

# **The Chimps Save the Day:** Geometric pattern matching skills to the rescue!



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**CS480: Group 2**

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## **Abstract**

Our game explores geometric pattern and visual spatial skills for children in the third grade. Players take the role of Chris or Crystal the Chimp, who is correcting the wrongs done by their nemesis, Arnie the Ape. The player must complete several puzzle-based levels to collect pieces to build a device capable of trapping their nemesis, Arnie the Ape. Once each pattern is complete, the player will be rewarded with one part they need to complete the device. Only by trapping Arnie the Ape will Chris or Crystal right what wrongs Arnie has committed. The player will guide Chris or Crystal in each level looking for objects that will fill in predetermined geometric patterns.

## **Game Overview**

### *High Concept*

The high game concept is geometric patterns, solved by visual and spatial skills. The tasks players perform involve looking for geometric shapes that fit in the assigned patterns. The shapes they find will need to be rotated and moved into their correct places. This introduces pattern matching and visual spatial skills.

### *Genre*

The game falls into the puzzle genre. Though the player can explore the area to look for pieces to fit into the puzzle, the main game play revolves around puzzles.

### *Hooks*

- Arnie the Ape destroyed an object in each level that the player needs to rebuild. Helping Chris or Crystal restore peace to the game world by fixing the object gives children a sense of importance, a very compelling reason for children to stick with the game.
- Another attraction is the ability to play in many different levels with game settings that jump in and out of real life and fantasy. Children will want to visit all of the fantastic and whimsical game levels.
- Children, in general, are fascinated by animals. Children will enjoy having the ability to play as a chimpanzee.

### *Backstory*

Chris and Crystal are carefree and loving characters who are incredibly good at building objects. Driven by jealousy, Arnie the Ape wreaks havoc in many different lands, challenging Chris and Crystal to stop him. Chris and Crystal must design a device to capture Arnie the Ape. To build this device, specific parts are required from the areas Arnie has ravaged. Chris and Crystal set out to each area to fix the wrongs Arnie created in hopes of receiving the parts necessary to build the machine.

### *Objective*

The objective of the game is to collect enough items from the game areas to build a device capable of stopping Arnie the Ape. Once the device is built, Arnie the Ape will be captured and the player will win.

### *Characters*

There are three main characters in the game:

- Chris (the male chimp)
- Crystal (the female chimp)
- Arnie the Ape.

The chimps, Chris and Crystal, are adorable, child-like chimpanzees while ‘Arnie the Ape’ is a scary, opposing gorilla. Chris and Crystal are drawn to appear very child-like. This is to avoid any fears children may have of animals. Also, because of their childlike appearance, the

children will connect with either character they pick. There will be other characters in the game too, but only as background characters or vehicles to progress the storyline.



### *Story progression*

The game starts out with Chris and Crystal discovering Arnie the Ape's devious deeds. When they arrive at school, Chris and Crystal find everything in disarray in Arnie's wake. The two vow to set right the dastardly deeds of the erroneous ape. The chimps draft plans for a device to capture Arnie the Ape. Chris or Crystal, depending on which character is chosen at the beginning of the game, visit the seven levels of the game, which progress from regular locations (such as their school, a museum, or a video arcade) to increasingly exotic locales (such as the beach, Central Park and Atlantis). During certain points in the game, Arnie the Ape returns to steal the object the chimps need, forcing the player to find alternative pieces of equipment. After working through the levels, the Chimps build a device capable of capturing Arnie the Ape. After capturing Arnie, there is a celebration for the Chimps by all of the people whom they helped throughout their quest.

### *Gameplay highlights*

Prior to the actual game play, students will be guided using a walkthrough tutorial of the game. The tutorial is aimed to explain what the game is, and how it is played. We believe that by giving the students just the minimum game play concepts, the students can train themselves to learn and improve some of the game play logics to be more successful throughout the game. This will give the students a sense of independence rather than depending on us to teach them throughout the game.

