is to pick a number N_3 between 0 and 1 (inclusive), in increments of 0.01. Your choice determines your penalty index on the task according to the following formula:

$$PenaltyIndex = (N_3 - N_2)^2$$

where N_2 is the number chosen by ***Player2***. When choosing N_3, you do not know which number N_2 has been chosen by ***Player2***, nor which number N_1 has been chosen by ***Player1***. The closer your guess is to the number chosen by ***Player2***, the lower your penalty index will be. The next table provides some <u>examples</u> of your penalty index based on some possible choices made by both you and ***Player2***.

		Player2's choice									
		0	**0.10**	**0.20**	**0.30**	**0.40**	**0.50**	**0.60**	**0.70**	**0.80**	**0.90**	**1**
Your choice	**0**	*0*	*0.01*	*0.04*	*0.09*	*0.16*	*0.25*	*0.36*	*0.49*	*0.64*	*0.81*	*1*
	0.10	*0.01*	*0*	*0.01*	*0.04*	*0.09*	*0.16*	*0.25*	*0.36*	*0.49*	*0.64*	*0.81*
	0.20	*0.04*	*0.01*	*0*	*0.01*	*0.04*	*0.09*	*0.16*	*0.25*	*0.36*	*0.49*	*0.64*
	0.30	*0.09*	*0.04*	*0.01*	*0*	*0.01*	*0.04*	*0.09*	*0.16*	*0.25*	*0.36*	*0.49*
	0.40	*0.16*	*0.09*	*0.04*	*0.01*	*0*	*0.01*	*0.04*	*0.09*	*0.16*	*0.25*	*0.36*
	0.50	*0.25*	*0.16*	*0.09*	*0.04*	*0.01*	*0*	*0.01*	*0.04*	*0.09*	*0.16*	*0.25*
	0.60	*0.36*	*0.25*	*0.16*	*0.09*	*0.04*	*0.01*	*0*	*0.01*	*0.04*	*0.09*	*0.16*
	0.70	*0.49*	*0.36*	*0.25*	*0.16*	*0.09*	*0.04*	*0.01*	*0*	*0.01*	*0.04*	*0.09*
	0.80	*0.64*	*0.49*	*0.36*	*0.25*	*0.16*	*0.09*	*0.04*	*0.01*	*0*	*0.01*	*0.04*
	0.90	*0.81*	*0.64*	*0.49*	*0.36*	*0.25*	*0.16*	*0.09*	*0.04*	*0.01*	*0*	*0.01*
	1	*1*	*0.81*	*0.64*	*0.49*	*0.36*	*0.25*	*0.16*	*0.09*	*0.04*	*0.01*	*0*

Recall that none of the players, including you, knows the color of the secret urn.

<u>Also, the penalty index is always a number between 0 and 1.</u>

<u>Important summary information</u>:

- ***Player1*** observes neither N_2 nor N_3.
- ***Player2*** observes neither N_1 nor N_3.
- ***You*** observe neither N_1 nor N_2.
- The computer draws a ball at random from the secret urn. The color of the ball is shown to <u>all</u> players, before any player makes his/her choice.
- The ball is re-inserted inside the urn after its color has been shown to all players.
- The <u>same secret urn</u> is used for all the periods of the <u>same</u> game.
- The computer randomly draws a <u>new</u> secret urn at the beginning of each new game.

How your Additional Earnings are Determined

Your additional earnings are determined based on your penalty index in **ONE** randomly chosen period of **ONE** randomly chosen game as follows. The computer randomly selects a number between 0 and 1 (inclusive) such that every number is equally likely to be selected. I.e., it is as likely to choose 0.5 as 0.346567. We refer to this number as the ***PaymentNumber***. The ***PaymentNumber*** is compared to your ***PenaltyIndex*** from the randomly chosen period of the randomly chosen game to determine your final earnings as follows:

If the ***PenaltyIndex*** is less than or equal to the ***PaymentNumber***, the 80 pesos you receive at the beginning are doubled. In this case, your overall earnings will be:

$$\boldsymbol{Final\ earnings = 100\ pesos\ +\ Earnings\ from\ the\ quiz\ + 160}$$

If the ***PenaltyIndex*** is greater than the ***PaymentNumber***, the 80 pesos you receive at the beginning are lost. In this case, your overall earnings will be:

$$\boldsymbol{Final\ earnings = 100\ pesos\ +\ Earnings\ from\ the\ qui}$$

The lower your penalty index is, the higher is your chance of doubling the 80 pesos.

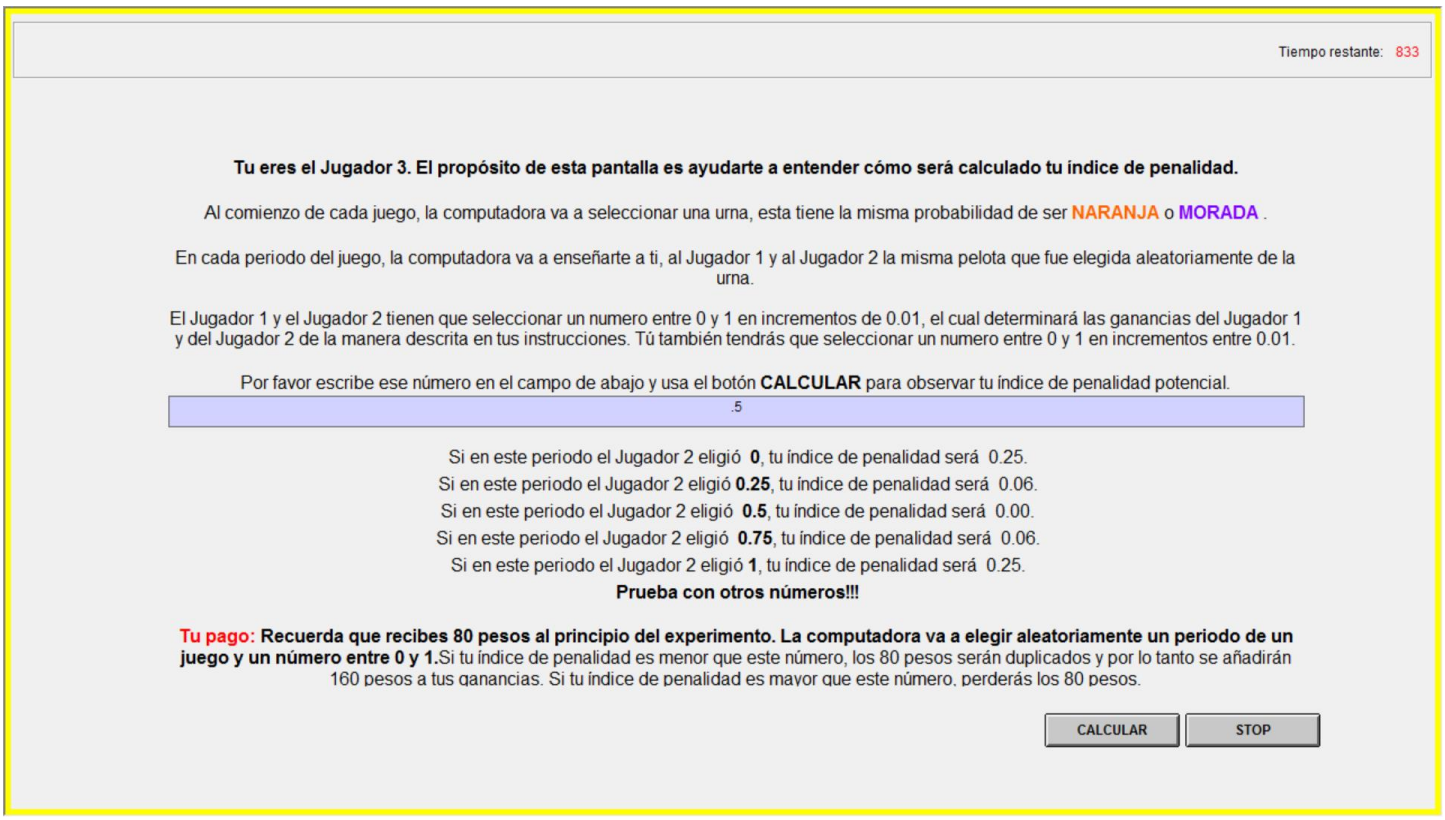
Examples: If your penalty index is zero, you double the 80 pesos with 100% chance.
If your penalty index is 0.25, you double the 80 pesos with 75% chance.
If your penalty index is 0.5, you double the 80 pesos with 50% chance.
If your penalty index is 0.75, you double the 80 pesos with 25% chance.
If your penalty index is 1, you double the 80 pesos with 0% chance.

You can either walk away with 260 pesos (plus your earnings from the quiz) or 100 pesos (plus your earnings from the quiz).

The computer selects a possibly different period and a possibly different *PaymentNumber* for each player.

Practice Before the Experiment: The Calculator

The experiment begins with the following screen.



Recall that the assignment of subjects to roles is random and anonymous. So, no other subject can observe which role you have been assigned to, and similarly you cannot observe which roles any other subject has been assigned to.

Every subject keeps his/her assigned role until the end of the experiment.

This screen allows you to familiarize yourself with the software. You can insert numbers in the calculator and it will display your penalty index given different possible choices of ***Player2***. These choices are just meant to explain how the software works and in no way reflect the choices that the subject in the role of ***Player2*** could be making during the experiment.

You have 12 minutes to play with the calculator, after which you will be asked to complete a quiz.

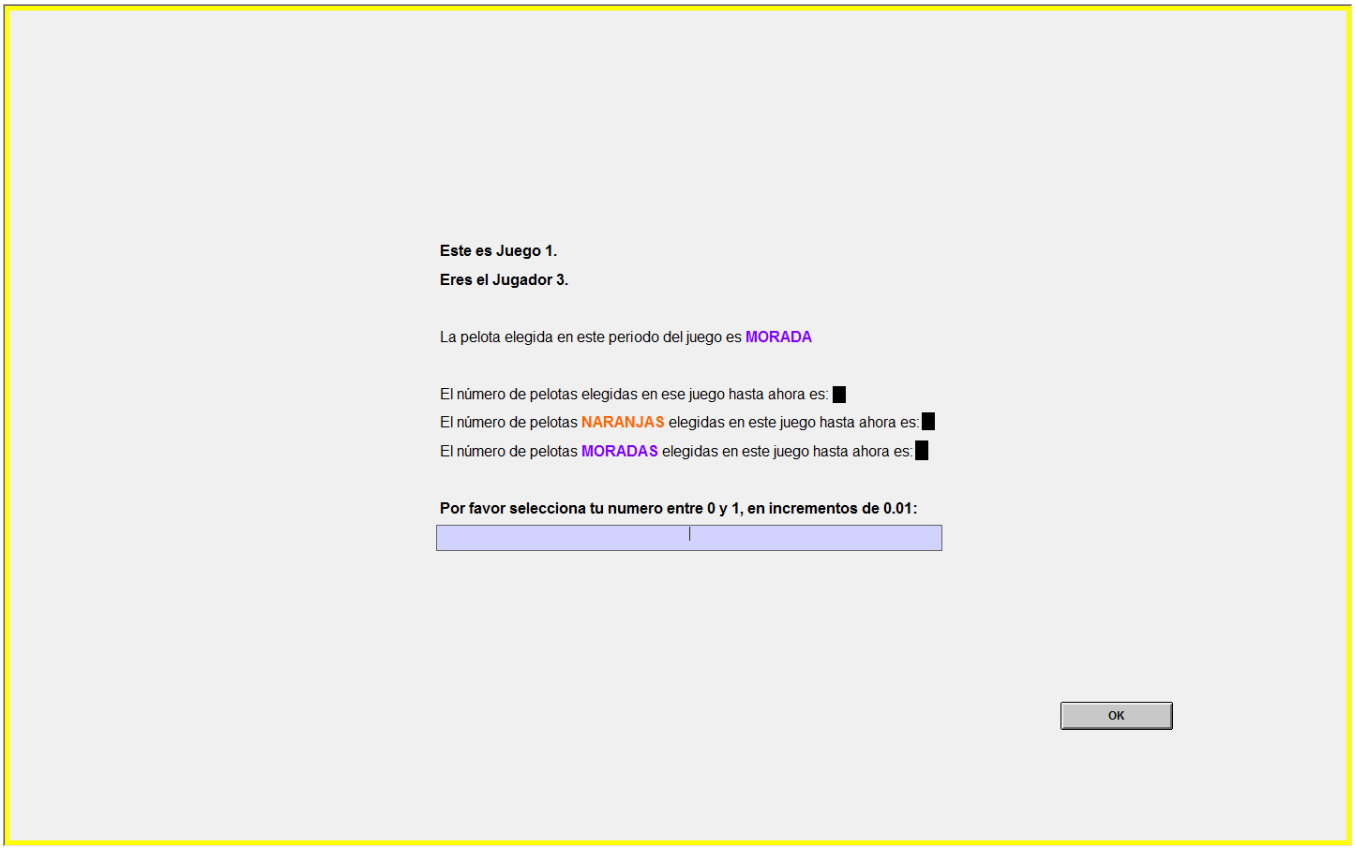
After the quiz, the experiment will begin.

Description of a Game

Recall that at the beginning of a game the computer randomly selects a new secret urn between ***ORANGE*** and ***PURPLE*** so that each earn is equally likely to be selected.

A ball is randomly drawn from the secret urn each period of the game. The color of the ball is shown to <u>all</u> players.

In each period of a game, you see a screen similar to the following one.



The initial screen shows you information about the color of the ball that the computer has drawn from the secret urn for this period. It also reminds you about how many balls of each color have been drawn so far.

For example, suppose that the round is currently in period 8 and the color of the ball drawn for this period is orange. If the history of balls drawn so far is orange, orange, purple, orange, purple, purple, purple the counter displays 4 orange balls (including the current orange ball), and 4 purple balls, for a total of 8 balls.

The screen asks you to choose a number between 0 and 1, in increments of 0.01. After you have entered your number, press OK in order to submit your choice.

The number that you entered will be used to determine your penalty index as previously described, based on the number chosen by ***Player2***.

Player1 and ***Player2*** observe a similar screen which reveals the color of the ball that the computer has randomly drawn from the secret urn.

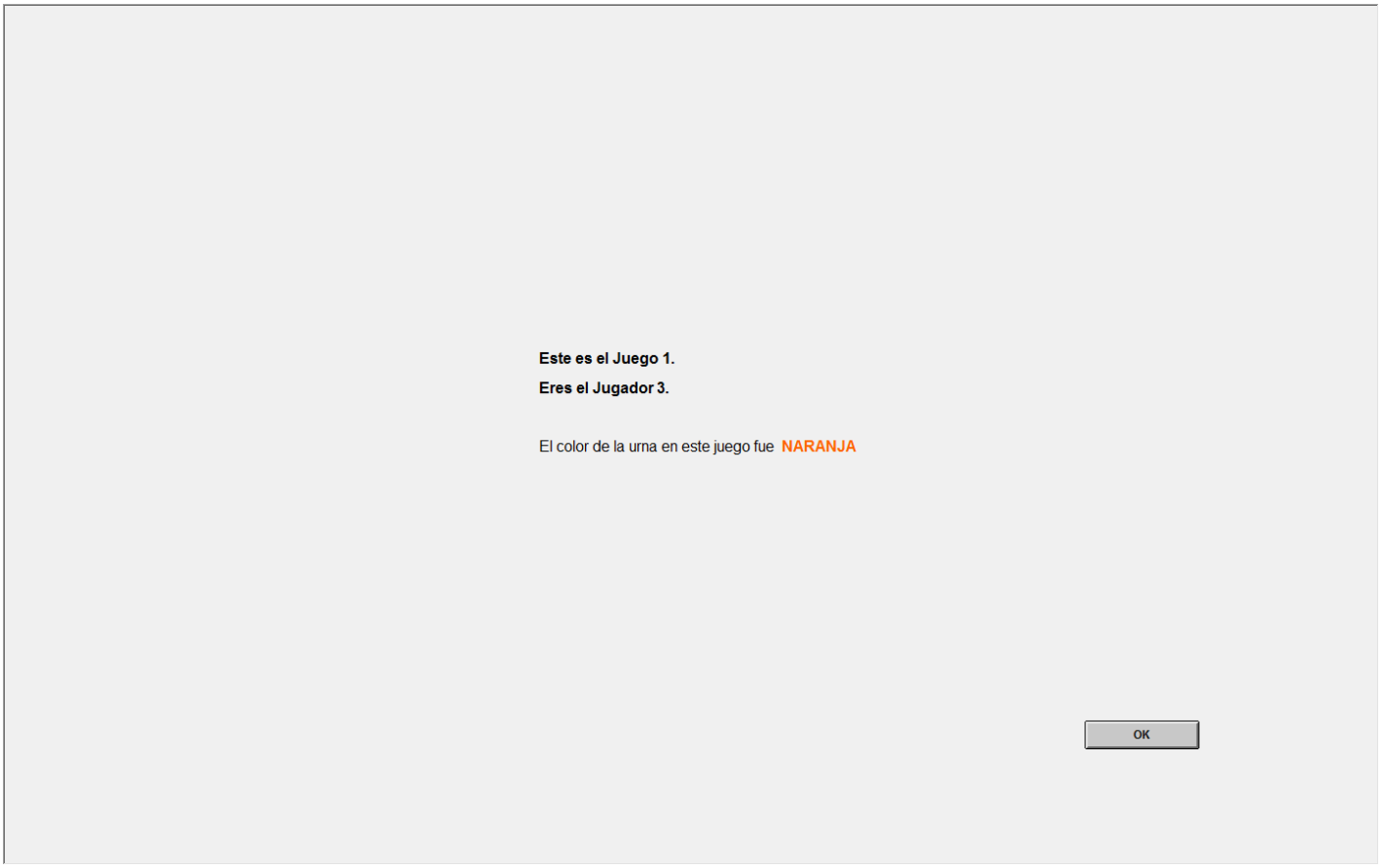
Once all three players have made their choice, the period ends and we proceed to the next period. Recall that a game lasts for 30 periods.

Important: You never observe your penalty index in any of the periods.

Information at the End of a Game

At the end of a game, all players observe a screen which reveals the color of the secret urn. However, you do not observe any information about your, or other players', penalty index in any of the periods.

For you, this screen may look like the following.



Please note that the experiment automatically continues to the next game after 30 SECONDS. If you push the OK button before the time has expired, you will be immediately prompted to the initial screen for the next game.

Instructions for Player 1 – Private Treatment

Please read carefully and raise your hand if you have any questions. All questions will be answered privately.

General Rules

Welcome and thank you for participating in the experiment today. Independent of your performance in the experiment, you automatically earned **100 pesos** for participating.

You will have 17 minutes to read the instructions. While reading the instructions, you will have the opportunity to familiarize yourself with the software. None of the decisions you make in this phase will count toward your earnings. After 12 minutes, you will be asked to complete a quiz. The quiz has 4 questions and all the answers can be found in the instructions. For every correct answer you will gain 2 peso. You will not lose pesos for any incorrect or incomplete answer. You will have 5 minutes to complete the quiz.

