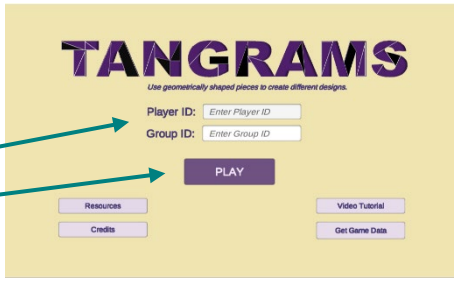
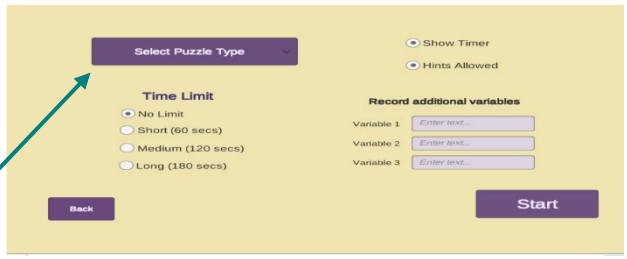
Tangrams Game Instructions

Go to the website https://stat2games.sites.grinnell.edu and select the **Tangrams** tab
Watch the video tutorial and then click the **Play Tangrams** button.
This site may take a few seconds to load.



- Enter a **Player ID** and a **Group ID**. Any combination of alpha-numeric characters will work. *Note that this ID will be public on the web, so do not use your actual name for a PlayerID.*
- Click the **Play** button:

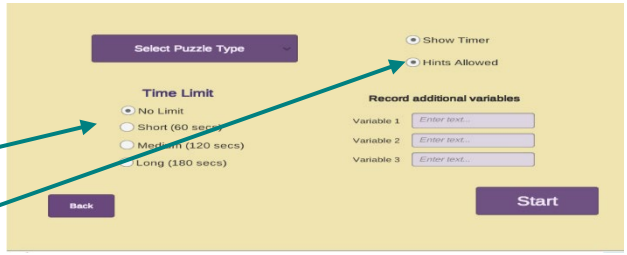
This will bring you to the **Menu** page. There are several options that you can choose from. You may choose to ignore these options and simply click the **Start** button.



> **Goal:** Arrange the geometric shapes on the left, called tans, into a specific pattern or design on the right as quickly as possible.

GAME OPTIONS:

Puzzle: Click here to choose which puzzle you want to try.



Time: Players can choose to restrict the time allowed to complete the game to 60, 120, 180, or unlimited seconds. The player can also choose to show or hide the timer.

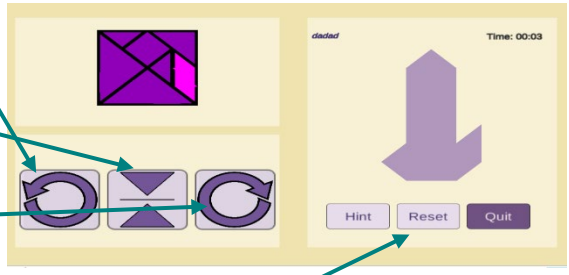
Hints Allowed: Players can allow or prohibit hints.

Record Additional Variables: Players can choose to record other features that might influence their game performance. For example, you can enter "Math" or "Other" into Variable 1 to keep track of whether the player is a Math major or not. With enough data, you can determine if major is related to the time it takes to win the game. Other variables that could be included are players' experience with online games or the amount of sleep the player had the night before.

Rotate left: Players can click on the counterclockwise button to rotate the shape left.

Flip upside down: Players can click on the triangles button to flip the shape upside down.

Rotate Right: Players can click on the clockwise button to rotate the shape left.



Hint: Players can press the hint button to see a hint.

Reset: Players can press the reset button to reset the shapes back to the left panel.

Quit: Players can press the Quit button to return to the main menu.

Tangrams Variable Descriptions:

Variable Name	Type	Description
Game:	Integer	Each game is assigned a unique game number
Date	Date	The date and time the game was played. It has a Year/Month/Day/Hour: Minute format
PlayerID	Categorical	Any alpha-numeric term used for each player
GroupID	Categorical	Any alpha-numeric term used for each player or group. Often instructors ask all students in the class to use the same GroupID
Potential response variables		
Time	Quantitative	The time used to complete the game
Win	Categorical	1 represents a win, 0 represents a loss
NumClicks	Quantitative	The number of clicks the player used during the game
Potential explanatory variables		
Puzzle	Categorial	The shape of the puzzle that the player selected
ReqTime	Categorial	The time option selected on the menu screen. The time available can be unlimited or set to 30, 60, or 90 seconds
DisplayTime	Categorial	1 represents that the timer was displayed. 0 represents no timer displayed
HintOn	Categorial	1 represents that the hint was allowed. 0 represents no hint is allowed
NumHints	Quantitative	The number of hints the player used during the game
HintTime	Quantitative	The time when the player used the first hint
Var1		Any additional variable you would like to record (e.g., player's age)
Var2		Any additional variable you would like to record (e.g., player's experience level)
Var3		Any additional variable you would like to record (e.g., type of distraction that the player was exposed to)

Sample student handouts, instructor notes, and research activities are available here:
https://drive.google.com/drive/folders/1UyMtxFthjD57UyssqUL1poXbmlRxl1ZM

Potential Research Questions:

T-test:

- When there is no time limit, does the major of the student lead to different expected completion times (Time)?
- When there is no time limit, can students from all introductory statistics courses at your institution have an expected completion time of less than two minutes?

Chi-Square Test:

- When there is a 30-second time limit, do two different puzzle shapes (Puzzle) have the same probability of winning (Win)?

ANOVA:

- Do the puzzle shapes (Puzzle) have different expected completion times (Time)?
- Is blocking by PlayerID better than a completely randomized design when testing the completion time of two or more puzzles?
- Does the expected completion time change depending on a student's intended college major, age, or gaming experience level?

Regression:

- Is there a relationship between the number of clicks (NumClicks) and the completion time (Time)?

Logistic Regression:

- How well can we predict the probability of winning based on Puzzle, PlayerID, NumClicks, ReqTime, DisplayTime, and NumHints?