- The game will feature multiple levels with different themes and increasing difficulty. Some possible levels include:
  - Fire house
  - Video arcade
  - Central Park
  - Golden Gate Bridge
  - Eiffel Tower
  - Atlantis
  - Shopping Mall
  - Classroom
  - Super Market
  - Museum
  - The Beach
- Each level will start out with a scene introducing the player's task.
  - For example, players will see Arnie demolish a car into pieces during a car dealership level. Players will then be asked by a car salesperson to rebuild the vehicle.

- The player needs to rebuild an object that the antagonist destroyed. Players will need to rotate and flip the pieces into the correct orientation before placing them back into the puzzle.
  - The pieces will not be easily slid into place; thus the player will have to change their orientation to assemble the object. Guessing will not be an option.
  - For example, the car at the car dealership will only go back together one way based on all of the pieces' shapes. A car door could not be fit into a wheel well.
- Each round will be timed, with each succeeding level getting faster. When each level is completed, the player will gain one piece of the final device. Beating all levels will complete the device.
  - The player will be kept aware of the time during a level by a status area on the screen that also details their score and level progress, i.e. on level 5 out of a total 7 levels in the game.
- Players will receive their piece of the device at the end of each level during a cut scene. This will be the vehicle by which the next level is introduced.
- Levels will be tailored to the gender of the player. All levels for the male and female players will contain the same puzzles; however the graphics and objects will be tailored to the players' gender.
  - For example, one level may have a female player fixing a broken necklace while a male character may fix a broken chain on a bicycle.
- A typical game will last an average of 30 minutes.
  - Levels will last on average, about 3 minutes. This will be enough time for students to complete the puzzle if they have acquired the skills our game reinforces. This will be also be a enough time to prevent children from guessing their way to completion. The levels will be complex enough that guessing will not be a sufficient heuristic.

#### *Art and Audio Highlights*

- The game will be done in a pixel-art style. Voice acting will be a key component for the audio aspect of the game as there will be a lot of character dialog between levels.
- The game also incorporates background music for all the levels. For example, an arcade level would have some techno music follow by some sound heard from real arcade games. Another example, there will definitely be some French background music for the Eiffel Tower level.
- Object sounds will also be integrated. For example, a hammer will make a "bang" noise when it is used by our hero character to put different parts together to form a bigger object.

### **Educational Overview**

#### *Learning Objective*

This game will help develop and fine-tune the students' spatial relationship and symmetry skills. The purpose of the game is not to introduce new skills, but to reinforce skills introduced in class. The students must be able to predict the results of sliding, flipping and turning objects in 2-dimensional shape. Predictions and general pattern-shape concepts are reinforced by the game by making them the focus of game play. Since no too pieces will be ambiguous, they player will not be able to guess or put pieces together out of order.

#### *Users*

According to the NTCM, children between third and fifth grade should be able to recognize, build, and compare two and three-dimensional geometric figures (particularly polygons and triangles), and predict and describe the results of sliding, flipping, and turning in two-dimensional shapes. We are targeting third graders with our game because children will be starting to develop these skills in the third grade. Our game will reinforce skills taught in

class by providing an interactive experience with complex shapes. In regards to the gender preference of the game, the game was specifically designed to adapt to the interests of both, males as well as females. It features both male and female characters to garner the interest of the player based on their own gender.

#### *Activities*

This game is meant to be a supplement for students who are learning the specified geometric concepts in class. The content of this game is very child oriented and colorful, and if used on a regular basis, could be distract from learning or loose its appeal from overexposure. However, when used in the context of a reward for children during a computer lab or recess, it would reinforce the skills learned in class. The best use of the game would be for children to spend time with it in the home, during the time the unit of spatial orientation is taught. By making the game homework, children get a practical way to practice geometric concepts of symmetry, rotation and translation.

#### *Assessment*

Prior to discussing assessment, it should be mentioned that for the game to be most beneficial to students, teachers should reiterate the game's activities into the concepts they are trying to teach in class. If students can see the relationship between what they are playing in the game and what they are being taught by their teacher, they will able to understand the concepts quicker because there are two factors teaching the same ideas in different ways simultaneously. In our game, there will be a post level assessment of the student's performance based on the time it them to finish the level. The time it takes the player to finish the level is an indication of their skills in the game. When used in a classroom setting, the teacher will be able to gauge the child's skill level based on the level assessment.