Quiz: After you answered all the questions of the quiz, press SEND ANSWERS, otherwise your answers will NOT be sent. After 5 MINUTES, you will not be able to send your answers anymore and the quiz will be considered incomplete and you will receive zero pesos.

We will pay 100 pesos plus your earnings from the quiz regardless of anything else that happens in the experiment. In addition to this, you will also be given 80 pesos. You will have an opportunity to either double the 80 pesos or lose it based on your performance in the tasks described below. All your earnings will be paid to you in CASH at the end of the experiment. If you double the 80 pesos, your earnings will be:

$$\boldsymbol{Final\ earnings = 100\ pesos\ +\ Earnings\ from\ the\ quiz\ + 160\ pesos}$$

If you lose the 80 pesos, your earnings will be:

$$\boldsymbol{Final\ earnings = 100\ pesos\ +\ Earnings\ from\ the\ quiz}$$

The information displayed on your computer screen is private. Please do not talk with other participants, attempt to communicate, or look at other participants' computer screens at any time during the session. Your cooperation is extremely important to guarantee that the data collected is accurate.

Please turn off your cellphones before the experiment begins.

Description of the Experiment

Subjects in this experiment are randomly assigned one of three roles: ***Player1***, ***Player2***, or ***Player3***.

You are *Player1*

Your role will remain fixed for the entire duration of the experiment, as will the roles of the other players.

At the beginning of the experiment, you will be randomly and anonymously matched with two other subjects, one in the role of ***Player2***, and the other one in the role of ***Player3***. You will be matched with these two subjects for the duration of the experiment. You will then play a game several times. Each time you play a game, the game will have **30 periods**.

Payment: In each period of each game, you will be given a task. The computer will record your performance in this task in each period of every game. At the end of the experiment, the computer will randomly select **ONE** period of **ONE** game to determine your final earnings. Whether the 80 pesos will be doubled or lost will depend on your performance in this randomly chosen period and an element of luck, as described below.

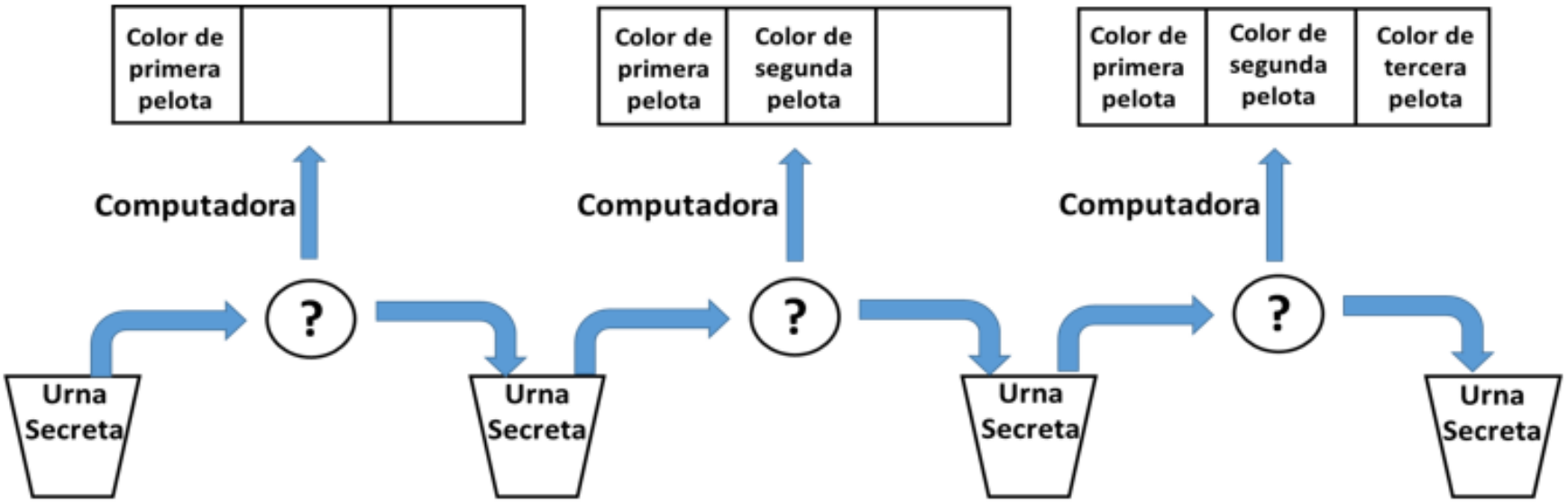
THE GAME: There are two urns each containing 3 balls. The ***ORANGE*** urn contains **2 orange** balls and **1 purple** ball, while the ***PURPLE*** urn contains **1 orange** ball and **2 purple** balls.

At the beginning of each game, the computer *secretly* selects one of the two urns with equal probability. That is, each urn is equally likely to be selected. **No player observes which urn was selected.**

In each period of a game, the computer randomly draws three balls with replacement from the selected urn. This means that the computer randomly draws a ball from the urn, records the color of the ball and reinserts the ball into the urn, after which the computer randomly draws a second ball, records the color of the ball and reinserts the ball into the urn, and finally the computer randomly draws a third ball, records the color of the ball and reinserts the ball into the urn; so that the composition of the secret urn is the same before every draw. The color of the first ball is shown to you, the color of the second ball is shown to ***Player2***, and the color of the third ball is shown to ***Player3***. Thus, you and the players you are matched with (***Player2*** and ***Player3***) observe a ball of a possibly different color (orange or purple) in every period.

This is also graphically presented in the next figure on the next page.

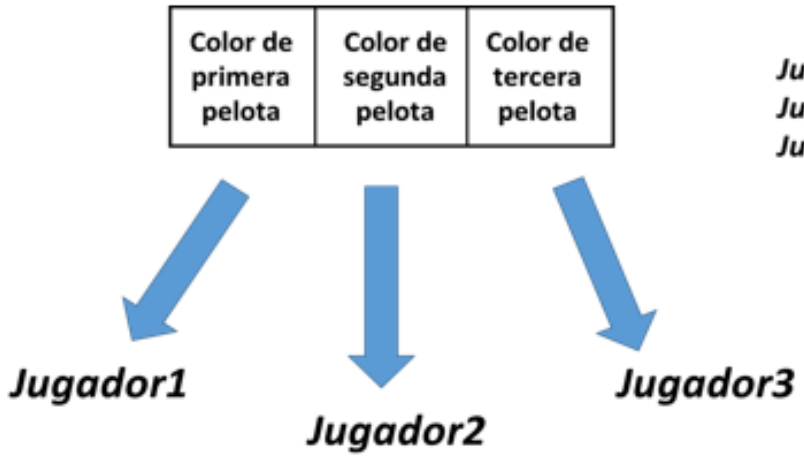
After 30 periods, the game is over and a new game begins. The computer randomly selects a new secret urn at the start of each new game.



La computadora elige aleatoriamente una pelota de la urna secreta, registra el color de la pelota, y luego la pelota se reinserta en la urna secreta

La computadora elige aleatoriamente una segunda pelota de la urna secreta, registra el color de la pelota, y luego la pelota se reinserta en la urna secreta

La computadora elige aleatoriamente una tercera pelota de la urna secreta, registra el color de la pelota, y luego la pelota se reinserta en la urna secreta



Jugador1 observa el color de la primera pelota.
Jugador2 observa el color de la segunda pelota.
Jugador3 observa el color de la tercera pelota.

Task: In each period, every player is assigned a task which depends on the player's role. As ***Player1***, your task is to bet on the color of the secret urn.

The tasks of ***Player2*** and ***Player3*** are irrelevant for your own task and will not affect your additional earnings in any way. For this reason, we will not describe ***Player2***'s and ***Player3***'s task to you.

More precisely, as ***Player1***, you are asked to pick a number N_1 between 0 and 1 (inclusive), in increments of 0.01. Your choice determines your penalty index on the task according to the following formula:

$$PenaltyIndex = (N_1 - Z)^2$$

where Z = 1 if the computer selected the ***ORANGE*** urn, and Z = 0 if the computer selected the ***PURPLE*** urn. The closer your guess is to the color of the secret urn, the lower your penalty index will be. The next table provides some examples of your penalty index based on the color of the secret urn and possible choices made by you.

Your choice	Secret urn is ***ORANGE*** (Z = 1)	Secret urn is ***PURPLE*** (Z = 0)
0	*1*	*0*
0.10	*0.81*	*0.01*
0.20	*0.64*	*0.04*
0.30	*0.49*	*0.09*
0.40	*0.36*	*0.16*
0.50	*0.25*	*0.25*
0.60	*0.16*	*0.36*
0.70	*0.09*	*0.49*
0.80	*0.04*	*0.64*
0.90	*0.01*	*0.81*
1	*0*	*1*

Recall that none of the players, including you, knows the color of the secret urn.

Also, the penalty index is always a number between 0 and 1.

Important summary information:

- The computer draws three balls at random with replacement from the secret urn. This means that after drawing each ball from the urn, the computer records the color of the ball and reinserts the ball in the urn, so that the composition of the secret urn is the same before the next draw. The color of the first ball is shown to you, the color of the second ball is shown to ***Player 2***, and the color of the third ball is shown to ***Player3***.
- Each player is shown the color of his/her secret ball before the player makes his/her choice.
- The same secret urn is used for all the periods of the same game.
- The computer randomly draws a new secret urn at the beginning of each new game.

How your Additional Earnings are Determined

Your additional earnings are determined based on your penalty index in **ONE** randomly chosen period of **ONE** randomly chosen game as follows. The computer randomly selects a number between 0 and 1 (inclusive) such that every number is equally likely to be selected. I.e., it is as likely to choose 0.5 as 0.346567. We refer to this number as the ***PaymentNumber***. The ***PaymentNumber*** is compared to your ***PenaltyIndex*** from the randomly chosen period of the randomly chosen game to determine your final earnings as follows:

If the ***PenaltyIndex*** is less than or equal to the ***PaymentNumber***, the 80 pesos you receive at the beginning are doubled. In this case, your overall earnings will be:

$$\boldsymbol{Final\ earnings = 100\ pesos\ +\ Earnings\ from\ the\ quiz\ + 160}$$

If the ***PenaltyIndex*** is greater than the ***PaymentNumber***, the 80 pesos you receive at the beginning are lost. In this case, your overall earnings will be:

$$\boldsymbol{Final\ earnings = 100\ pesos\ +\ Earnings\ from\ the\ qui}$$

The lower your penalty index is, the higher is your chance of doubling the 80 pesos.

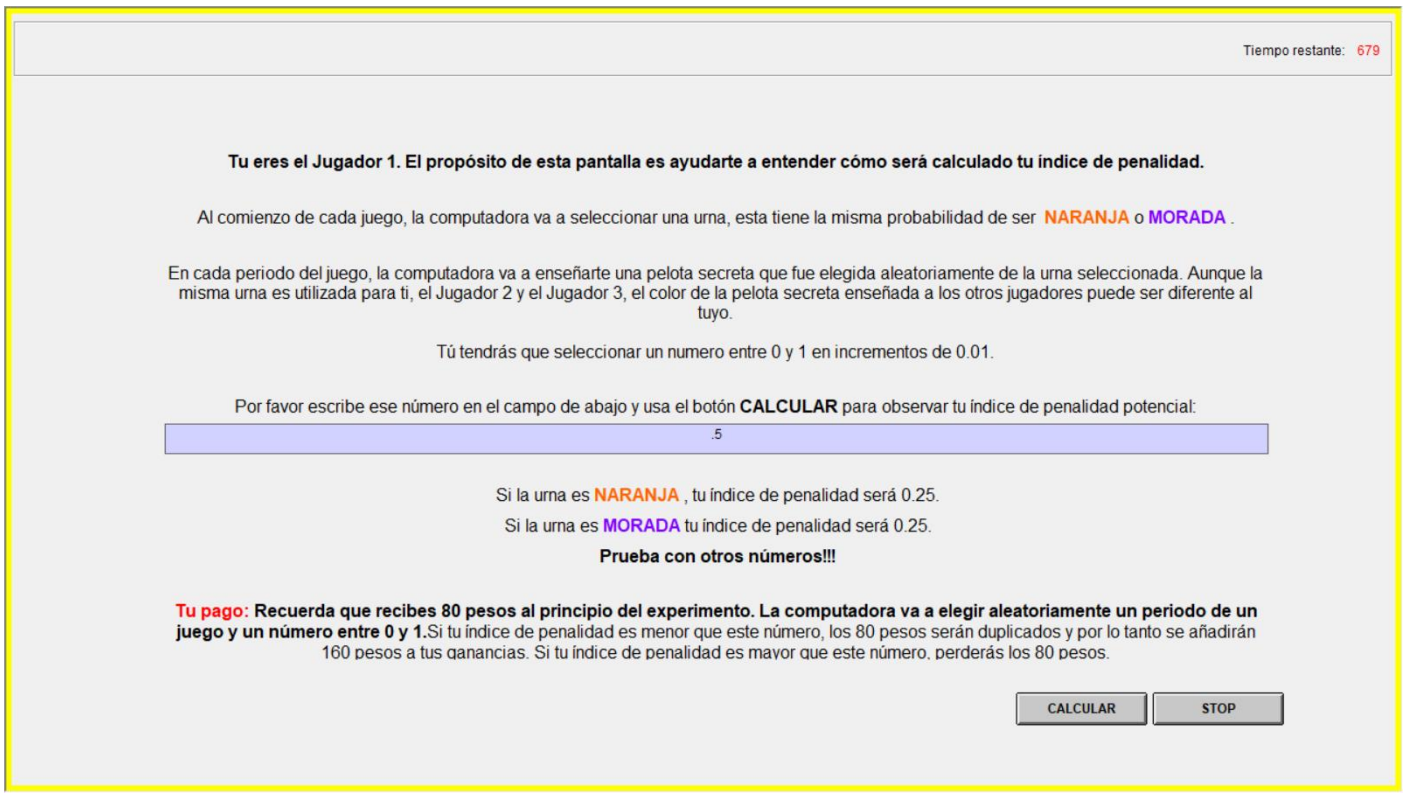
Examples: If your penalty index is zero, you double the 80 pesos with 100% chance.
If your penalty index is 0.25, you double the 80 pesos with 75% chance.
If your penalty index is 0.5, you double the 80 pesos with 50% chance.
If your penalty index is 0.75, you double the 80 pesos with 25% chance.
If your penalty index is 1, you double the 80 pesos with 0% chance.

You can either walk away with 260 pesos (plus your earnings from the quiz) or 100 pesos (plus your earnings from the quiz).

The computer selects a possibly different period and a possibly different *PaymentNumber* for each player.

Practice Before the Experiment: The Calculator

The experiment begins with the following screen.



Recall that the assignment of subjects to roles is random and anonymous. So, no other subject can observe which role you have been assigned to, and similarly you cannot observe which roles any other subject has been assigned to.

Every subject keeps his/her assigned role until the end of the experiment.

This screen allows you to familiarize yourself with the software. You can insert numbers in the calculator and it will display your penalty index given different possible choices of the secret urn by the computer.

You have 12 minutes to play with the calculator, after which you will be asked to complete a quiz.

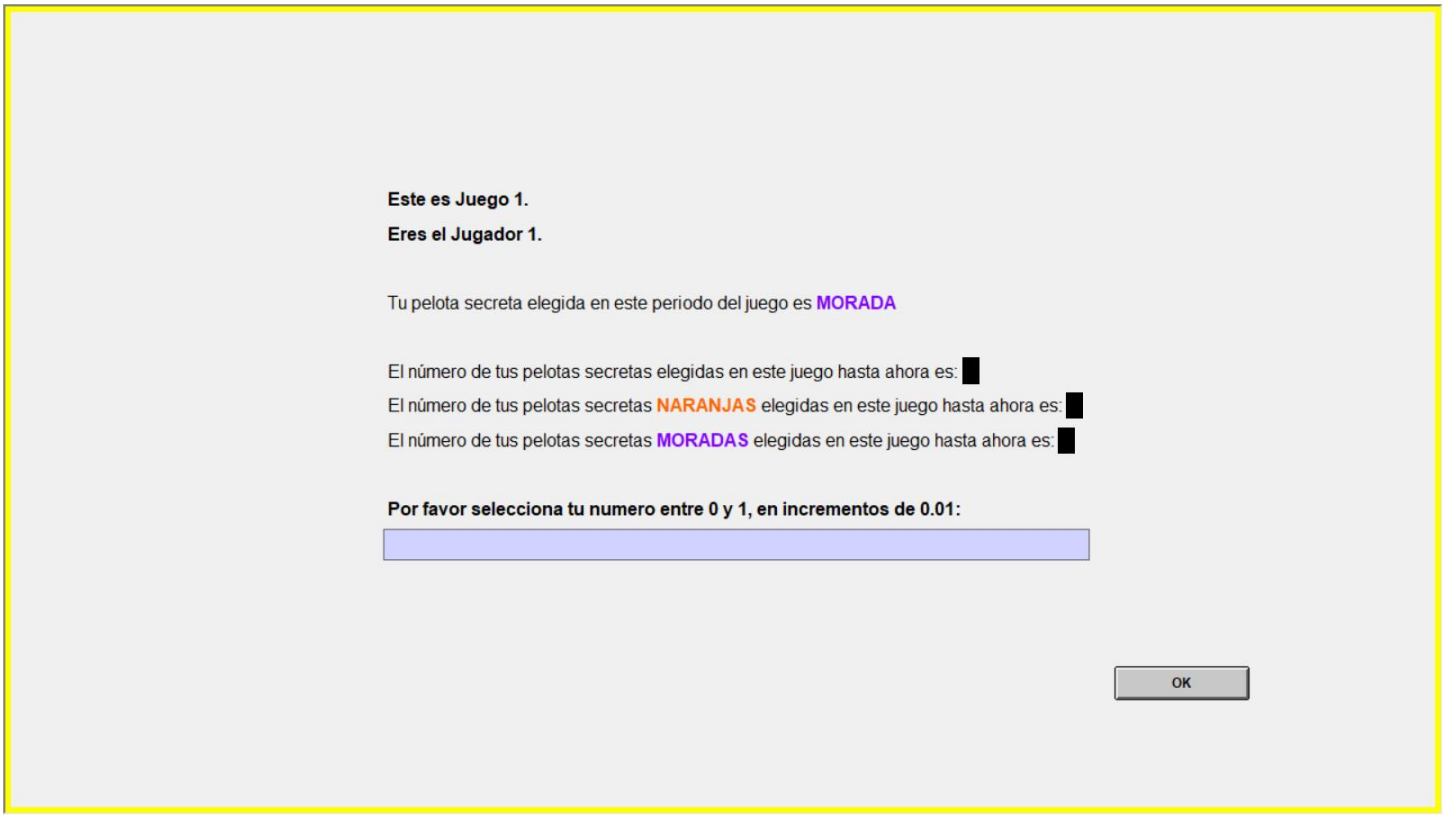
After the quiz, the experiment will begin.

Description of a Game

Recall that at the beginning of a game the computer randomly selects a new secret urn between ***ORANGE*** and ***PURPLE*** so that each earn is equally likely to be selected.

In each period of a game, the computer randomly draws a secret ball with replacement for you and for each player that you are matched with. You can see the color of your secret ball but you cannot see the color of the secret ball the computer drew for your matched partners.

In each period of a game, you see a screen similar to the following one.



The initial screen shows you information about the color of your secret ball that the computer has drawn from the secret urn for this period. It also reminds you about how many secret balls of each color have been drawn so far.

For example, suppose that the round is currently in period 8 and the color of your secret ball drawn for this period is orange. If the history of your secret balls drawn so far is orange, orange, purple, orange, purple, purple, purple the counter displays 4 orange balls (including your current secret orange ball), and 4 purple balls, for a total of 8 secret balls.

The screen asks you to choose a number between 0 and 1, in increments of 0.01. After you have entered your number, press OK in order to submit your choice.

The number that you entered will be used to determine your penalty index as previously described, based on the color of the secret urn.

Player2 observes a similar screen which reveals the color of his/her secret ball. ***Player3*** also observes a similar screen which reveals the color of his/her secret ball.

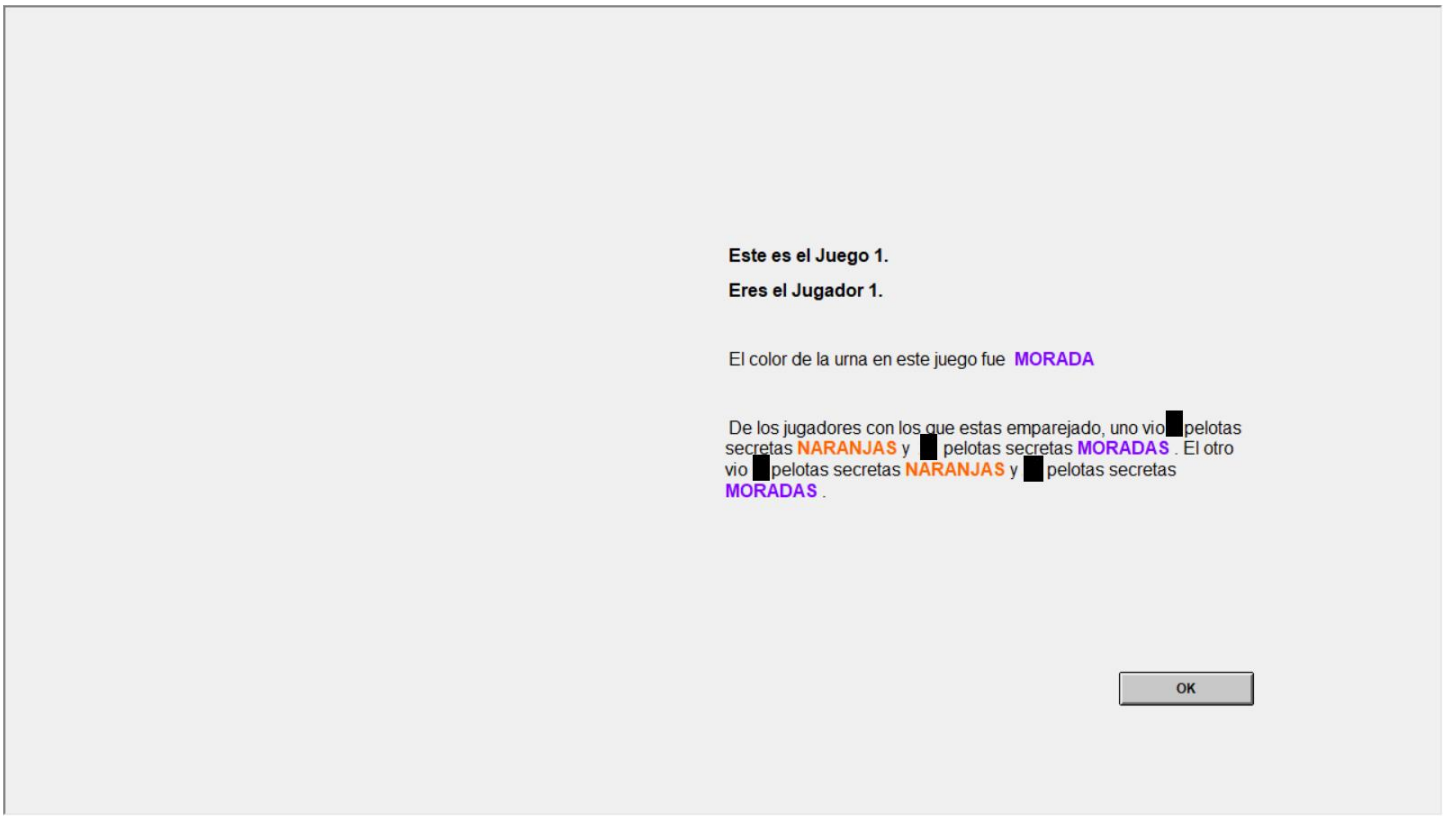
Once all three players have made their choice, the period ends and we proceed to the next period. Recall that a game lasts for 30 periods.

Important: You never observe your penalty index in any of the periods.

Information at the End of a Game

At the end of a game, all players observe a screen which reveals the color of the secret urn. However, you do not observe any information about your, or other players', penalty index in any of the periods.

For you, this screen may look like the following.



Please note that the experiment automatically continues to the next game after 30 SECONDS. If you push the OK button before the time has expired, you will be immediately prompted to the initial screen for the next game.

Instructions for Player 2 – Private Treatment

Please read carefully and raise your hand if you have any questions. All questions will be answered privately.

General Rules

Welcome and thank you for participating in the experiment today. Independent of your performance in the experiment, you automatically earned **100 pesos** for participating.

You will have 17 minutes to read the instructions. While reading the instructions, you will have the opportunity to familiarize yourself with the software. None of the decisions you make in this phase will count toward your earnings. After 12 minutes, you will be asked to complete a quiz. The quiz has 4 questions and all the answers can be found in the instructions. For every correct answer you will gain 2 peso. You will not lose pesos for any incorrect or incomplete answer. You will have 5 minutes to complete the quiz.

Quiz: After you answered all the questions of the quiz, press SEND ANSWERS, otherwise your answers will NOT be sent. After 5 MINUTES, you will not be able to send your answers anymore and the quiz will be considered incomplete and you will receive zero pesos.

We will pay 100 pesos plus your earnings from the quiz regardless of anything else that happens in the experiment. In addition to this, you will also be given 80 pesos. You will have an opportunity to either double the 80 pesos or lose it based on your performance in the tasks described below. All your earnings will be paid to you in CASH at the end of the experiment. If you double the 80 pesos, your earnings will be:

$$\boldsymbol{Final\ earnings = 100\ pesos\ +\ Earnings\ from\ the\ quiz\ + 160\ pesos}$$

If you lose the 80 pesos, your earnings will be:

$$\boldsymbol{Final\ earnings = 100\ pesos\ +\ Earnings\ from\ the\ quiz}$$

The information displayed on your computer screen is private. Please do not talk with other participants, attempt to communicate, or look at other participants' computer screens at any time during the session. Your cooperation is extremely important to guarantee that the data collected is accurate.

Please turn off your cellphones before the experiment begins.

Description of the Experiment

Subjects in this experiment are randomly assigned one of three roles: ***Player1***, ***Player2***, or ***Player3***.

You are *Player2*

Your role will remain fixed for the entire duration of the experiment, as will the roles of the other players.

At the beginning of the experiment, you will be randomly and anonymously matched with two other subjects, one in the role of ***Player1***, and the other one in the role of ***Player3***. You will be matched with these two subjects for the duration of the experiment. You will then play a game with ***Player1*** several times. Each time you play a game, the game will have **30 periods**.

Payment: In each period of each game, you will be given a task. The computer will record your performance in this task in each period of every game. At the end of the experiment, the computer will randomly select **ONE** period of **ONE** game to determine your final earnings. Whether the 80 pesos will be doubled or lost will depend on your performance in this randomly chosen period and an element of luck, as described below.

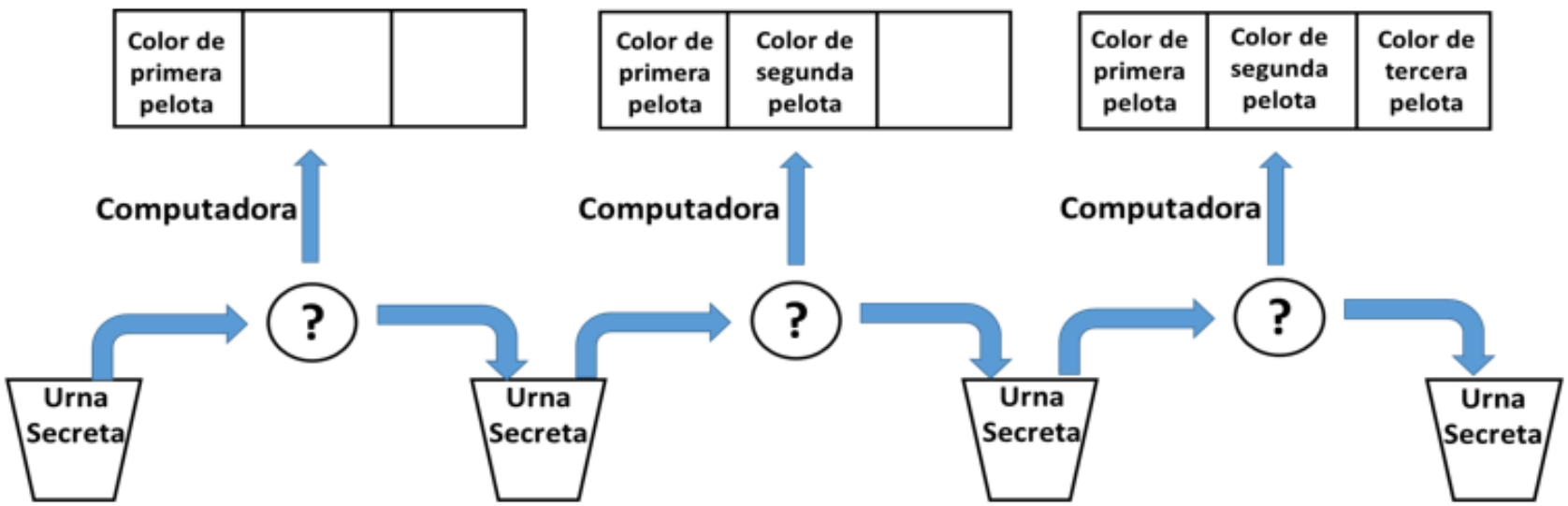
THE GAME: There are two urns each containing 3 balls. The ***ORANGE*** urn contains **2 orange** balls and **1 purple** ball, while the ***PURPLE*** urn contains **1 orange** ball and **2 purple** balls.

At the beginning of each game, the computer *secretly* selects one of the two urns with equal probability. That is, each urn is equally likely to be selected. **No player observes which urn was selected.**

In each period of a game, the computer randomly draws three balls with replacement from the selected urn. This means that the computer randomly draws a ball from the urn, records the color of the ball and reinserts the ball into the urn, after which the computer randomly draws a second ball, records the color of the ball and reinserts the ball into the urn, and finally the computer randomly draws a third ball, records the color of the ball and reinserts the ball into the urn; so that the composition of the secret urn is the same before every draw. The color of the first ball is shown to ***Player 1***, the color of the second ball is shown to you, and the color of the third ball is shown to ***Player3***. Thus, you and the players you are matched with (***Player1*** and ***Player3***) observe a ball of a possibly different color (orange or purple) in every period.

This is also graphically presented in the next figure on the next page.

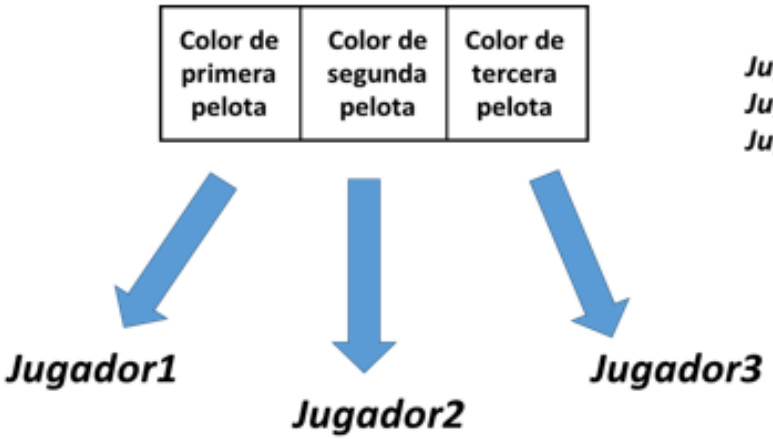
After 30 periods, the game is over and a new game begins. The computer randomly selects a new secret urn at the start of each new game.



La computadora elige aleatoriamente una pelota de la urna secreta, registra el color de la pelota, y luego la pelota se reinserta en la urna secreta

La computadora elige aleatoriamente una segunda pelota de la urna secreta, registra el color de la pelota, y luego la pelota se reinserta en la urna secreta

La computadora elige aleatoriamente una tercera pelota de la urna secreta, registra el color de la pelota, y luego la pelota se reinserta en la urna secreta



Jugador1 observa el color de la primera pelota.
Jugador2 observa el color de la segunda pelota.
Jugador3 observa el color de la tercera pelota.

Task: In each period, every player is assigned a task which depends on the player's role. ***Player1***'s task is to bet on the color of the secret urn. As ***Player2***, your task is to bet on which number ***Player1*** has chosen.

The task of ***Player3*** is irrelevant for your own task and will not affect your additional earnings in any way. For this reason, we will not describe ***Player3***'s task to you.

More precisely:

- ***Player1*** is asked to pick a number N_1 between 0 and 1 (inclusive), in increments of 0.01. ***Player1***'s choice determines his/her penalty index on the task according to the following formula:

$$PenaltyIndex = (N_1 - Z)^2$$

where Z = 1 if the computer selected the ***ORANGE*** urn, and Z = 0 if the computer selected the ***PURPLE*** urn. The closer ***Player1***'s guess is to the color of the secret urn, the lower ***Player1***'s penalty index will be. The next table provides some examples of penalty index for ***Player1*** based on the color of the secret urn and possible choices made by ***Player1***.

Player1's choice	Secret urn is ***ORANGE*** (Z = 1)	Secret urn is ***PURPLE*** (Z = 0)
0	*1*	*0*
0.10	*0.81*	*0.01*
0.20	*0.64*	*0.04*
0.30	*0.49*	*0.09*
0.40	*0.36*	*0.16*
0.50	*0.25*	*0.25*
0.60	*0.16*	*0.36*
0.70	*0.09*	*0.49*
0.80	*0.04*	*0.64*
0.90	*0.01*	*0.81*
1	*0*	*1*

- **YOUR TASK:** As ***Player2***, your task is to pick a number N_2 between 0 and 1 (inclusive), in increments of 0.01. Your choice determines your penalty index on the task according to the following formula:

$$PenaltyIndex = (N_2 - N_1)^2$$

where N_1 is the number chosen by ***Player1***. When choosing N_2, you do not know which number N_1 has been chosen by ***Player1***. The closer your guess is to the number chosen by ***Player1***, the lower your penalty index will be. The next table provides some examples of your penalty index based on some possible choices made by both you and ***Player1***.

Player1's choice

Your choice	**0**	**0.10**	**0.20**	**0.30**	**0.40**	**0.50**	**0.60**	**0.70**	**0.80**	**0.90**	**1**
0	*0*	*0.01*	*0.04*	*0.09*	*0.16*	*0.25*	*0.36*	*0.49*	*0.64*	*0.81*	*1*
0.10	*0.01*	*0*	*0.01*	*0.04*	*0.09*	*0.16*	*0.25*	*0.36*	*0.49*	*0.64*	*0.81*
0.20	*0.04*	*0.01*	*0*	*0.01*	*0.04*	*0.09*	*0.16*	*0.25*	*0.36*	*0.49*	*0.64*
0.30	*0.09*	*0.04*	*0.01*	*0*	*0.01*	*0.04*	*0.09*	*0.16*	*0.25*	*0.36*	*0.49*
0.40	*0.16*	*0.09*	*0.04*	*0.01*	*0*	*0.01*	*0.04*	*0.09*	*0.16*	*0.25*	*0.36*
0.50	*0.25*	*0.16*	*0.09*	*0.04*	*0.01*	*0*	*0.01*	*0.04*	*0.09*	*0.16*	*0.25*
0.60	*0.36*	*0.25*	*0.16*	*0.09*	*0.04*	*0.01*	*0*	*0.01*	*0.04*	*0.09*	*0.16*
0.70	*0.49*	*0.36*	*0.25*	*0.16*	*0.09*	*0.04*	*0.01*	*0*	*0.01*	*0.04*	*0.09*
0.80	*0.64*	*0.49*	*0.36*	*0.25*	*0.16*	*0.09*	*0.04*	*0.01*	*0*	*0.01*	*0.04*
0.90	*0.81*	*0.64*	*0.49*	*0.36*	*0.25*	*0.16*	*0.09*	*0.04*	*0.01*	*0*	*0.01*
1	*1*	*0.81*	*0.64*	*0.49*	*0.36*	*0.25*	*0.16*	*0.09*	*0.04*	*0.01*	*0*

Recall that none of the players, including you, knows the color of the secret urn.

Also, the penalty index is always a number between 0 and 1.

Important summary information:

- ***Player1*** does not observe $\boldsymbol{N_2}$.
- ***You*** do not observe $\boldsymbol{N_1}$.
- The computer draws three balls at random with replacement from the secret urn. This means that after drawing each ball from the urn, the computer records the color of the ball and reinserts the ball in the urn, so that the composition of the secret urn is the same before the next draw. The color of the first ball is shown to ***Player 1***, the color of the second ball is shown to you, and the color of the third ball is shown to ***Player3***.
- Each player is shown the color of his/her secret ball before the player makes his/her choice.
- The same secret urn is used for all the periods of the same game.
- The computer randomly draws a new secret urn at the beginning of each new game.

How your Additional Earnings are Determined

Your additional earnings are determined based on your penalty index in **ONE** randomly chosen period of **ONE** randomly chosen game as follows. The computer randomly selects a number between 0 and 1 (inclusive) such that every number is equally likely to be selected. I.e., it is as likely to choose 0.5 as 0.346567. We refer to this number as the ***PaymentNumber***. The ***PaymentNumber*** is compared to your ***PenaltyIndex*** from the randomly chosen period of the randomly chosen game to determine your final earnings as follows:

If the ***PenaltyIndex*** is less than or equal to the ***PaymentNumber***, the 80 pesos you receive at the beginning are doubled. In this case, your overall earnings will be:

$$\boldsymbol{Final\ earnings = 100\ pesos\ +\ Earnings\ from\ the\ quiz\ + 160}$$

If the ***PenaltyIndex*** is greater than the ***PaymentNumber***, the 80 pesos you receive at the beginning are lost. In this case, your overall earnings will be:

$$\boldsymbol{Final\ earnings = 100\ pesos\ +\ Earnings\ from\ the\ qui}$$

The lower your penalty index is, the higher is your chance of doubling the 80 pesos.