#### *Development and Deployment Platform*

Since the primary audience is children between the ages of eight and nine it is reasonable to assume that their experience with computers is minimal. It is important to also note that the technology of school computers is most likely not cutting edge. Thus, the platform must be easily playable on many different systems. To ease computer requirements for the children playing the game, our game will be playable on both a CD-ROM, and on a website devoted to the game. While not every child will have a computer in their home, every child should have access to a computer in their school, library, community center or acquaintance's house.

The game will be written in ActionScript and will be exported to the web, and to CD-ROM via a Macromedia Director interface. The game will be playable on any platform supporting a CD-ROM drive, or the internet and the Flash Player plug-in. The game designers have estimated that it will take approximately 6 months to complete the gaming program.

#### **Conclusion**

Our game features child friendly characters and content. The game's platform neutrality makes it accessible to children running any type of computer. Most importantly, children will learn so see geometric shapes in every day objects. The visual spatial skills they will learn could fuel their interest into fields such as engineering.

## Appendix

### Game Startup:

At the start of the game, a selection screen allows the player to select if they want to “Start a New Game” or “Load Saved Game.” By selecting “Load Saved Game,” the player must provide the saved game statistics report to continue playing the game where they left off. A cinematic movie clip, which is the introduction of the story appears when the “Start a New Game” option is selected. When the movie clip is over, another selection screen follows to allow the player to select his or her own chimp character. The character choices are “Chris the Chimp” or “Crystal the Chimp,” which are male and female respectively.

### Select your chimp character!



**Chris the Chimp**



**Crystal the Chimp**

When the character selection has been decided upon, the player will be oriented with a game tutorial that explains the basic game play concepts.

### Beginning Game Tutorial

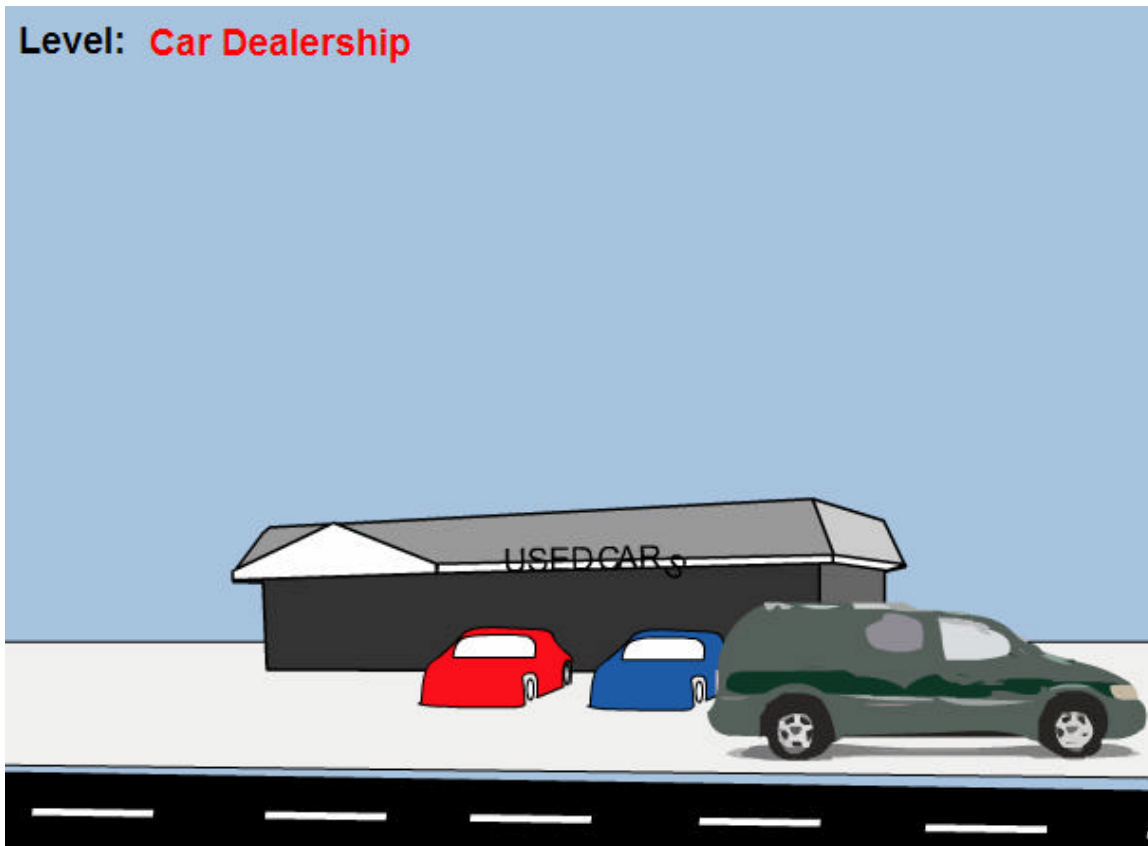
The tutorial will guide the students and walk them through the basic game concepts. Concepts such as game layout (what’s laid out and where it’s located on the screen) and game maneuver (how to interact with the game).