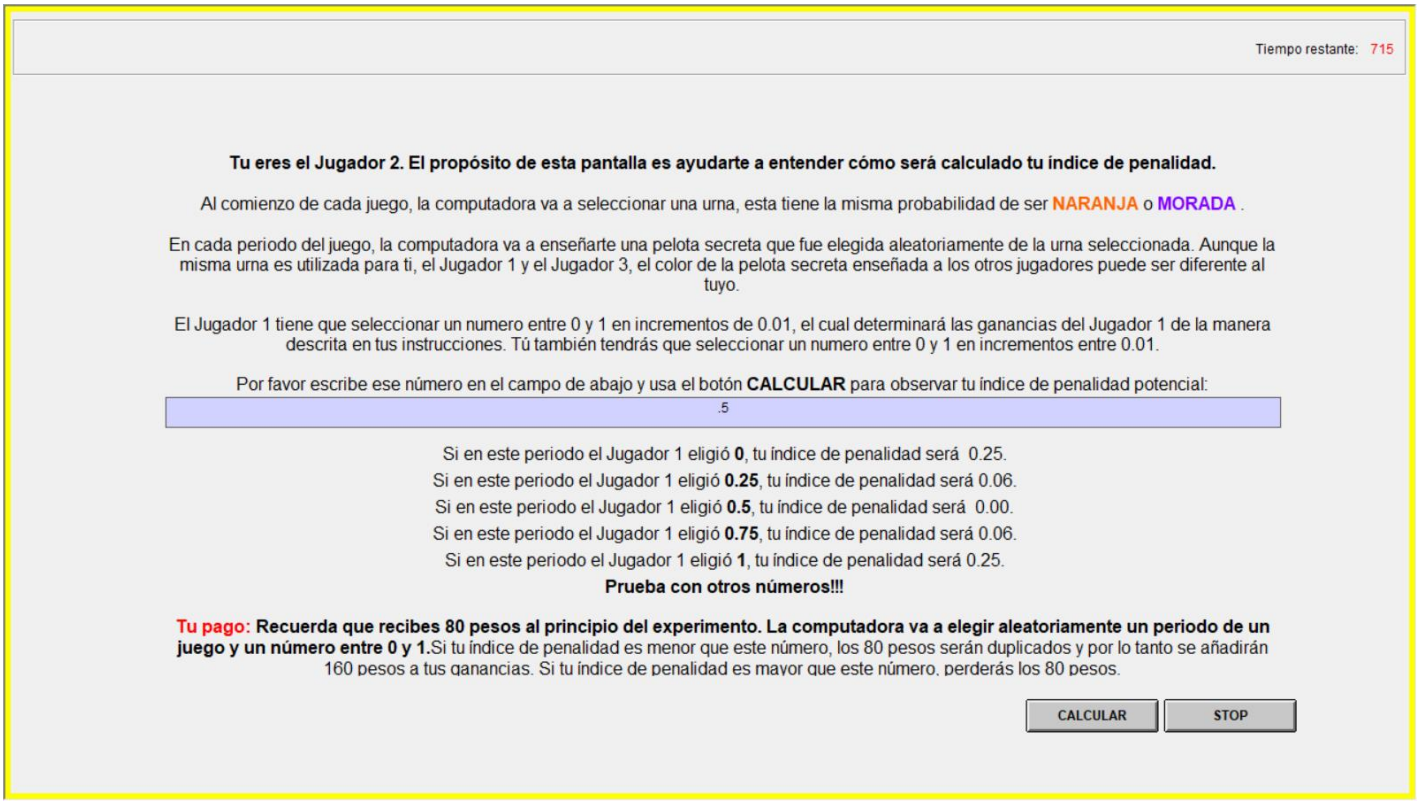
Examples: If your penalty index is zero, you double the 80 pesos with 100% chance.
If your penalty index is 0.25, you double the 80 pesos with 75% chance.
If your penalty index is 0.5, you double the 80 pesos with 50% chance.
If your penalty index is 0.75, you double the 80 pesos with 25% chance.
If your penalty index is 1, you double the 80 pesos with 0% chance.

You can either walk away with 260 pesos (plus your earnings from the quiz) or 100 pesos (plus your earnings from the quiz).

The computer selects a possibly different period and a possibly different *PaymentNumber* for each player.

Practice Before the Experiment: The Calculator

The experiment begins with the following screen.



Recall that the assignment of subjects to roles is random and anonymous. So, no other subject can observe which role you have been assigned to, and similarly you cannot observe which roles any other subject has been assigned to.

Every subject keeps his/her assigned role until the end of the experiment.

This screen allows you to familiarize yourself with the software. You can insert numbers in the calculator and it will display your penalty index given different possible choices of ***Player1***. These choices are just meant to explain how the software works and in no way reflect the choices that the subject in the role of ***Player1*** could be making during the experiment.

You have 12 minutes to play with the calculator, after which you will be asked to complete a quiz.

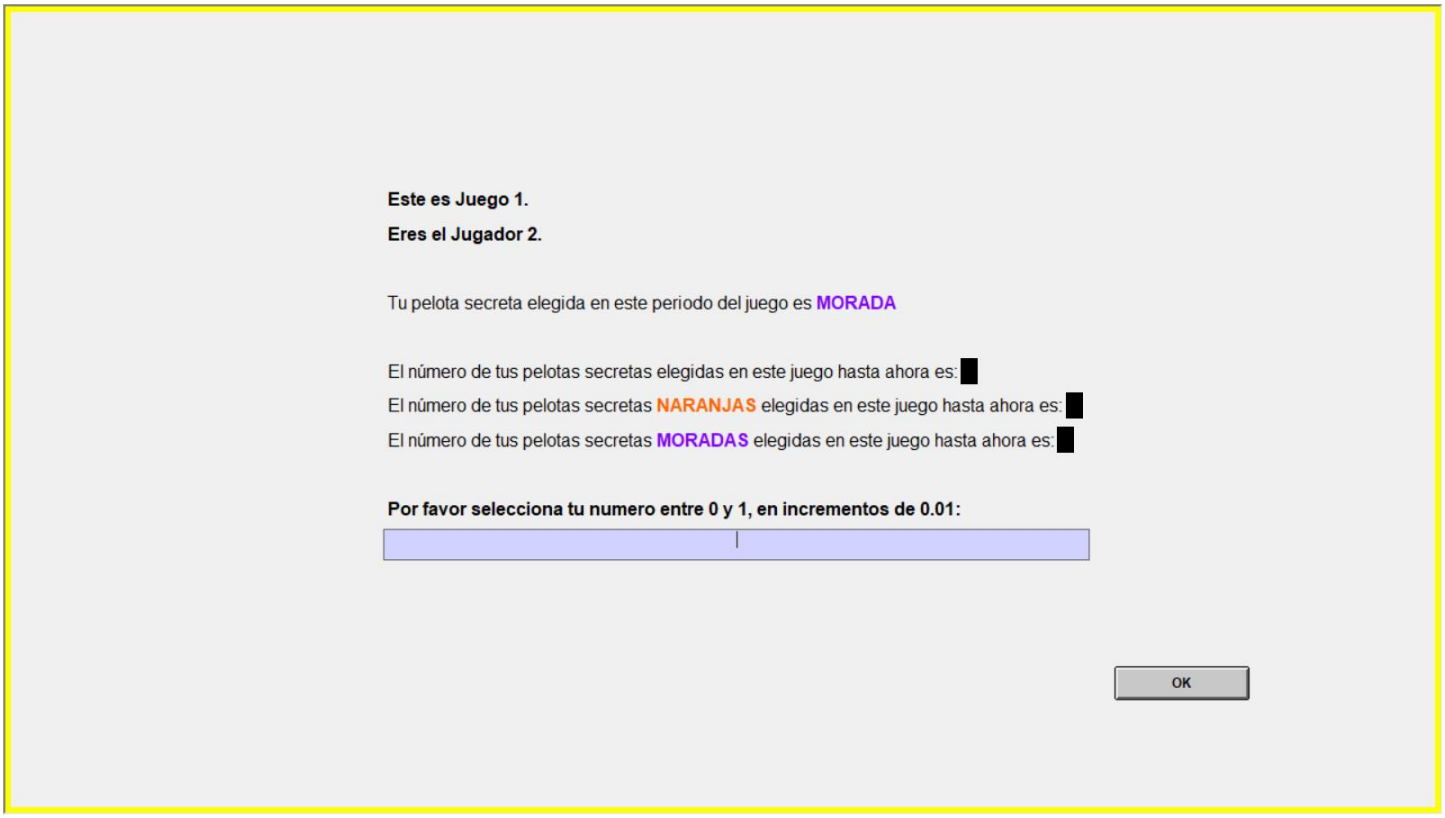
After the quiz, the experiment will begin.

Description of a Game

Recall that at the beginning of a game the computer randomly selects a new secret urn between ***ORANGE*** and ***PURPLE*** so that each earn is equally likely to be selected.

In each period of a game, the computer randomly draws a secret ball with replacement for you and for each player that you are matched with. You can see the color of your secret ball but you cannot see the color of the secret ball the computer drew for your matched partners.

In each period of a game, you see a screen similar to the following one.



The initial screen shows you information about the color of your secret ball that the computer has drawn from the secret urn for this period. It also reminds you about how many secret balls of each color have been drawn so far.

For example, suppose that the round is currently in period 8 and the color of your secret ball drawn for this period is orange. If the history of your secret balls drawn so far is orange, orange, purple, orange, purple, purple, purple the counter displays 4 orange balls (including your current secret orange ball), and 4 purple balls, for a total of 8 secret balls.

The screen asks you to choose a number between 0 and 1, in increments of 0.01. After you have entered your number, press OK in order to submit your choice.

The number that you entered will be used to determine your penalty index as previously described, based on the number chosen by ***Player1***.

Player1 observes a similar screen which reveals the color of his/her secret ball. ***Player3*** also observes a similar screen which reveals the color of his/her secret ball.

Once all three players have made their choice, the period ends and we proceed to the next period. Recall that a game lasts for 30 periods.

Important: You never observe your penalty index in any of the periods.

Information at the End of a Game

At the end of a game, all players observe a screen which reveals the color of the secret urn. However, you do not observe any information about your, or other players', penalty index in any of the periods.

For you, this screen may look like the following.

Please note that the experiment automatically continues to the next game after 30 SECONDS. If you push the OK button before the time has expired, you will be immediately prompted to the initial screen for the next game.

Instructions for Player 3 – Private Treatment

Please read carefully and raise your hand if you have any questions. All questions will be answered privately.

General Rules

Welcome and thank you for participating in the experiment today. Independent of your performance in the experiment, you automatically earned **100 pesos** for participating.

You will have 17 minutes to read the instructions. While reading the instructions, you will have the opportunity to familiarize yourself with the software. None of the decisions you make in this phase will count toward your earnings. After 12 minutes, you will be asked to complete a quiz. The quiz has 4 questions and all the answers can be found in the instructions. For every correct answer you will gain 2 peso. You will not lose pesos for any incorrect or incomplete answer. You will have 5 minutes to complete the quiz.

Quiz: After you answered all the questions of the quiz, press SEND ANSWERS, otherwise your answers will NOT be sent. After 5 MINUTES, you will not be able to send your answers anymore and the quiz will be considered incomplete and you will receive zero pesos.

We will pay 100 pesos plus your earnings from the quiz regardless of anything else that happens in the experiment. In addition to this, you will also be given 80 pesos. You will have an opportunity to either double the 80 pesos or lose it based on your performance in the tasks described below. All your earnings will be paid to you in CASH at the end of the experiment. If you double the 80 pesos, your earnings will be:

$$\boldsymbol{Final\ earnings = 100\ pesos\ +\ Earnings\ from\ the\ quiz\ + 160\ pesos}$$

If you lose the 80 pesos, your earnings will be:

$$\boldsymbol{Final\ earnings = 100\ pesos\ +\ Earnings\ from\ the\ quiz}$$

The information displayed on your computer screen is private. Please do not talk with other participants, attempt to communicate, or look at other participants' computer screens at any time during the session. Your cooperation is extremely important to guarantee that the data collected is accurate.

Please turn off your cellphones before the experiment begins.

Description of the Experiment

Subjects in this experiment are randomly assigned one of three roles: ***Player1***, ***Player2***, or ***Player3***.

You are *Player3*

Your role will remain fixed for the entire duration of the experiment, as will the roles of the other players.

At the beginning of the experiment, you will be randomly and anonymously matched with two other subjects, one in the role of ***Player1***, and the other one in the role of ***Player2***. You will be matched with these two subjects for the duration of the experiment. You will then play a game with ***Player1*** and ***Player2*** several times. Each time you play a game, the game will have **30 periods**.

Payment: In each period of each game, you will be given a task. The computer will record your performance in this task in each period of every game. At the end of the experiment, the computer will randomly select **ONE** period of **ONE** game to determine your final earnings. Whether the 80 pesos will be doubled or lost will depend on your performance in this randomly chosen period and an element of luck, as described below.

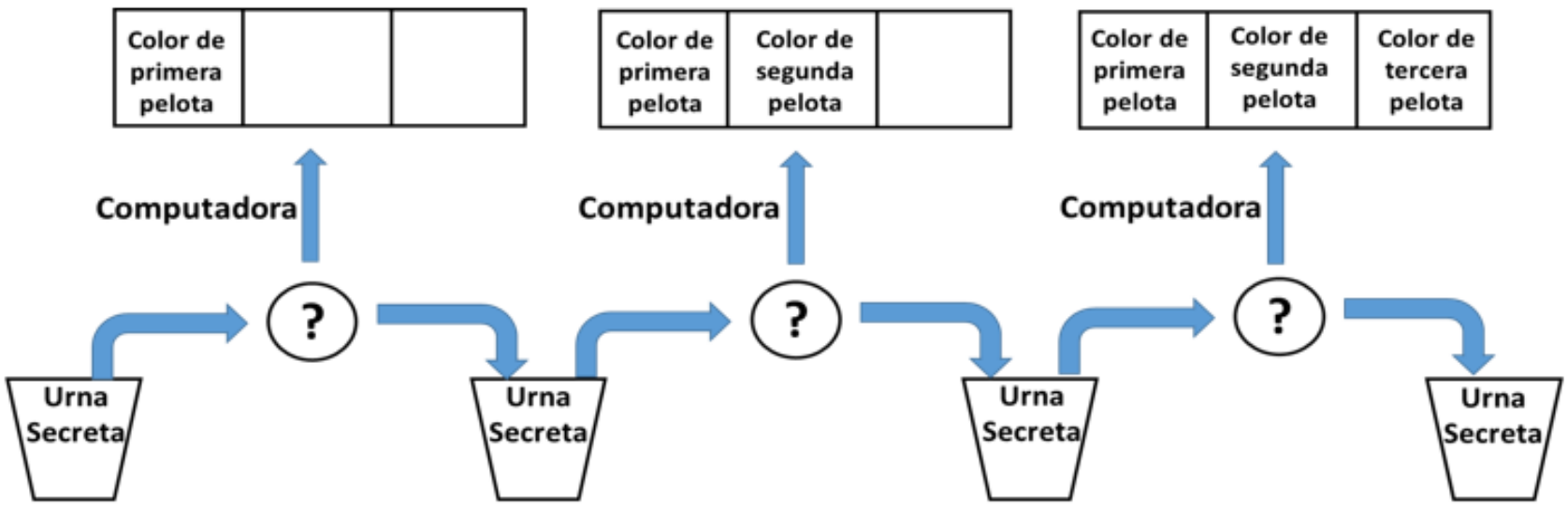
THE GAME: There are two urns each containing 3 balls. The ***ORANGE*** urn contains **2 orange** balls and **1 purple** ball, while the ***PURPLE*** urn contains **1 orange** ball and **2 purple** balls.

At the beginning of each game, the computer *secretly* selects one of the two urns with equal probability. That is, each urn is equally likely to be selected. **No player observes which urn was selected.**

In each period of a game, the computer randomly draws three balls with replacement from the selected urn. This means that the computer randomly draws a ball from the urn, records the color of the ball and reinserts the ball into the urn, after which the computer randomly draws a second ball, records the color of the ball and reinserts the ball into the urn, and finally the computer randomly draws a third ball, records the color of the ball and reinserts the ball into the urn; so that the composition of the secret urn is the same before every draw. The color of the first ball is shown to ***Player 1***, the color of the second ball is shown to ***Player 2***, and the color of the third ball is shown to you. Thus, you and the players you are matched with (***Player1*** and ***Player2***) observe a ball of a possibly different color (orange or purple) in every period.

This is also graphically presented in the next figure on the next page.

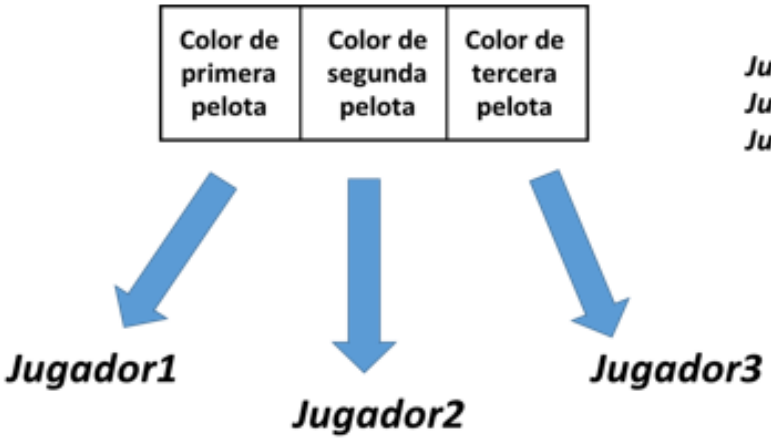
After 30 periods, the game is over and a new game begins. The computer randomly selects a new secret urn at the start of each new game.



La computadora elige aleatoriamente una pelota de la urna secreta, registra el color de la pelota, y luego la pelota se reinserta en la urna secreta

La computadora elige aleatoriamente una segunda pelota de la urna secreta, registra el color de la pelota, y luego la pelota se reinserta en la urna secreta

La computadora elige aleatoriamente una tercera pelota de la urna secreta, registra el color de la pelota, y luego la pelota se reinserta en la urna secreta



Jugador1 observa el color de la primera pelota.
Jugador2 observa el color de la segunda pelota.
Jugador3 observa el color de la tercera pelota.

Task: In each period, every player is assigned a task which depends on the player's role. ***Player1***'s task is to bet on the color of the secret urn. ***Player2***'s task is to bet on which number ***Player1*** has chosen. As ***Player3***, your task is to bet on which number ***Player2*** has chosen.

More precisely:

- ***Player1*** is asked to pick a number N_1 between 0 and 1 (inclusive), in increments of 0.01. ***Player1***'s choice determines his/her penalty index on the task according to the following formula:

$$PenaltyIndex = (N_1 - Z)^2$$

where Z = 1 if the computer selected the ***ORANGE*** urn, and Z = 0 if the computer selected the ***PURPLE*** urn. The closer ***Player1***'s guess is to the color of the secret urn, the lower ***Player1***'s penalty index will be. The next table provides some examples of penalty index for ***Player1*** based on the color of the secret urn and possible choices made by ***Player1***.

Player1's choice	Secret urn is ***ORANGE*** (Z = 1)	Secret urn is ***PURPLE*** (Z = 0)
0	*1*	*0*
0.10	*0.81*	*0.01*
0.20	*0.64*	*0.04*
0.30	*0.49*	*0.09*
0.40	*0.36*	*0.16*
0.50	*0.25*	*0.25*
0.60	*0.16*	*0.36*
0.70	*0.09*	*0.49*
0.80	*0.04*	*0.64*
0.90	*0.01*	*0.81*
1	*0*	*1*

- ***Player2*** is asked to pick a number N_2 between 0 and 1 (inclusive), in increments of 0.01. ***Player2***'s choice determines his/her penalty index on the task according to the following formula:

$$PenaltyIndex = (N_2 - N_1)^2$$

where N_1 is the number chosen by ***Player1***. When choosing N_2, ***Player2*** does not know which number N_1 has been chosen by ***Player1***. The closer ***Player2*** 's guess is to the number chosen by ***Player1***, the lower ***Player2*** 's penalty index will be. The next table provides some examples of penalty index for ***Player2*** based on some possible choices made by both ***Player1*** and ***Player2***.

Player1's choice

Player2's choice	0	0.10	0.20	0.30	0.40	0.50	0.60	0.70	0.80	0.90	1
0	*0*	*0.01*	*0.04*	*0.09*	*0.16*	*0.25*	*0.36*	*0.49*	*0.64*	*0.81*	*1*
0.10	*0.01*	*0*	*0.01*	*0.04*	*0.09*	*0.16*	*0.25*	*0.36*	*0.49*	*0.64*	*0.81*
0.20	*0.04*	*0.01*	*0*	*0.01*	*0.04*	*0.09*	*0.16*	*0.25*	*0.36*	*0.49*	*0.64*
0.30	*0.09*	*0.04*	*0.01*	*0*	*0.01*	*0.04*	*0.09*	*0.16*	*0.25*	*0.36*	*0.49*
0.40	*0.16*	*0.09*	*0.04*	*0.01*	*0*	*0.01*	*0.04*	*0.09*	*0.16*	*0.25*	*0.36*
0.50	*0.25*	*0.16*	*0.09*	*0.04*	*0.01*	*0*	*0.01*	*0.04*	*0.09*	*0.16*	*0.25*
0.60	*0.36*	*0.25*	*0.16*	*0.09*	*0.04*	*0.01*	*0*	*0.01*	*0.04*	*0.09*	*0.16*
0.70	*0.49*	*0.36*	*0.25*	*0.16*	*0.09*	*0.04*	*0.01*	*0*	*0.01*	*0.04*	*0.09*
0.80	*0.64*	*0.49*	*0.36*	*0.25*	*0.16*	*0.09*	*0.04*	*0.01*	*0*	*0.01*	*0.04*
0.90	*0.81*	*0.64*	*0.49*	*0.36*	*0.25*	*0.16*	*0.09*	*0.04*	*0.01*	*0*	*0.01*
1	*1*	*0.81*	*0.64*	*0.49*	*0.36*	*0.25*	*0.16*	*0.09*	*0.04*	*0.01*	*0*

- **<u>YOUR TASK</u>:** As ***Player3***, your task is to pick a number $\boldsymbol{N_3}$ between 0 and 1 (inclusive), in increments of 0.01. Your choice determines your penalty index on the task according to the following formula:

$$\boldsymbol{PenaltyIndex = (N_3 - N_2)^2}$$

where $\boldsymbol{N_2}$ is the number chosen by ***Player2***. When choosing $\boldsymbol{N_3}$, you do not know which number $\boldsymbol{N_2}$ has been chosen by ***Player2***, nor which number $\boldsymbol{N_1}$ has been chosen by ***Player1***. The closer your guess is to the number chosen by ***Player2***, the lower your penalty index will be. The next table provides some <u>examples</u> of your penalty index based on some possible choices made by both you and ***Player2***.

Player2's choice

Your choice	0	0.10	0.20	0.30	0.40	0.50	0.60	0.70	0.80	0.90	1
0	*0*	*0.01*	*0.04*	*0.09*	*0.16*	*0.25*	*0.36*	*0.49*	*0.64*	*0.81*	*1*
0.10	*0.01*	*0*	*0.01*	*0.04*	*0.09*	*0.16*	*0.25*	*0.36*	*0.49*	*0.64*	*0.81*
0.20	*0.04*	*0.01*	*0*	*0.01*	*0.04*	*0.09*	*0.16*	*0.25*	*0.36*	*0.49*	*0.64*
0.30	*0.09*	*0.04*	*0.01*	*0*	*0.01*	*0.04*	*0.09*	*0.16*	*0.25*	*0.36*	*0.49*
0.40	*0.16*	*0.09*	*0.04*	*0.01*	*0*	*0.01*	*0.04*	*0.09*	*0.16*	*0.25*	*0.36*
0.50	*0.25*	*0.16*	*0.09*	*0.04*	*0.01*	*0*	*0.01*	*0.04*	*0.09*	*0.16*	*0.25*
0.60	*0.36*	*0.25*	*0.16*	*0.09*	*0.04*	*0.01*	*0*	*0.01*	*0.04*	*0.09*	*0.16*
0.70	*0.49*	*0.36*	*0.25*	*0.16*	*0.09*	*0.04*	*0.01*	*0*	*0.01*	*0.04*	*0.09*
0.80	*0.64*	*0.49*	*0.36*	*0.25*	*0.16*	*0.09*	*0.04*	*0.01*	*0*	*0.01*	*0.04*
0.90	*0.81*	*0.64*	*0.49*	*0.36*	*0.25*	*0.16*	*0.09*	*0.04*	*0.01*	*0*	*0.01*
1	*1*	*0.81*	*0.64*	*0.49*	*0.36*	*0.25*	*0.16*	*0.09*	*0.04*	*0.01*	*0*

Recall that none of the players, including you, knows the color of the secret urn.

<u>Also, the penalty index is always a number between 0 and 1.</u>

Important summary information:

- ***Player1*** observes neither N_2 nor N_3.
- ***Player2*** observes neither N_1 nor N_3.
- ***You*** observe neither N_1 nor N_2.
- The computer draws three balls at random with replacement from the secret urn. This means that after drawing each ball from the urn, the computer records the color of the ball and reinserts the ball in the urn, so that the composition of the secret urn is the same before the next draw. The color of the first ball is shown to ***Player 1***, the color of the second ball is shown to ***Player 2***, and the color of the third ball is shown to you.
- Each player is shown the color of his/her secret ball before the player makes his/her choice.
- The same secret urn is used for all the periods of the same game.
- The computer randomly draws a new secret urn at the beginning of each new game.

How your Additional Earnings are Determined

Your additional earnings are determined based on your penalty index in **ONE** randomly chosen period of **ONE** randomly chosen game as follows. The computer randomly selects a number between 0 and 1 (inclusive) such that every number is equally likely to be selected. I.e., it is as likely to choose 0.5 as 0.346567. We refer to this number as the ***PaymentNumber***. The ***PaymentNumber*** is compared to your ***PenaltyIndex*** from the randomly chosen period of the randomly chosen game to determine your final earnings as follows:

If the ***PenaltyIndex*** is less than or equal to the ***PaymentNumber***, the 80 pesos you receive at the beginning are doubled. In this case, your overall earnings will be:

$$\boldsymbol{Final\ earnings = 100\ pesos\ +\ Earnings\ from\ the\ quiz\ + 160}$$

If the ***PenaltyIndex*** is greater than the ***PaymentNumber***, the 80 pesos you receive at the beginning are lost. In this case, your overall earnings will be:

$$\boldsymbol{Final\ earnings = 100\ pesos\ +\ Earnings\ from\ the\ qui}$$

The lower your penalty index is, the higher is your chance of doubling the 80 pesos.

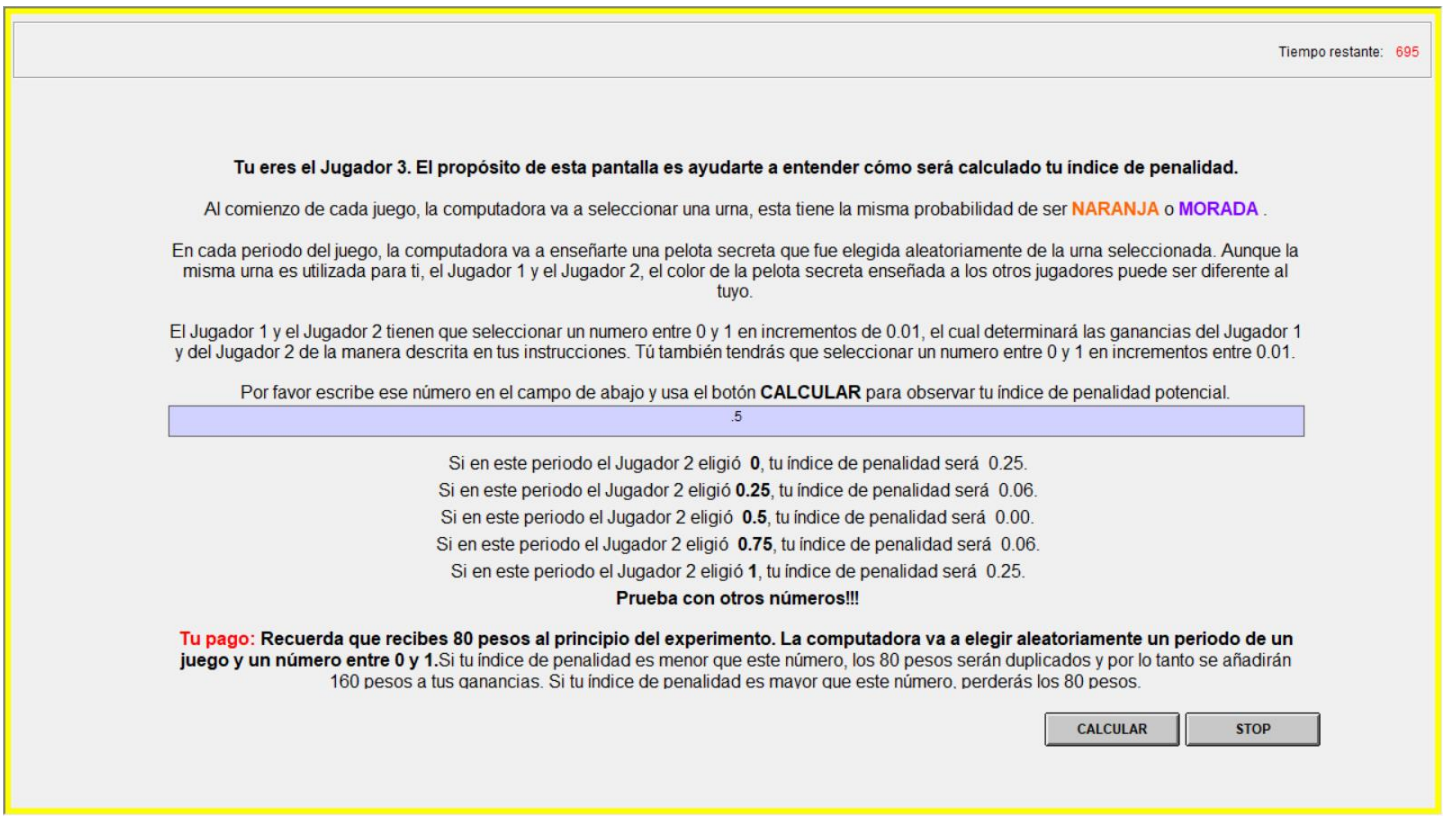
Examples: If your penalty index is zero, you double the 80 pesos with 100% chance.
If your penalty index is 0.25, you double the 80 pesos with 75% chance.
If your penalty index is 0.5, you double the 80 pesos with 50% chance.
If your penalty index is 0.75, you double the 80 pesos with 25% chance.
If your penalty index is 1, you double the 80 pesos with 0% chance.

You can either walk away with 260 pesos (plus your earnings from the quiz) or 100 pesos (plus your earnings from the quiz).

The computer selects a possibly different period and a possibly different *PaymentNumber* for each player.

Practice Before the Experiment: The Calculator

The experiment begins with the following screen.



Recall that the assignment of subjects to roles is random and anonymous. So, no other subject can observe which role you have been assigned to, and similarly you cannot observe which roles any other subject has been assigned to.

Every subject keeps his/her assigned role until the end of the experiment.

This screen allows you to familiarize yourself with the software. You can insert numbers in the calculator and it will display your penalty index given different possible choices of ***Player2***. These choices are just meant to explain how the software works and in no way reflect the choices that the subject in the role of ***Player2*** could be making during the experiment.

You have 12 minutes to play with the calculator, after which you will be asked to complete a quiz.

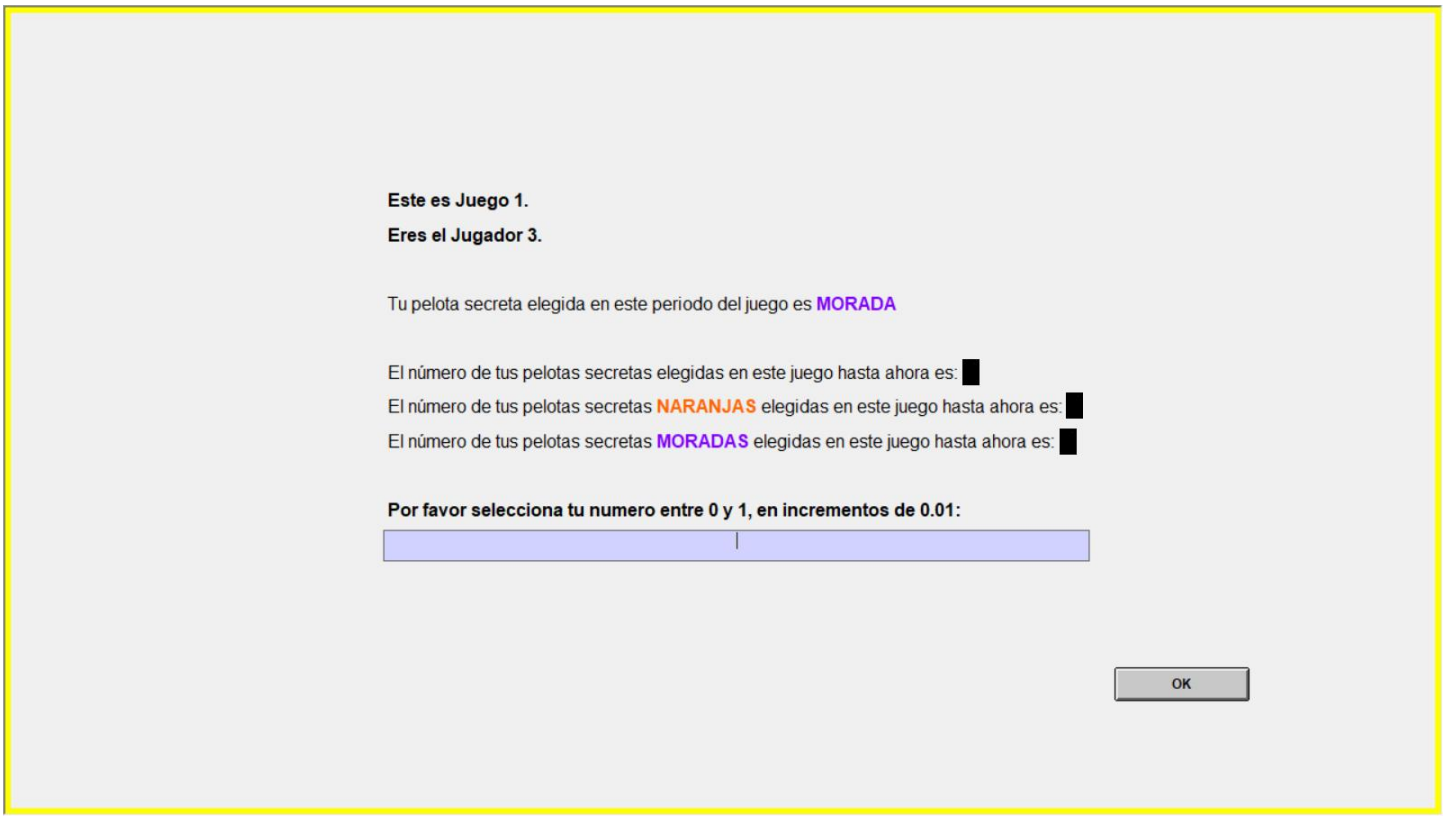
After the quiz, the experiment will begin.

Description of a Game

Recall that at the beginning of a game the computer randomly selects a new secret urn between ***ORANGE*** and ***PURPLE*** so that each earn is equally likely to be selected.

In each period of a game, the computer randomly draws a secret ball with replacement for you and for each player that you are matched with. You can see the color of your secret ball but you cannot see the color of the secret ball the computer drew for your matched partners.

In each period of a game, you see a screen similar to the following one.



The initial screen shows you information about the color of your secret ball that the computer has drawn from the secret urn for this period. It also reminds you about how many secret balls of each color have been drawn so far.

For example, suppose that the round is currently in period 8 and the color of your secret ball drawn for this period is orange. If the history of your secret balls drawn so far is orange, orange, purple, orange, purple, purple, purple the counter displays 4 orange balls (including your current secret orange ball), and 4 purple balls, for a total of 8 secret balls.

The screen asks you to choose a number between 0 and 1, in increments of 0.01. After you have entered your number, press OK in order to submit your choice.

The number that you entered will be used to determine your penalty index as previously described, based on the number chosen by ***Player2***.

Player1 observes a similar screen which reveals the color of his/her secret ball. ***Player2*** also observes a similar screen which reveals the color of his/her secret ball.