An example tutorial would be a very basic level, and the students are shown the game play screen. There will be arrows pointing to different areas of the screen showing them the importance of these specific areas. For example, the work bench area has a text and voice

description that informs the students of its functions. It will guide the students to pick a piece by either double clicking or dragging it into the work bench. From there, it will show them the concept of rotation and also flipping. The concept of flipping the X or Y axis may be an unfamiliar terminology, but our tutorial will teach them what those interactions do. They may not know what it is at first, but they will understand it after playing through the level. Scoring, timer and how they affect the level assessment will also be explained to the student.

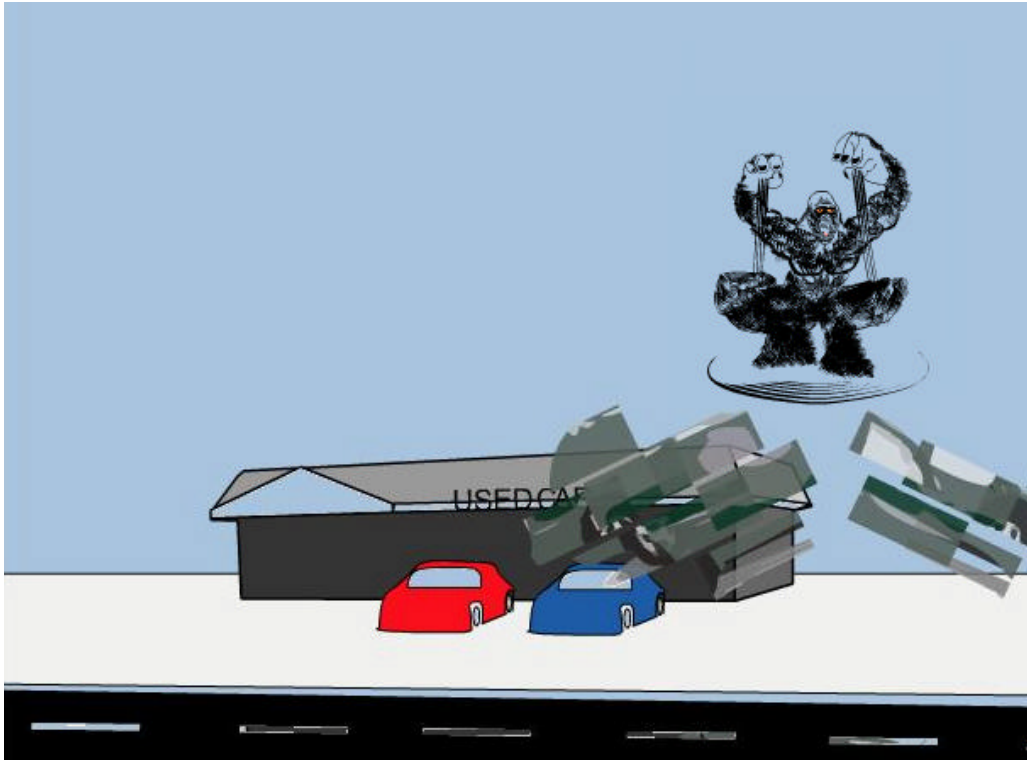
**Level: Car Dealership**

The first setting will be at a car dealership. Used cars are parked outside the dealership.



**Pre-Game Play:**

Before the player is allowed to interact with the game, a short cinematic movie clip shows how Arnie, the mischievous ape, runs rampantly throughout the setting. In the case of the car dealership level, Arnie the Ape sees a mini van, jumps on it, and breaks it into pieces. Once Arnie jumps on the mini-van, it explodes. The students will be able to see some of the pieces that they will be working with when putting the mini-van together.



After witnessing the damage caused by Arnie the Ape, the player will begin to repair the level by putting the mini van back together.

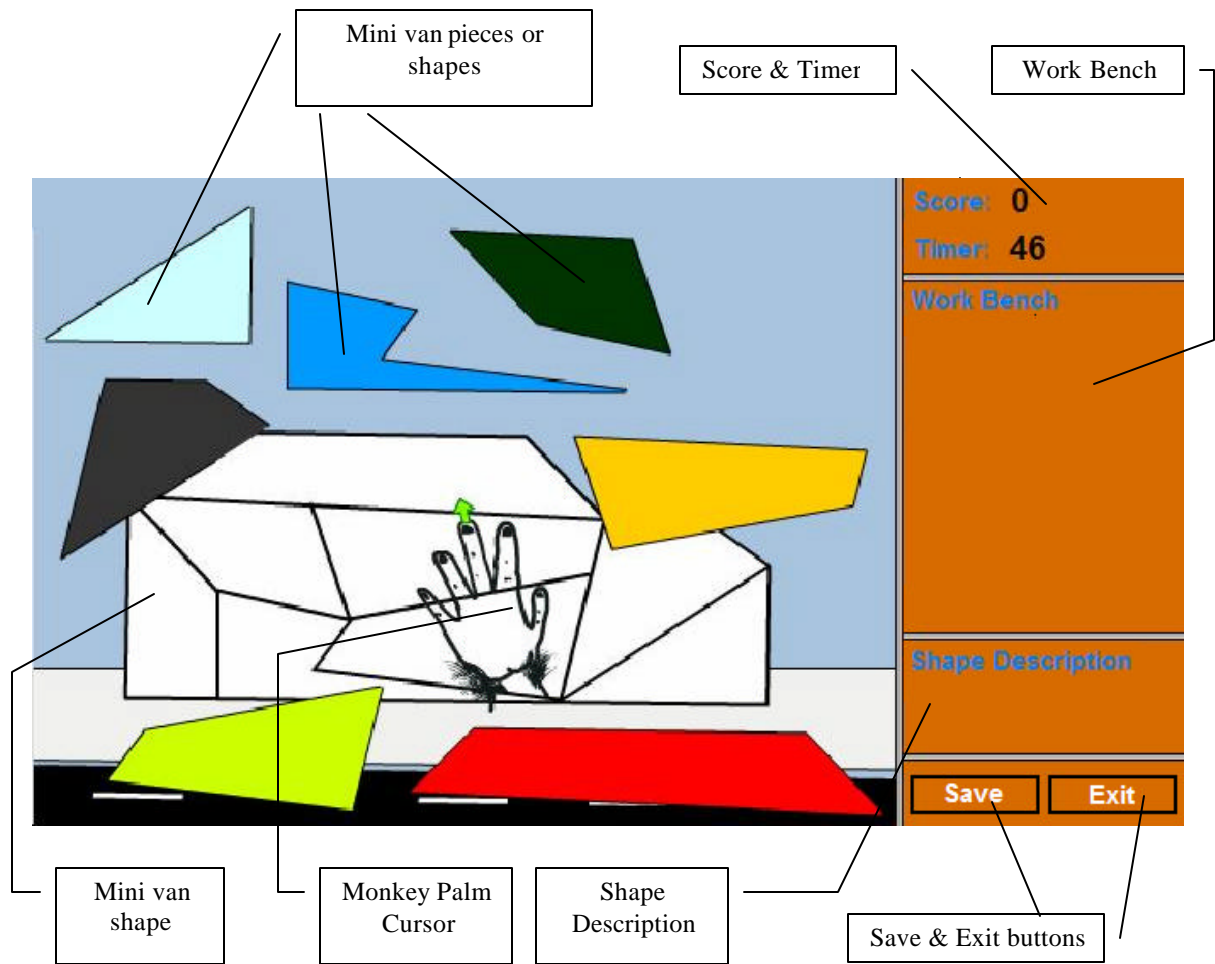
#### Game Play:

This introduces how the player pieces together the mini-van. The layout of the work area consists of:

- the exact mini-van figure that needs to be achieved at the end of the level
- the mini-van pieces randomly dispersed on the screen
- the score
- the timer
- the work bench
- the piece description
- the save and exit buttons, and
- the monkey palm cursor

The screen is split into sub panels.

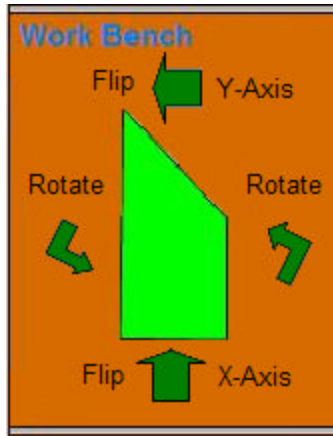
- Left panel (main panel)
  - the mini-van figure
  - and the mini-van pieces
- Right panel (side panel)
  - the score
  - the timer
  - the work bench
  - the piece description
  - and the save and exit buttons



The player's score increases for every correct piece that fits into place and decreases for every incorrect placement. The timer will increment as the player completes the puzzle.

The pieces are outlined within the figure. For this level, the outline of the mini-van figure is visible, but for other harder levels, the outline may be omitted. The mini-van pieces are located on the main panel of the screen. They are randomly dispersed in the panel with random rotations and symmetrical flips. They can be dragged with the monkey palm cursor onto the mini-van figure to snap it into place. They can also be double-clicked to bring that individual piece to the work bench.

Using the clickable rotation arrows, the work bench provides the player with the ability to rotate the piece 90 degrees. It also allows the player to flip the piece along the X-axis or the Y-axis using the clickable flip arrows. At anytime, the player can click on the piece and drag it to the mini-van figure to snap it into place or they can drag it back to the main panel and work on another piece at the work bench.