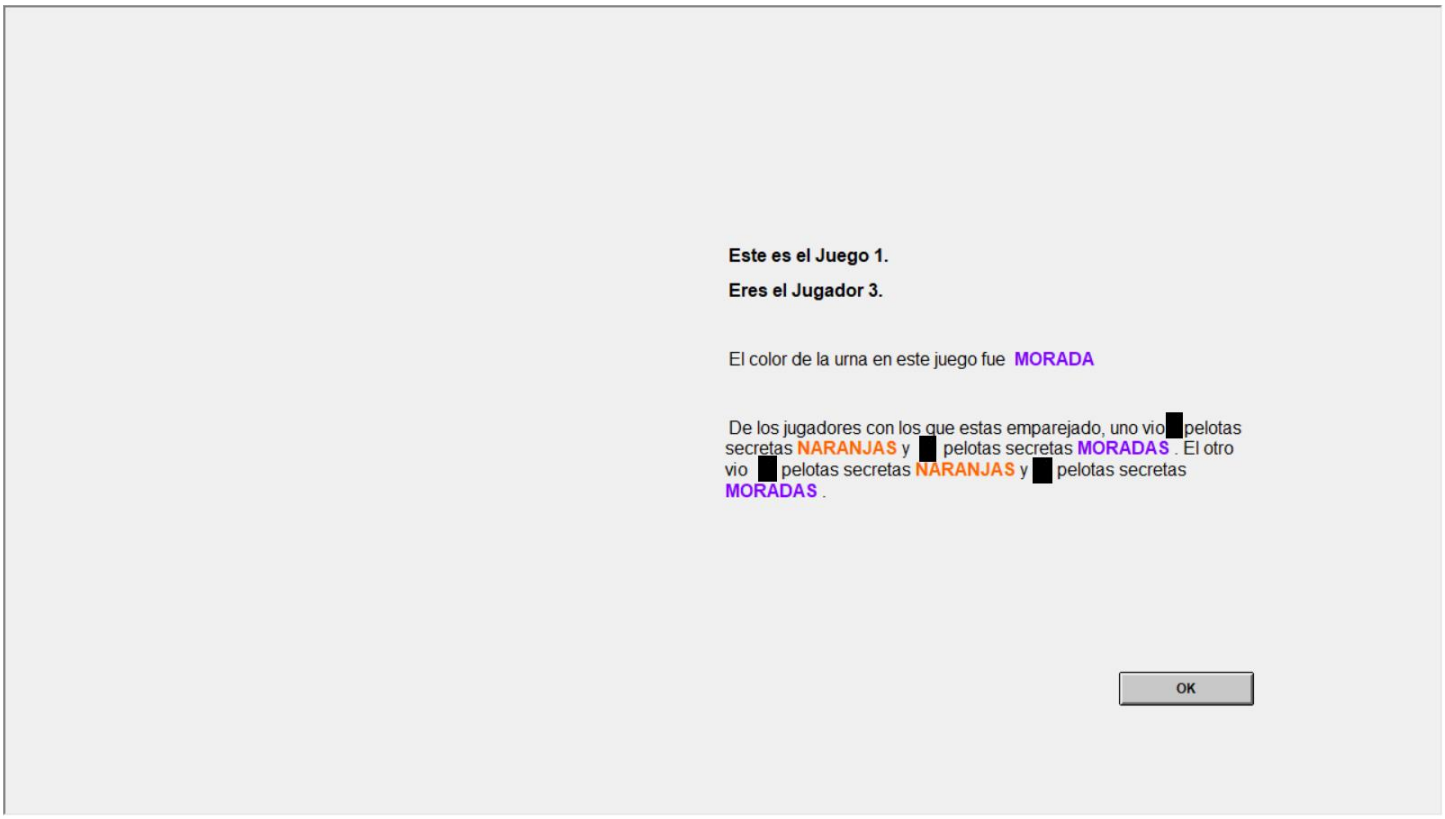
Once all three players have made their choice, the period ends and we proceed to the next period. Recall that a game lasts for 30 periods.

Important: You never observe your penalty index in any of the periods.

Information at the End of a Game

At the end of a game, all players observe a screen which reveals the color of the secret urn. However, you do not observe any information about your, or other players', penalty index in any of the periods.

For you, this screen may look like the following.



Please note that the experiment automatically continues to the next game after 30 SECONDS. If you push the OK button before the time has expired, you will be immediately prompted to the initial screen for the next game.

Quiz (Player 1, Public and Private)

Question 1: Suppose that the color of the secret urn is ***PURPLE***. If you choose $N_1 = 0.4$ which of the following statements is true:

A. Your penalty index is 0.09
B. Your penalty index is 0.16
C. Your penalty index is 0.25

Question 2: Which of the following statements is true?

A. If the penalty index gets smaller, the chance of doubling the 80 pesos goes down
B. If the penalty index gets smaller, the chance of doubling the 80 pesos stays the same
C. If the penalty index gets smaller, the chance of doubling the 80 pesos goes up

Question 3: Your additional earnings depend on:

A. Your performance in one randomly chosen period of one randomly chosen game
B. Your performance in all periods of one randomly chosen game
C. Your performance in one randomly chosen period of every game

Question 4: Which of the following statements is true?

A. At the beginning of each period of the game, the computer randomly selects a new urn
B. At the beginning of the experiment, the computer randomly selects an urn which is used for every game of the experiment
C. At the beginning of each game, the computer randomly selects a new urn which is used for every period of the game

Quiz (Player 2, Public and Private)

Question 1: Suppose that ***Player1*** chose $N_1 = 0.3$. If you choose $N_2 = 0.7$ which of the following statements is true:

A. Your penalty index is 0.09
B. Your penalty index is 0.16
C. Your penalty index is 0.25

Question 2: Which of the following statements is true?

A. If the penalty index gets smaller, the chance of doubling the 80 pesos goes down
B. If the penalty index gets smaller, the chance of doubling the 80 pesos stays the same
C. If the penalty index gets smaller, the chance of doubling the 80 pesos goes up

Question 3: Your additional earnings depend on:

A. Your performance in one randomly chosen period of one randomly chosen game
B. Your performance in all periods of one randomly chosen game
C. Your performance in one randomly chosen period of every game

Question 4: Which of the following statements is true?

A. At the beginning of each period of the game, the computer randomly selects a new urn
B. At the beginning of the experiment, the computer randomly selects an urn which is used for every game of the experiment
C. At the beginning of each game, the computer randomly selects a new urn which is used for every period of the game

Quiz (Player 3, Public and Private)

Question 1: Suppose that ***Player2*** chose $N_2 = 0.3$. If you choose $N_3 = 0.7$ which of the following statements is true:

A. Your penalty index is 0.09
B. Your penalty index is 0.16
C. Your penalty index is 0.25

Question 2: Which of the following statements is true?

A. If the penalty index gets smaller, the chance of doubling the 80 pesos goes down
B. If the penalty index gets smaller, the chance of doubling the 80 pesos stays the same
C. If the penalty index gets smaller, the chance of doubling the 80 pesos goes up

Question 3: Your additional earnings depend on:

A. Your performance in one randomly chosen period of one randomly chosen game
B. Your performance in all periods of one randomly chosen game
C. Your performance in one randomly chosen period of every game

Question 4: Which of the following statements is true?

A. At the beginning of each period of the game, the computer randomly selects a new urn
B. At the beginning of the experiment, the computer randomly selects an urn which is used for every game of the experiment
C. At the beginning of each game, the computer randomly selects a new urn which is used for every period of the game

Instructions for Online Experiments

Within-Public Treatment

Part 1: Test

You will complete a test. The test has **7** questions. You will receive **$0.10** for each correct answer.

You have **10 minutes** to answer all the questions. Please read each question carefully. Once you submit an answer, you cannot change it.

If the time expires before you have completed the test, you will only get paid for the correct answers that you submitted provided that you complete both parts of the experiment. We will tell you your test result at the end of the experiment.

Please press NEXT when you are ready to start with Part 1 of the experiment.
[*The test is a modified and longer version of the Cognitive Reflection Test. The test is followed by a short survey page asking the participant to report age and gender. The survey page was used to prevent dropouts from getting automatically matched to an active participants, which can only occur by pro-actively clicking the NEXT button.*]

Part 2: Instructions

Thank you for continuing with the experiment! You have up to 15 minutes to read these instructions, after which you will automatically proceed to the next page.

Don't worry about having to remember all the information on this page. Each decision screen contains a summary of the most relevant information from these instructions.

For this part, you will be matched with another participant, who also completed Part 1. You and your matched partner will play a game 30 times. Each time you play the game is called a **round**.

In every round, you will have to make two decisions. The computer will record your performance in every decision you make (for a total of 2x30 = 60 decisions in the game).

Despite the fact that the game lasts for 30 rounds, we expect the experiment to move quickly across rounds. Although, this will ultimately depend on you and your matched partner.

The game proceeds as fast as the slower participant, so remember to submit your decisions in a timely manner.

At the end of the experiment, the computer will randomly select ONE of your decisions to determine your additional earnings. You can gain a bonus of $\$\mathbf{3.00}$ depending on the accuracy of the decision selected for payment, and an element of randomness as explained below.

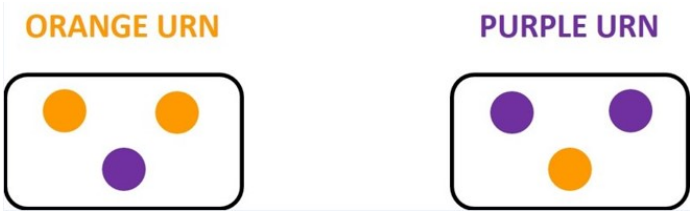
In each round, you will have **2 minutes** to make each choice. The timer is set to ensure that, if your partner decides to stop playing, for example by closing the browser page, the program will automatically end the experiment after your partner's time expires. You will still have the opportunity to earn the additional bonus. This will be based on the accuracy of one randomly chosen decision among those you have taken until that round. However, if you let the time expire or you quit the game before the end, you will not get paid for either part of the experiment.

THE GAME

There are two urns: the **Orange** urn, and the **Purple** urn.

- The **Orange** urn contains 2 **ORANGE** balls and 1 **PURPLE** ball.
- The **Purple** urn contains 1 **ORANGE** ball and 2 **PURPLE** balls.

Here is a graphical illustration:



At the beginning of the game, the computer secretly selects one of the two urns with equal probability. That is, each urn has a 50% chance to be selected. We refer to the selected urn as the **secret urn**, which is fixed for the rest of the experiment.

Neither you nor your partner observe which urn was selected.

In each round of the game, the computer randomly draws a ball from the **secret urn**. After the ball is drawn, its color is revealed to you and your matched partner. Thus, you and your partner observe the same ball color (**ORANGE** or **PURPLE**) in every round.

The ball is reinserted in the **secret urn** after each draw so that the composition of the **secret urn** is always the same at the beginning of the next round. After 30 rounds, the game is over and you will get paid.

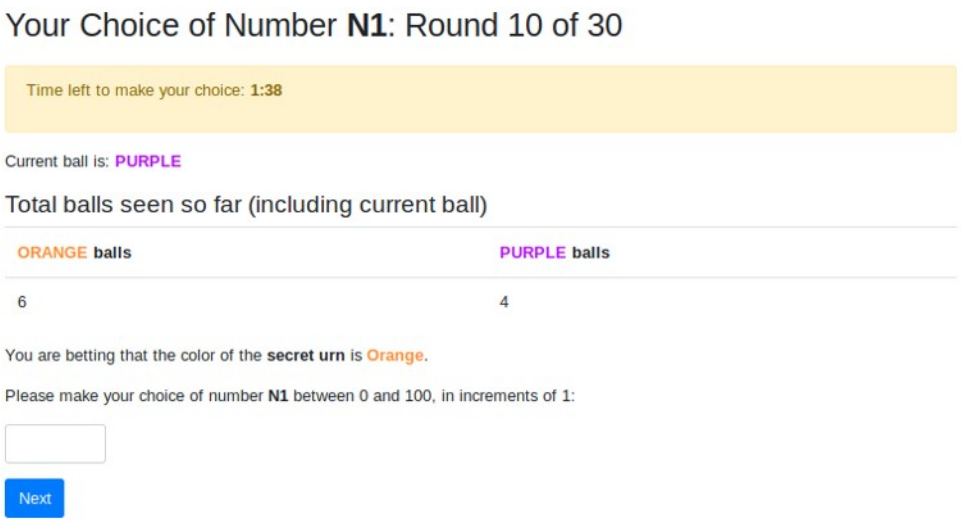
DECISIONS IN EACH ROUND

In each round, you are asked to pick two numbers: **N1** and **N2**, each between 0 and 100, in increments of 1:

- **N1** is your bet that the color of the **secret urn** is **Orange**.
- **N2** is your bet on which number **N1** your partner has chosen in the current round.

Recall that both you and your partner observe the same information in every round before making any decisions.

The first screen you see at the beginning of a round asks you to submit your choice of number **N1**. For example, in an arbitrary round, you and your partner might observe a screen like the following:

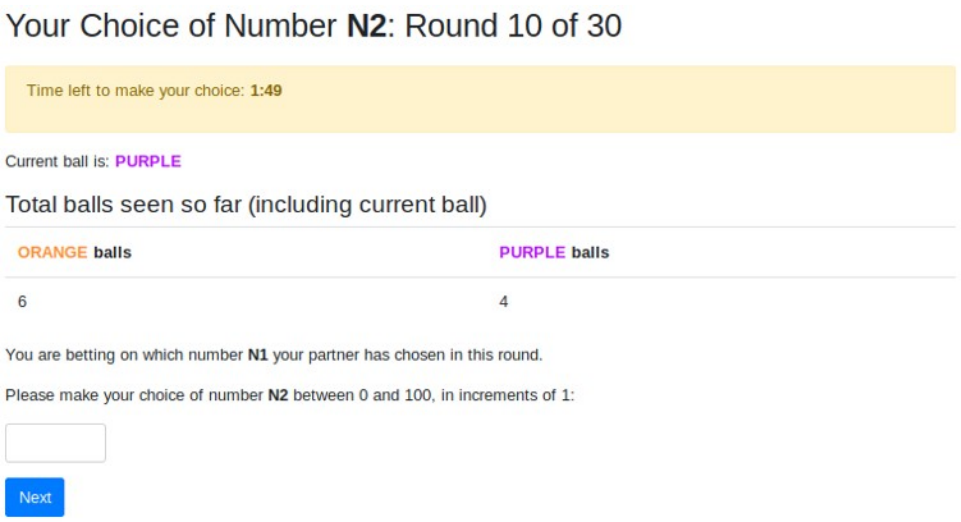


The screen shows you information about the color of the ball that the computer has drawn from the **secret urn** for this round. It also reminds you about how many balls of each color have been drawn so far from the **secret urn**.

For example, suppose that the game is currently in round 10 (as in the screen above) and the color of the ball drawn for this round is **PURPLE**. If the history of balls drawn so far is **ORANGE**,

ORANGE, **ORANGE**, **PURPLE**, **ORANGE**, **ORANGE**, **PURPLE**, **ORANGE**, **PURPLE**, **PURPLE**, the table displays 6 **ORANGE** balls and 4 **PURPLE** balls, for a total of 10 balls (including the current ball).

A second, and similar, screen asks you to submit your choice of number **N2**.



Press **NEXT** when you are ready to submit each choice.

HOW YOUR BONUS IS DETERMINED

The program selects ONE randomly chosen decision out of your 60 decisions to determine whether or not you will receive the additional bonus of $**3.00**.

Each decision determines a **PenaltyIndex** which is computed as described below.

If your choice of **N1** is randomly selected for payment, the **PenaltyIndex** is given by the following formula:

PenaltyIndex = (**N1**/100 - 1) * (**N1**/100 - 1), if the **secret urn** is **Orange**

PenaltyIndex = (**N1**/100) * (**N1**/100), if the **secret urn** is **Purple**

That is, the closer your choice is to the color of the **secret urn** (0 if the **secret urn** is **Purple**, and 100 if the **secret urn** is **Orange**), the lower your **PenaltyIndex** will be. However, neither you nor your partner observe the color of the **secret urn**.

Note that the penalty index is always between 0 and 1, no matter what choice you make.

The next table provides some examples of your **PenaltyIndex** based on the color of the **secret urn** and possible choices of **N1** made by you:

Your choice of **N1**	**PenaltyIndex** if **secret urn** is **Orange**	**PenaltyIndex** if **secret urn** is **Purple**
0	*1*	*0*
10	*0.81*	*0.01*
20	*0.64*	*0.04*
30	*0.49*	*0.09*
40	*0.36*	*0.16*
50	*0.25*	*0.25*
60	*0.16*	*0.36*
70	*0.09*	*0.49*
80	*0.04*	*0.64*
90	*0.01*	*0.81*
100	*0*	*1*

If your choice of number **N2** is instead randomly selected for payment, the **PenaltyIndex** is given by the following formula:

$$\textbf{PenaltyIndex} = [(\textbf{N2} - \textbf{N1\_partner})/100] * [(\textbf{N2} - \textbf{N1\_partner})/100]$$

That is, the closer your choice is to the number chosen by your partner, the lower your **PenaltyIndex** will be.

Again, note that the penalty index is always between 0 and 1, no matter what choice you make.

The next table provides some examples of your **PenaltyIndex** based on your choice of number **N2** and possible choices of **N1** made by your partner:

		Your partner's choice of **N1**										
		0	**10**	**20**	**30**	**40**	**50**	**60**	**70**	**80**	**90**	**100**
Your choice of **N2**	**0**	*0*	*0.01*	*0.04*	*0.09*	*0.16*	*0.25*	*0.36*	*0.49*	*0.64*	*0.81*	*1*
	10	*0.01*	*0*	*0.01*	*0.04*	*0.09*	*0.16*	*0.25*	*0.36*	*0.49*	*0.64*	*0.81*
	20	*0.04*	*0.01*	*0*	*0.01*	*0.04*	*0.09*	*0.16*	*0.25*	*0.36*	*0.49*	*0.64*
	30	*0.09*	*0.04*	*0.01*	*0*	*0.01*	*0.04*	*0.09*	*0.16*	*0.25*	*0.36*	*0.49*
	40	*0.16*	*0.09*	*0.04*	*0.01*	*0*	*0.01*	*0.04*	*0.09*	*0.16*	*0.25*	*0.36*
	50	*0.25*	*0.16*	*0.09*	*0.04*	*0.01*	*0*	*0.01*	*0.04*	*0.09*	*0.16*	*0.25*
	60	*0.36*	*0.25*	*0.16*	*0.09*	*0.04*	*0.01*	*0*	*0.01*	*0.04*	*0.09*	*0.16*
	70	*0.49*	*0.36*	*0.25*	*0.16*	*0.09*	*0.04*	*0.01*	*0*	*0.01*	*0.04*	*0.09*
	80	*0.64*	*0.49*	*0.36*	*0.25*	*0.16*	*0.09*	*0.04*	*0.01*	*0*	*0.01*	*0.04*
	90	*0.81*	*0.64*	*0.49*	*0.36*	*0.25*	*0.16*	*0.09*	*0.04*	*0.01*	*0*	*0.01*
	100	*1*	*0.81*	*0.64*	*0.49*	*0.36*	*0.25*	*0.16*	*0.09*	*0.04*	*0.01*	*0*

After computing your **PenaltyIndex**, the program randomly selects a number between 0 and 1 (inclusive) such that every number is equally likely to be selected (up to 5 decimal digits). I.e., it is as likely to choose 0.1145 or 0.5 or 0.893, etc. We refer to this number as the **PaymentNumber**.

You win the bonus of $**3.00** IF your **PenaltyIndex** <= **PaymentNumber**

The lower your **PenaltyIndex** is, the higher is your chance of receiving the bonus.