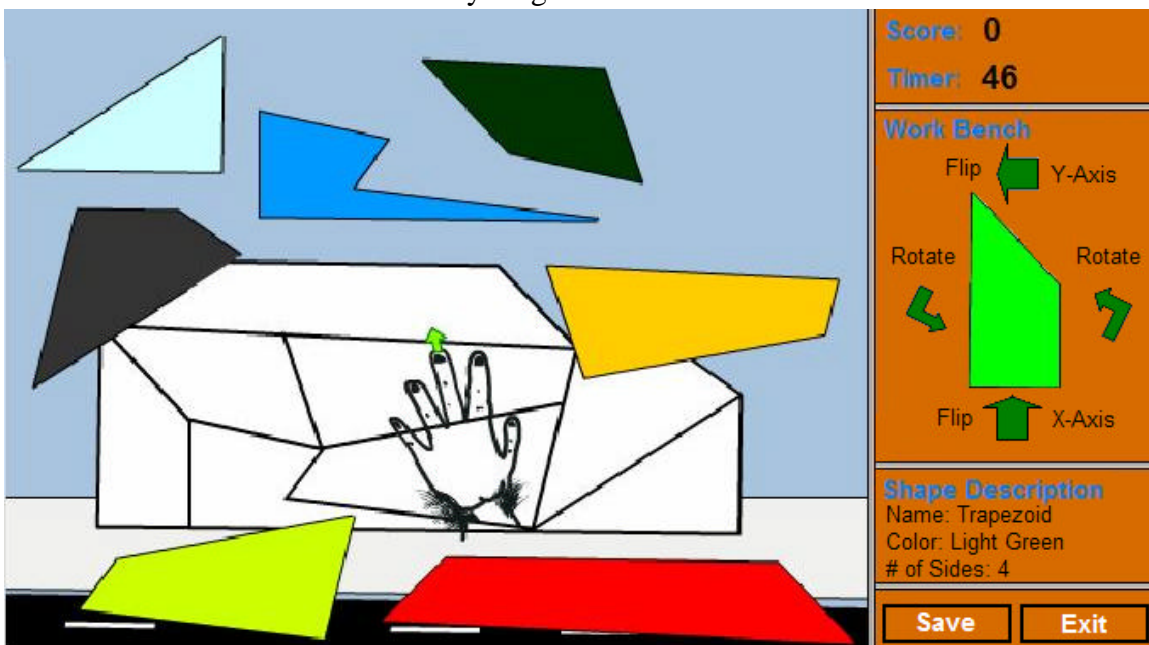


While working with a piece on the work bench, the description will appear below it to inform the player of the shape, color, and the number of sides of that particular piece.



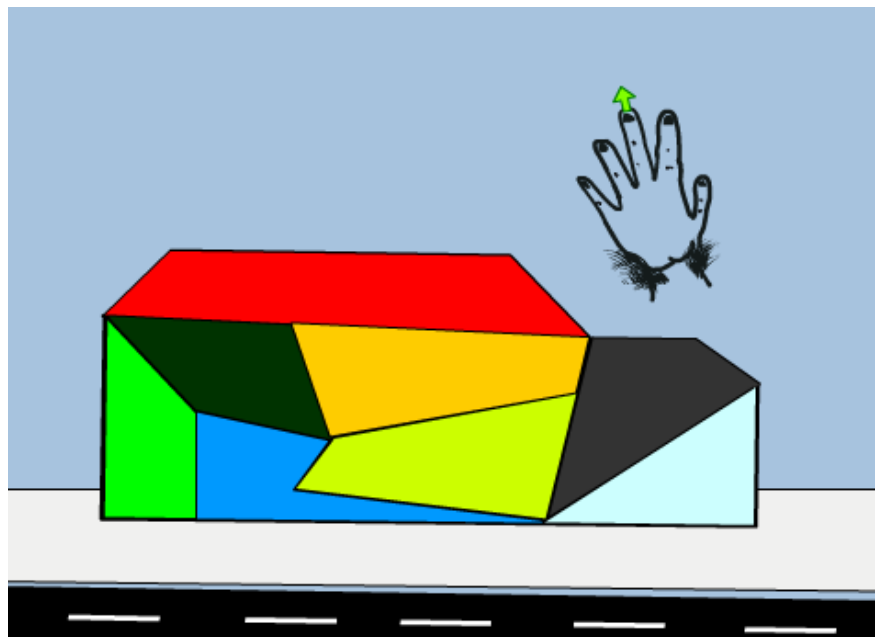
The save button allows the player to save their game and game play assessment. This option lets players continue where they left off. The exit button will allow players to save and exit their game.

Here is how it would look with everything combined.



Post Game Play:

Below is a screenshot showing how the main panel would look like when the player successfully completes the puzzle for the level.



The mini-van piece will morph back into a new mini-van, signifying level completion. This will be followed by a cinematic movie clip showing how the chimps successfully rebuilt the van from all the broken pieces. The last screen of the level will show the player's assessment. This will show the player's score, the time it took to complete the level and the statistics of all the previous levels. It will also display three buttons that allow the player to continue to the next level, save the game, or exit the game.