Examples:

- If your **PenaltyIndex** is 0, you win the bonus of $**3.00** with 100% chance.
- If your **PenaltyIndex** is 0.25, you win the bonus of $**3.00** with 75% chance.
- If your **PenaltyIndex** is 0.5, you win the bonus of $**3.00** with 50% chance.
- If your **PenaltyIndex** is 0.75, you win the bonus of $**3.00** with 25% chance.
- If your **PenaltyIndex** is 1, you win the bonus of $**3.00** with 0% chance.

Please proceed to the next page when you are ready to start the game.

[*After pressing NEXT subjects see another page telling them that they will see a waiting page in case no other participant is ready to be matched with them. The additional page is meant to prevent subjects that drop out at the instructions stage to be matched with another participant, as this requires them to press NEXT again on the page following the instructions.*]

Screenshots for Within-Public Treatment

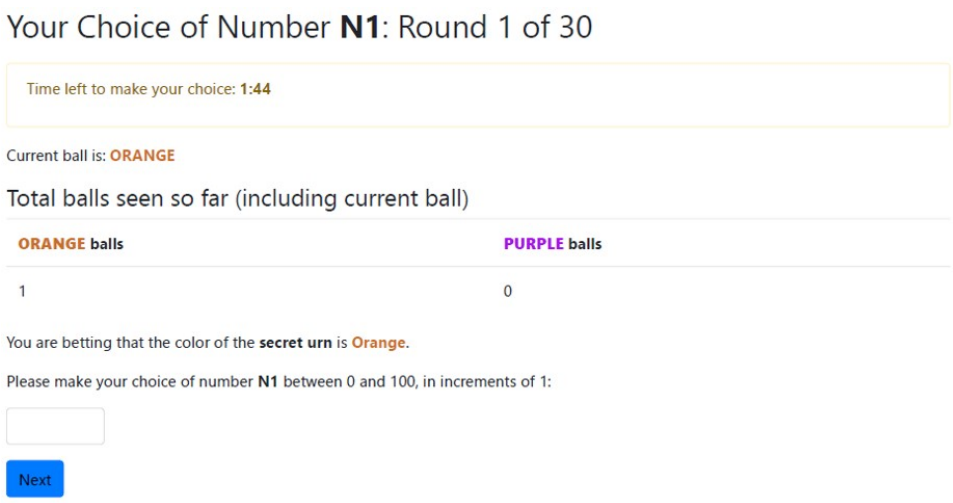
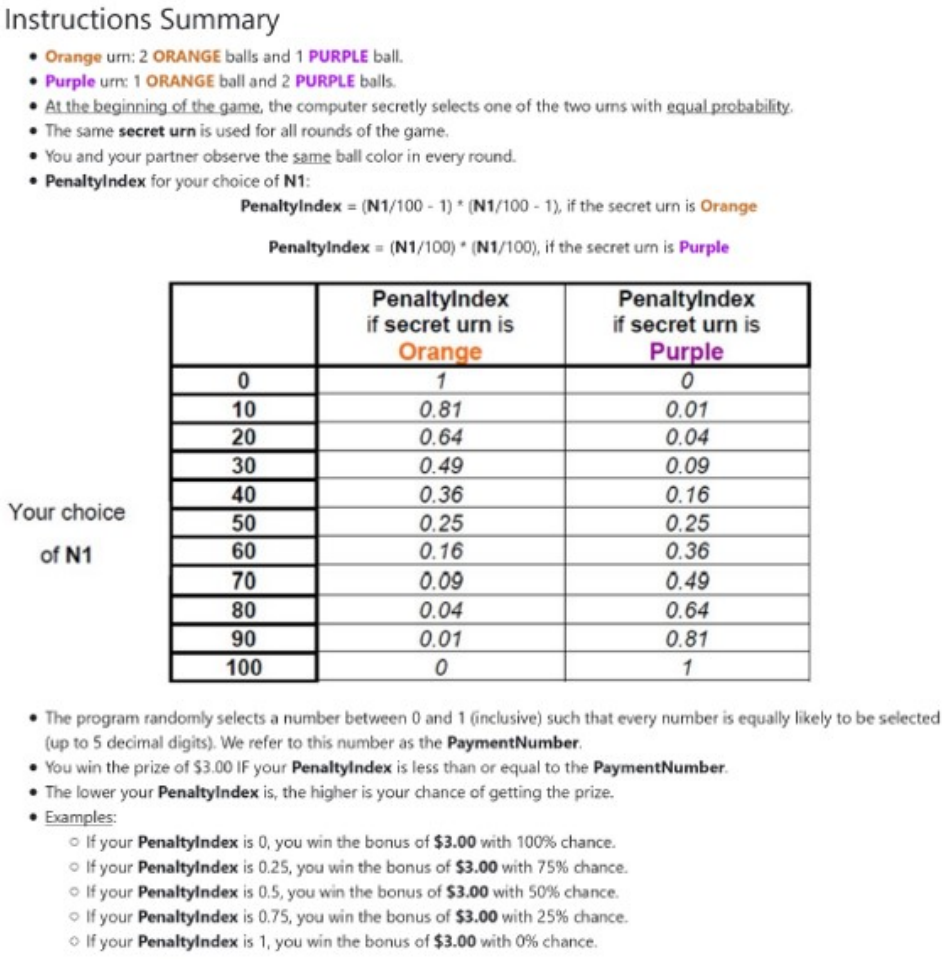


Figure 1: Screenshot of the first decision page.



Instructions Summary

- **Orange** urn: 2 **ORANGE** balls and 1 **PURPLE** ball.
- **Purple** urn: 1 **ORANGE** ball and 2 **PURPLE** balls.
- At the beginning of the game, the computer secretly selects one of the two urns with equal probability.
- The same **secret urn** is used for all rounds of the game.
- You and your partner observe the same ball color in every round.
- **PenaltyIndex** for your choice of **N1**:

PenaltyIndex = (**N1**/100 - 1) * (**N1**/100 - 1), if the secret urn is **Orange**

PenaltyIndex = (**N1**/100) * (**N1**/100), if the secret urn is **Purple**

Your choice of **N1**	**PenaltyIndex** if secret urn is **Orange**	**PenaltyIndex** if secret urn is **Purple**
0	*1*	*0*
10	*0.81*	*0.01*
20	*0.64*	*0.04*
30	*0.49*	*0.09*
40	*0.36*	*0.16*
50	*0.25*	*0.25*
60	*0.16*	*0.36*
70	*0.09*	*0.49*
80	*0.04*	*0.64*
90	*0.01*	*0.81*
100	*0*	*1*

- The program randomly selects a number between 0 and 1 (inclusive) such that every number is equally likely to be selected (up to 5 decimal digits). We refer to this number as the **PaymentNumber**.
- You win the prize of $3.00 IF your **PenaltyIndex** is less than or equal to the **PaymentNumber**.
- The lower your **PenaltyIndex** is, the higher is your chance of getting the prize.
- Examples:
  - If your **PenaltyIndex** is 0, you win the bonus of **$3.00** with 100% chance.
  - If your **PenaltyIndex** is 0.25, you win the bonus of **$3.00** with 75% chance.
  - If your **PenaltyIndex** is 0.5, you win the bonus of **$3.00** with 50% chance.
  - If your **PenaltyIndex** is 0.75, you win the bonus of **$3.00** with 25% chance.
  - If your **PenaltyIndex** is 1, you win the bonus of **$3.00** with 0% chance.

Figure 2: Screenshot of the summary information displayed at the bottom of the first decision page in each round.

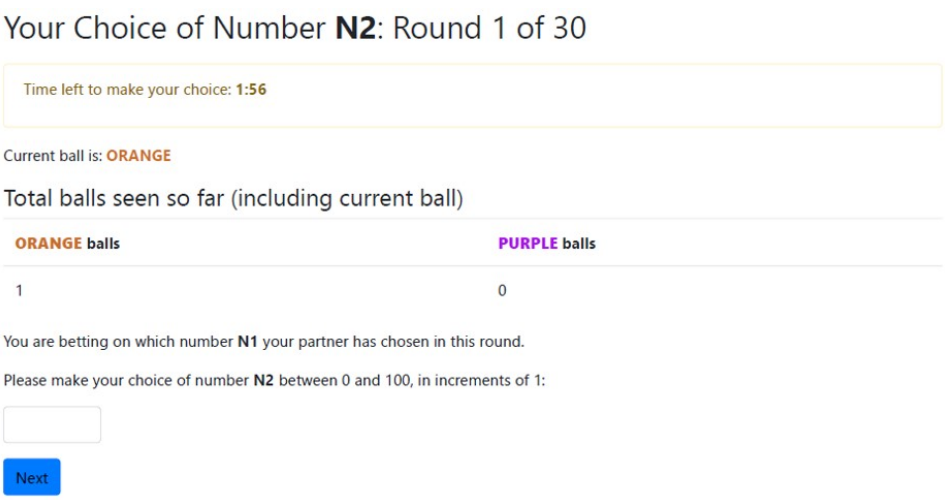


Figure 3: Screenshot of the second decision page.

Instructions Summary

- **Orange** urn: 2 **ORANGE** balls and 1 **PURPLE** ball.
- **Purple** urn: 1 **ORANGE** ball and 2 **PURPLE** balls.
- At the beginning of the game, the computer secretly selects one of the two urns with equal probability.
- The same **secret urn** is used for all rounds of the game.
- You and your partner observe the same ball color in every round.
- **PenaltyIndex** for your choice of **N2**:

PenaltyIndex = [(**N2** - **N1_partner**)/100] * [(**N2** - **N1_partner**)/100]

Your partner's choice of **N1**

Your choice of **N2**	0	10	20	30	40	50	60	70	80	90	100
0	0	0.01	0.04	0.09	0.16	0.25	0.36	0.49	0.64	0.81	1
10	0.01	0	0.01	0.04	0.09	0.16	0.25	0.36	0.49	0.64	0.81
20	0.04	0.01	0	0.01	0.04	0.09	0.16	0.25	0.36	0.49	0.64
30	0.09	0.04	0.01	0	0.01	0.04	0.09	0.16	0.25	0.36	0.49
40	0.16	0.09	0.04	0.01	0	0.01	0.04	0.09	0.16	0.25	0.36
50	0.25	0.16	0.09	0.04	0.01	0	0.01	0.04	0.09	0.16	0.25
60	0.36	0.25	0.16	0.09	0.04	0.01	0	0.01	0.04	0.09	0.16
70	0.49	0.36	0.25	0.16	0.09	0.04	0.01	0	0.01	0.04	0.09
80	0.64	0.49	0.36	0.25	0.16	0.09	0.04	0.01	0	0.01	0.04
90	0.81	0.64	0.49	0.36	0.25	0.16	0.09	0.04	0.01	0	0.01
100	1	0.81	0.64	0.49	0.36	0.25	0.16	0.09	0.04	0.01	0

- The program randomly selects a number between 0 and 1 (inclusive) such that every number is equally likely to be selected (up to 5 decimal digits). We refer to this number as the **PaymentNumber**.
- You win the prize of $3.00 IF your **PenaltyIndex** is less than or equal to the **PaymentNumber**.
- The lower your **PenaltyIndex** is, the higher is your chance of getting the prize.
- Examples:
  - If your **PenaltyIndex** is 0, you win the bonus of **$3.00** with 100% chance.
  - If your **PenaltyIndex** is 0.25, you win the bonus of **$3.00** with 75% chance.
  - If your **PenaltyIndex** is 0.5, you win the bonus of **$3.00** with 50% chance.
  - If your **PenaltyIndex** is 0.75, you win the bonus of **$3.00** with 25% chance.
  - If your **PenaltyIndex** is 1, you win the bonus of **$3.00** with 0% chance.

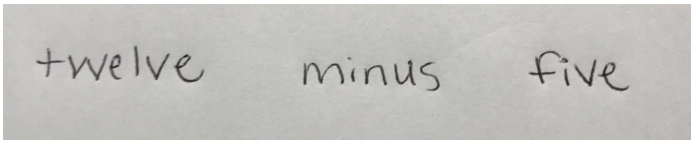
Figure 4: Screenshot of the summary information displayed at the bottom of the second decision page.

Within-Private Treatment

Test

Please answer the question in the image below using the answer box. Write your answer in lowercase letters.
For example, if the answer is 3, write **three** in the answer box without any spaces.
If you submit an incorrect answer, you won't be allowed to continue with the experiment.

QUESTION:



Instructions

Thank you for participating in this experiment!

Please remember that you have **30 minutes** to submit this assignment on MTurk from the time you accepted it!

If you complete this experiment within the allotted time, you will receive an additional bonus of **$1** on top of any other earnings.

Please read the information on this screen carefully. A good understanding of these instructions can increase your chances of making more money during the experiment.

Don't worry about having to remember all the information on this page. Each decision screen contains a summary of the most relevant information from these instructions.

In this experiment, you will be matched with another participant. You and your matched partner will play a game 30 times. Each time you play the game is called a **round**.

In every round, you will have to make two decisions. The computer will record your performance in every decision you make (for a total of 2x30 = 60 decisions in the game).

Despite the fact that the game lasts for 30 rounds, we expect the experiment to move quickly across rounds. Although, this will ultimately depend on you and your matched partner.

The game proceeds as fast as the slower participant, so remember to submit your decisions in a timely manner.

At the end of the experiment, the computer will randomly select ONE of your decisions to determine your additional earnings. You can gain a bonus of **$3** depending on the accuracy of the decision selected for payment, and an element of randomness as explained below.

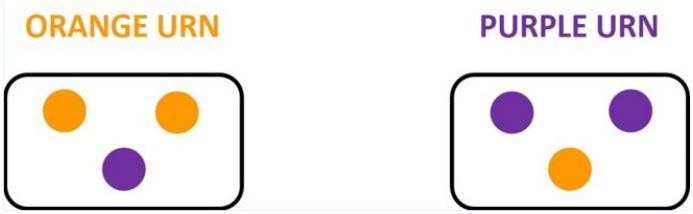
In each round, you will have **1 minute** to make each choice. The timer is set to ensure that, if your partner decides to stop playing, for example by closing the browser page, the program will automatically end the experiment after your partner's time expires. You will still have the opportunity to earn the additional bonus. This will be based on the accuracy of one randomly chosen decision among those you have taken until that round. However, if you let the time expire or you quit the game before the end, you will not get paid for either part of the experiment.

THE GAME

There are two urns: the **Orange** urn, and the **Purple** urn.

- The **Orange** urn contains 2 **ORANGE** balls and 1 **PURPLE** ball.
- The **Purple** urn contains 1 **ORANGE** ball and 2 **PURPLE** balls.

Here is a graphical illustration:



At the beginning of the game, the computer secretly selects one of the two urns with equal probability. That is, each urn has a 50% chance to be selected. We refer to the selected urn as the **secret urn**, which is fixed for the rest of the experiment.

Neither you nor your partner observe which urn was selected.

IMPORTANT: In every round of the game, the computer draws one ball at random from the **secret urn**, it records the color of the ball and reinserts the ball into the **secret urn** so that the composition of the **secret urn** is always the same. Then, the computer draws another ball at random from the **secret urn**, it records the color of the ball and reinserts the ball into the **secret**

urn. The color of one of the two balls is shown ONLY to you, while the color of the other ball is shown ONLY to your partner.

Thus, in every round, you and your partner observe a ball of the same or a possibly different color (ORANGE or PURPLE).

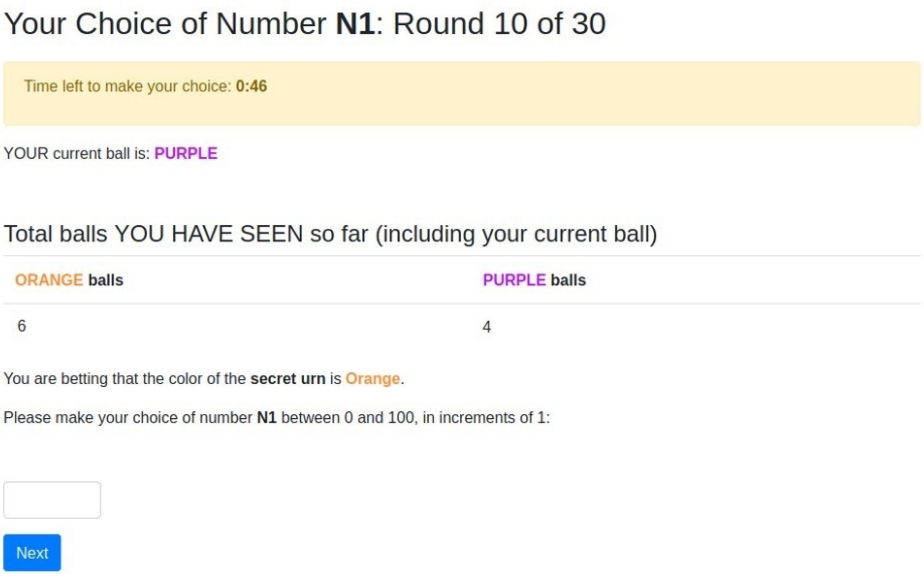
DECISIONS IN EACH ROUND

In each round, you are asked to pick two numbers: **N1** and **N2**, each between 0 and 100, in increments of 1:

- **N1** is your bet that the color of the **secret urn** is **Orange**.
- **N2** is your bet on which number **N1** your partner has chosen in the current round.

Recall that both you and your partner **may have observed a different sequence of balls** drawn from the same **secret urn**.

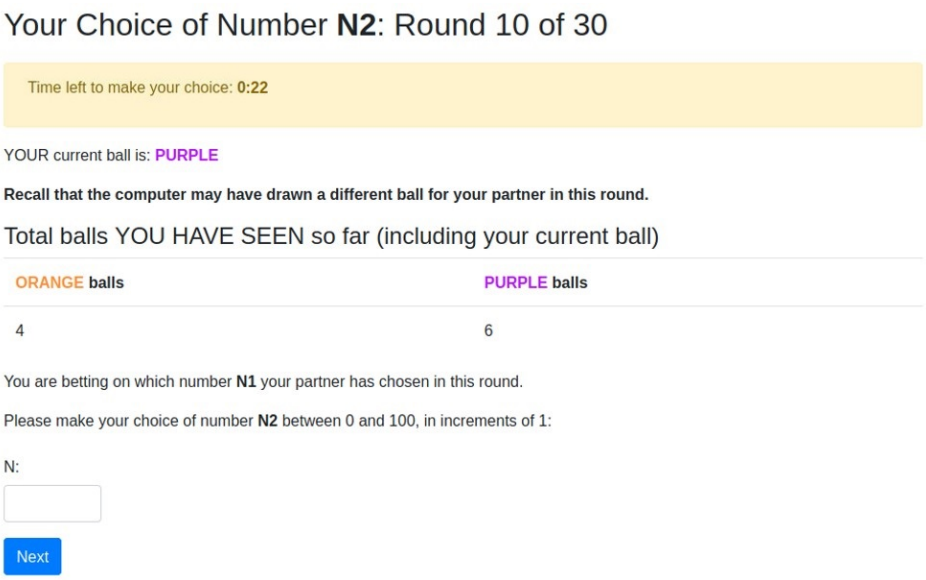
The first screen you see at the beginning of a round asks you to submit your choice of number **N1**. For example, in an arbitrary round, you and your partner might observe a screen like the following:



The screen shows you information about the color of YOUR ball that the computer has drawn from the **secret urn** for this round. It also reminds you about how many balls of each color have been drawn so far from the **secret urn** for YOU.

For example, suppose that the game is currently in round 10 (as in the screen above) and the color of your ball drawn for this round is **PURPLE**. If the history of balls drawn so far is **ORANGE**, **ORANGE**, **ORANGE**, **PURPLE**, **ORANGE**, **ORANGE**, **PURPLE**, **ORANGE**, **PURPLE**, **PURPLE**, the table displays 6 **ORANGE** balls and 4 **PURPLE** balls, for a total of 10 balls (including your current ball).

A second, and similar, screen asks you to submit your choice of number **N2**.



Press **NEXT** when you are ready to submit each choice.

HOW YOUR BONUS IS DETERMINED

The program selects ONE randomly chosen decision out of your 60 decisions to determine whether or not you will receive the additional bonus of $**3.00**.

Each decision determines a **PenaltyIndex** which is computed as described below.

If your choice of **N1** is randomly selected for payment, the **PenaltyIndex** is given by the following formula:

PenaltyIndex = (**N1**/100 - 1) * (**N1**/100 - 1), if the **secret urn** is **Orange**

PenaltyIndex = (**N1**/100) * (**N1**/100), if the **secret urn** is **Purple**

That is, the closer your choice is to the color of the **secret urn** (0 if the **secret urn** is **Purple**, and 100 if the **secret urn** is **Orange**), the lower your **PenaltyIndex** will be. However, neither you nor your partner observe the color of the **secret urn**.

Note that the penalty index is always between 0 and 1, no matter what choice you make.

The next table provides some examples of your **PenaltyIndex** based on the color of the **secret urn** and possible choices of **N1** made by you:

Your choice of **N1**	PenaltyIndex if secret urn is Orange	PenaltyIndex if secret urn is Purple
0	*1*	*0*
10	*0.81*	*0.01*
20	*0.64*	*0.04*
30	*0.49*	*0.09*
40	*0.36*	*0.16*
50	*0.25*	*0.25*
60	*0.16*	*0.36*
70	*0.09*	*0.49*
80	*0.04*	*0.64*
90	*0.01*	*0.81*
100	*0*	*1*

If your choice of number **N2** is instead randomly selected for payment, the **PenaltyIndex** is given by the following formula:

$$\textbf{PenaltyIndex} = [(\textbf{N2} - \textbf{N1\_partner})/100] * [(\textbf{N2} - \textbf{N1\_partner})/100]$$

That is, the closer your choice is to the number chosen by your partner, the lower your **PenaltyIndex** will be.

Again, note that the penalty index is always between 0 and 1, no matter what choice you make.

The next table provides some examples of your **PenaltyIndex** based on your choice of number **N2** and possible choices of **N1** made by your partner:

Your choice of **N2** \ Your partner's choice of **N1**	**0**	**10**	**20**	**30**	**40**	**50**	**60**	**70**	**80**	**90**	**100**
0	*0*	*0.01*	*0.04*	*0.09*	*0.16*	*0.25*	*0.36*	*0.49*	*0.64*	*0.81*	*1*
10	*0.01*	*0*	*0.01*	*0.04*	*0.09*	*0.16*	*0.25*	*0.36*	*0.49*	*0.64*	*0.81*
20	*0.04*	*0.01*	*0*	*0.01*	*0.04*	*0.09*	*0.16*	*0.25*	*0.36*	*0.49*	*0.64*
30	*0.09*	*0.04*	*0.01*	*0*	*0.01*	*0.04*	*0.09*	*0.16*	*0.25*	*0.36*	*0.49*
40	*0.16*	*0.09*	*0.04*	*0.01*	*0*	*0.01*	*0.04*	*0.09*	*0.16*	*0.25*	*0.36*
50	*0.25*	*0.16*	*0.09*	*0.04*	*0.01*	*0*	*0.01*	*0.04*	*0.09*	*0.16*	*0.25*
60	*0.36*	*0.25*	*0.16*	*0.09*	*0.04*	*0.01*	*0*	*0.01*	*0.04*	*0.09*	*0.16*
70	*0.49*	*0.36*	*0.25*	*0.16*	*0.09*	*0.04*	*0.01*	*0*	*0.01*	*0.04*	*0.09*
80	*0.64*	*0.49*	*0.36*	*0.25*	*0.16*	*0.09*	*0.04*	*0.01*	*0*	*0.01*	*0.04*
90	*0.81*	*0.64*	*0.49*	*0.36*	*0.25*	*0.16*	*0.09*	*0.04*	*0.01*	*0*	*0.01*
100	*1*	*0.81*	*0.64*	*0.49*	*0.36*	*0.25*	*0.16*	*0.09*	*0.04*	*0.01*	*0*

After computing your **PenaltyIndex**, the program randomly selects a number between 0 and 1 (inclusive) such that every number is equally likely to be selected (up to 5 decimal digits). I.e., it is as likely to choose 0.1145 or 0.5 or 0.893, etc. We refer to this number as the **PaymentNumber**.

You win the bonus of $**3.00** IF your **PenaltyIndex** <= **PaymentNumber**

The lower your **PenaltyIndex** is, the higher is your chance of receiving the bonus.

Examples:

- If your **PenaltyIndex** is 0, you win the bonus of $**3.00** with 100% chance.
- If your **PenaltyIndex** is 0.25, you win the bonus of $**3.00** with 75% chance.
- If your **PenaltyIndex** is 0.5, you win the bonus of $**3.00** with 50% chance.
- If your **PenaltyIndex** is 0.75, you win the bonus of $**3.00** with 25% chance.
- If your **PenaltyIndex** is 1, you win the bonus of $**3.00** with 0% chance.

Please proceed to the next page when you are ready to start the game.

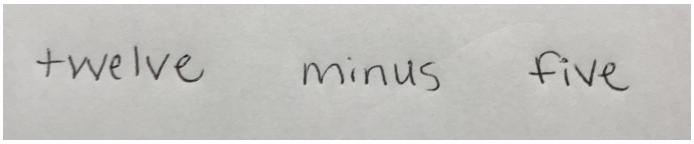
[*After pressing NEXT subjects see another page telling them that they will see a waiting page in case no other participant is ready to be matched with them. The additional page is meant to prevent subjects that drop out at the instructions stage to be matched with another participant, as this requires them to press NEXT again on the page following the instructions.*]

Within-Long Treatment

Test

Please answer the question in the image below using the answer box. Write your answer in lowercase letters.
For example, if the answer is 3, write **three** in the answer box without any spaces.
If you submit an incorrect answer, you won't be allowed to continue with the experiment.

QUESTION:



Instructions

Thank you for participating in this experiment!

Please remember that you have **30 minutes** to submit this assignment on MTurk from the time you accepted it!

If you complete this experiment within the allotted time, you will receive an additional bonus of **$1** on top of any other earnings.

Please read the information on this screen carefully. A good understanding of these instructions can increase your chances of making more money during the experiment.

Don't worry about having to remember all the information on this page. Each decision screen contains a summary of the most relevant information from these instructions.

In this experiment, you will be matched with another participant. You and your matched partner will play a game 30 times. Each time you play the game is called a **round**.

In every round, you will have to make two decisions. The computer will record your performance in every decision you make (for a total of 2x30 = 60 decisions in the game).

Despite the fact that the game lasts for 30 rounds, we expect the experiment to move quickly across rounds. Although, this will ultimately depend on you and your matched partner.

The game proceeds as fast as the slower participant, so remember to submit your decisions in a timely manner.

At the end of the experiment, the computer will randomly select ONE of your decisions to determine your additional earnings. You can gain a bonus of **$3** depending on the accuracy of the decision selected for payment, and an element of randomness as explained below.

In each round, you will have **1 minute** to make each choice. The timer is set to ensure that, if your partner decides to stop playing, for example by closing the browser page, the program will automatically end the experiment after your partner's time expires. You will still have the opportunity to earn the additional bonus. This will be based on the accuracy of one randomly

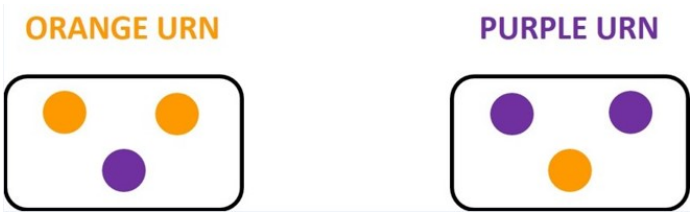
chosen decision among those you have taken until that round. However, if you let the time expire or you quit the game before the end, you will not get paid for either part of the experiment.

THE GAME

There are two urns: the **Orange** urn, and the **Purple** urn.

- The **Orange** urn contains 2 **ORANGE** balls and 1 **PURPLE** ball.
- The **Purple** urn contains 1 **ORANGE** ball and 2 **PURPLE** balls.

Here is a graphical illustration:



At the beginning of the game, the computer secretly selects one of the two urns with equal probability. That is, each urn has a 50% chance to be selected. We refer to the selected urn as the **secret urn**, which is fixed for the rest of the experiment.

Neither you nor your partner observe which urn was selected.

IMPORTANT: In every round of the game, the computer draws **10 balls** in sequence and at random from the **secret urn**. After each of the 10 draws, it records the color of the current ball and reinserts it into the **secret urn** so that the composition of the **secret urn** is always the same before the next draw.

You and your partner observe the same 10 ball draws at the beginning of any given round.

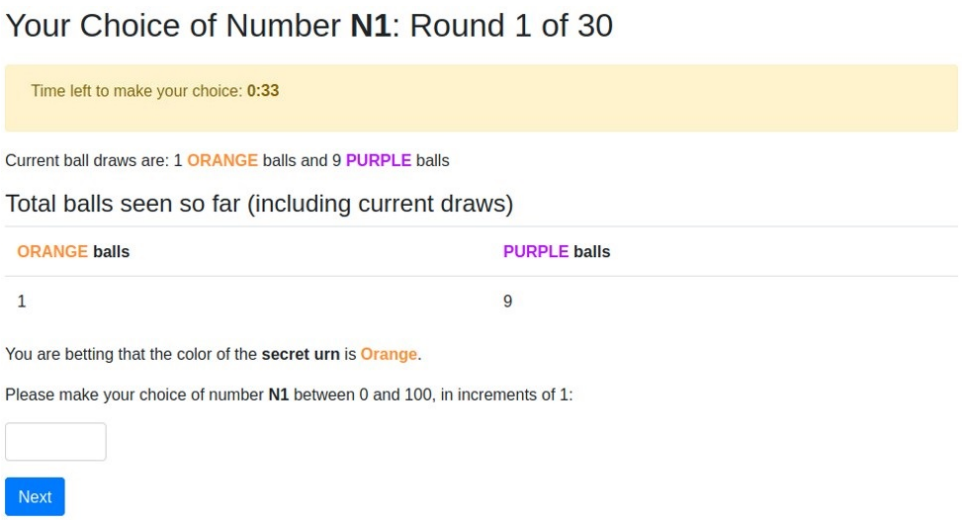
DECISIONS IN EACH ROUND

In each round, you are asked to pick two numbers: **N1** and **N2**, each between 0 and 100, in increments of 1:

- **N1** is your bet that the color of the **secret urn** is **Orange**.
- **N2** is your bet on which number **N1** your partner has chosen in the current round.

Recall that both you and your partner **observe the same sequence of balls** drawn from the **secret urn**.

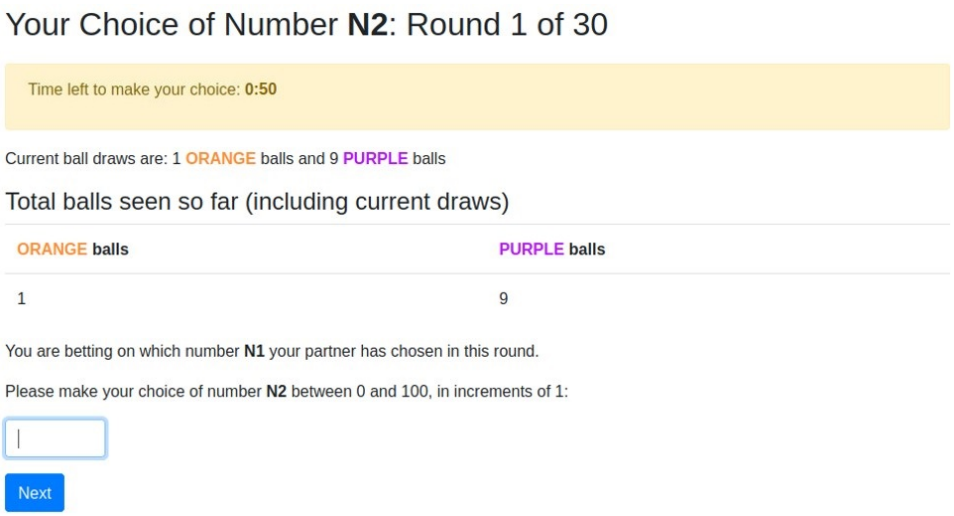
The first screen you see at the beginning of a round asks you to submit your choice of number **N1**. For example, in an arbitrary round, you and your partner might observe a screen like the following:



The screen shows you information about the colors of the set of 10 balls that the computer has drawn from the **secret urn** in Round 1 for both you and your partner. It also reminds you about how many balls of each color have been drawn so far from the **secret urn**. Since you are in Round 1, this is the same as the number of **ORANGE** and **PURPLE** balls drawn in this round.

For example, the screen shows that the current set of balls contains 1 **ORANGE** ball and 9 **PURPLE** balls for a total of 10 balls.

A second, and similar, screen asks you to submit your choice of number **N2**.



Press **NEXT** when you are ready to submit each choice.

Each subsequent round proceeds in the same manner.

HOW YOUR BONUS IS DETERMINED

The program selects ONE randomly chosen decision out of your 60 decisions to determine whether or not you will receive the additional bonus of $**3.00**.

Each decision determines a **PenaltyIndex** which is computed as described below.

If your choice of **N1** is randomly selected for payment, the **PenaltyIndex** is given by the following formula:

PenaltyIndex = (**N1**/100 - 1) * (**N1**/100 - 1), if the **secret urn** is **Orange**

PenaltyIndex = (**N1**/100) * (**N1**/100), if the **secret urn** is **Purple**

That is, the closer your choice is to the color of the **secret urn** (0 if the **secret urn** is **Purple**, and 100 if the **secret urn** is **Orange**), the lower your **PenaltyIndex** will be. However, neither you nor your partner observe the color of the **secret urn**.

Note that the penalty index is always between 0 and 1, no matter what choice you make.

The next table provides some examples of your **PenaltyIndex** based on the color of the **secret urn** and possible choices of **N1** made by you:

Your choice of **N1**	PenaltyIndex if secret urn is Orange	PenaltyIndex if secret urn is Purple
0	*1*	*0*
10	*0.81*	*0.01*
20	*0.64*	*0.04*
30	*0.49*	*0.09*
40	*0.36*	*0.16*
50	*0.25*	*0.25*
60	*0.16*	*0.36*
70	*0.09*	*0.49*
80	*0.04*	*0.64*
90	*0.01*	*0.81*
100	*0*	*1*

If your choice of number **N2** is instead randomly selected for payment, the **PenaltyIndex** is given by the following formula:

$$\textbf{PenaltyIndex} = [(\textbf{N2} - \textbf{N1\_partner})/100] * [(\textbf{N2} - \textbf{N1\_partner})/100]$$

That is, the closer your choice is to the number chosen by your partner, the lower your **PenaltyIndex** will be.

Again, note that the penalty index is always between 0 and 1, no matter what choice you make.

The next table provides some examples of your **PenaltyIndex** based on your choice of number **N2** and possible choices of **N1** made by your partner:

Your choice of **N2** \ Your partner's choice of **N1**	**0**	**10**	**20**	**30**	**40**	**50**	**60**	**70**	**80**	**90**	**100**
0	*0*	*0.01*	*0.04*	*0.09*	*0.16*	*0.25*	*0.36*	*0.49*	*0.64*	*0.81*	*1*
10	*0.01*	*0*	*0.01*	*0.04*	*0.09*	*0.16*	*0.25*	*0.36*	*0.49*	*0.64*	*0.81*
20	*0.04*	*0.01*	*0*	*0.01*	*0.04*	*0.09*	*0.16*	*0.25*	*0.36*	*0.49*	*0.64*
30	*0.09*	*0.04*	*0.01*	*0*	*0.01*	*0.04*	*0.09*	*0.16*	*0.25*	*0.36*	*0.49*
40	*0.16*	*0.09*	*0.04*	*0.01*	*0*	*0.01*	*0.04*	*0.09*	*0.16*	*0.25*	*0.36*
50	*0.25*	*0.16*	*0.09*	*0.04*	*0.01*	*0*	*0.01*	*0.04*	*0.09*	*0.16*	*0.25*
60	*0.36*	*0.25*	*0.16*	*0.09*	*0.04*	*0.01*	*0*	*0.01*	*0.04*	*0.09*	*0.16*
70	*0.49*	*0.36*	*0.25*	*0.16*	*0.09*	*0.04*	*0.01*	*0*	*0.01*	*0.04*	*0.09*
80	*0.64*	*0.49*	*0.36*	*0.25*	*0.16*	*0.09*	*0.04*	*0.01*	*0*	*0.01*	*0.04*
90	*0.81*	*0.64*	*0.49*	*0.36*	*0.25*	*0.16*	*0.09*	*0.04*	*0.01*	*0*	*0.01*
100	*1*	*0.81*	*0.64*	*0.49*	*0.36*	*0.25*	*0.16*	*0.09*	*0.04*	*0.01*	*0*

After computing your **PenaltyIndex**, the program randomly selects a number between 0 and 1 (inclusive) such that every number is equally likely to be selected (up to 5 decimal digits). I.e., it is as likely to choose 0.1145 or 0.5 or 0.893, etc. We refer to this number as the **PaymentNumber**.

You win the bonus of $**3.00** IF your **PenaltyIndex** <= **PaymentNumber**

The lower your **PenaltyIndex** is, the higher is your chance of receiving the bonus.

Examples:

- If your **PenaltyIndex** is 0, you win the bonus of $**3.00** with 100% chance.
- If your **PenaltyIndex** is 0.25, you win the bonus of $**3.00** with 75% chance.
- If your **PenaltyIndex** is 0.5, you win the bonus of $**3.00** with 50% chance.
- If your **PenaltyIndex** is 0.75, you win the bonus of $**3.00** with 25% chance.
- If your **PenaltyIndex** is 1, you win the bonus of $**3.00** with 0% chance.

Please proceed to the next page when you are ready to start the game.

[*After pressing NEXT subjects see another page telling them that they will see a waiting page in case no other participant is ready to be matched with them. The additional page is meant to prevent subjects that drop out at the instructions stage to be matched with another participant, as this requires them to press NEXT again on the page following the instructions.*]