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Rochester Institute of Technology

A Thesis submitted to the Faculty of the College
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degree of Master of Fine Arts.

Sticker Land: Interactive Educational Game

by:

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CONTENTS

INTRODUCTION

1

RESEARCH

Interactive Education

Strategies for Interactive Education:

Drill and Practice

Interface Design

3

PROCEDURE

Opening

Menu

Layout and Grid

Navigation

Animation

9

CONCLUSION

18

APPENDIX

Color Prints

BIBLIOGRAPHY

INTRODUCTION

The purpose of “Sticker Land” is to create a prototype of an interactive educational game equipped with text, graphics, sound, music and animation. This project is designed for teaching colors, shapes, counting and vocabulary to preschoolers. This report will touch on the objective and significance of the project, the areas covered in research, and the procedure as well as the outcome of the project.

Multimedia is a class of computer-driven interactive communication systems which create, store, transmit, and retrieve visual and auditory networks of information.

One of the most important claims of multimedia is that, because it combines the technology of video, audio and computers, it offers a unique environment for interactivity, learner control and student interest and motivation. Multimedia provides a higher level of mastery over the subject matter. It gives students “hands-on” learning, better retention, specific feedback and increased levels of understanding.

With such important functions, educational multimedia packages should be kept simple, clear, concise and consistent. All information that a student needs should be provided on the screen. Colors, graphics, animation, and sound should maintain student’s interest without being distracting.

The objective of this project is to incorporate interactive multimedia technology within the rigid structure of traditional sticker book to make the individual content come alive for the student by creating drill to practice lessons in a game format. Students get immediate feedback from anything they do and it makes learning exciting for them.

The significance of this project is to combine interactive multimedia with brilliant graphic design and apply them to the solution of interactive education.

Multimedia makes learning fun. Students love it because it enables them to advance at their own pace. This new technology can also be a teacher's best friend, easing the load in overcrowded classrooms. Though never meant to be a surrogate parent or teacher - or a replacement for textbooks - multimedia, software gives students dynamic one-to-one instruction that they might not get otherwise. By combining traditional text with elements of sight and sound, this educational game helps make learning more fun and rewarding.

Educational Software

The benefit of interactive education using a computer, is that the learners work at their own pace and level, plus providing them with varied directions of learning. Give them content options, a choice of modes of control, and a range of activities. Different people will have different needs, both in what they want to get out of a program and how they learn. Some people learn better either through hearing, seeing, or doing. It's best to include all three teaching methods, in order to reach all these people. Also, by including a range of different activities, a program will keep learner's interest and help stimulate the movement of information to long-term memory.

"Active Learning Through Multimedia"¹ discusses the qualities of educational software which can give kids individual attention, allows them to fail without the fear of embarrassment, and makes them active learners rather than passive ones. The article offers the following advice for creating educational multimedia. Good educational software should be interactive, ensuring that the students are doing instead of just watching. It should provide goals that children want to adopt and ask the learner to use information in a realistic situation.

1. Foley, J.D., Wallace, V.L., "Active Learning Through Multimedia," IEEE Multimedia. November 1994: 67-78.

Here are the major principles of educational software:

- Learn by doing.
- What they learn should be related to real-life problems they're struggling with.
- They should recall or construct a solution instead of picking it from a list.
- The software should tell good stories.
- They should be able to use the experience they acquire to respond to future problems.
- The learner should be in control of the educational process.
- The software should offer a safe place to fail.
(Do not ridicule the learner.)
- The student should be able to locate answers easily.
- Good software allows the learner to make discoveries and demonstrate new abilities.
- Learning should be fun. ("IEEE Multimedia" 69-78)

Carole Ellison, in "Do Kids Learn From Computer Games?"², says that kids learn from computer games for a variety of reason. Learning is more effective when it's fun. The greater the adventure and challenge in the game, the more likely it will get the kids to think critically. Games that present kids with puzzles actually challenge them to think logically and to focus on relationships (Compute 3). Educational

2. Carole Ellison, "Do Kids Learn From Computer Game," Compute. October 1992 : 3.

Systems Design, a New York consulting firm, has found that interactive software can actually speed learning by 30% to 50% over conventional methods ("Business Week" 82)

Strategies for Interactive Education:

Drill and Practice

In Richard C. Forcier's The Computer as a Productivity Tool in Education³, he says that teachers used a time-honored technique, drill and practice, to reinforce instruction by providing the repetition necessary to move acquired skills and concepts into long-term memory(241). A typical format used in drill and practice programs is illustrated by the diagram in Figure 1.

The student can interact with the computer by responding to screen prompts and by clicking a mouse. The computer presents material for student interaction, provides suitable feedback to student responses, and usually records the rate of success, often displayed as a score or percentage.

Forcier states , "Gaming, though often found in drill and practice programs, can be found in educational software. The technique has a set of rules and a clear contest. Students or groups of students may compete against each other or against the computer or other fixed standard. The program provides students with the material and its presentation interesting enough to be willing to become mentally and emotionally involved. The program's use of basic graphic design as well as a variety

3. Forcier, Richard C., The Computer as a Productivity Tool in Education. Englewood : Prentice-Hall, 1996.

of stimuli such as color, sound, and animation in both its presentation and feedback screens greatly enhances its effectiveness” (242).

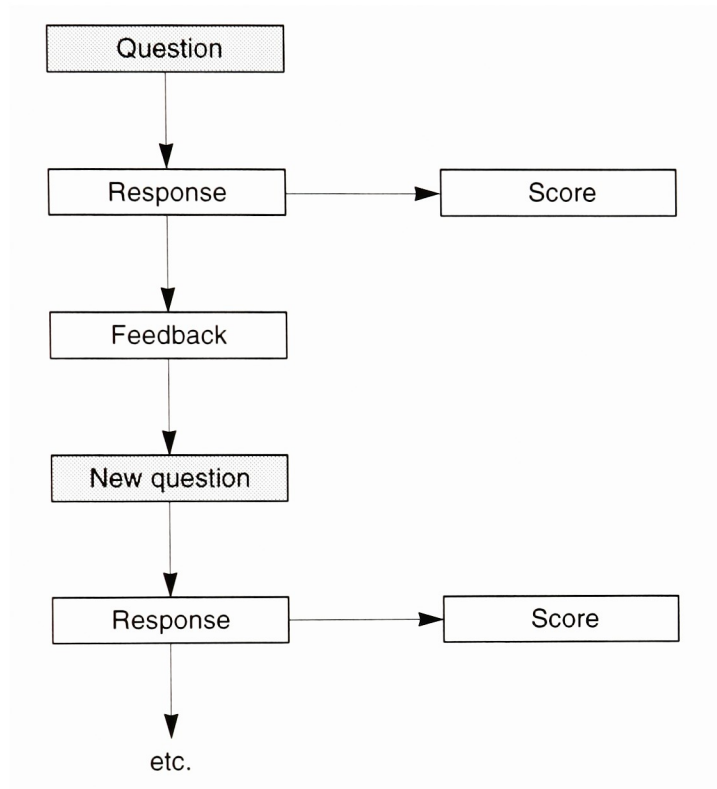


Figure 1. A typical drill and practice format.

Source: Richard C. Forcier (241).

Interface Design

In his article "Into The Interface,"⁴ Ian Grant discusses the user interface, which is the most tangible part of any software program. A Microsoft and Group Bull report showed both beginners and experienced users worked faster and made fewer mistakes with a GUI (Graphical User Interface), which is based largely on pictures and icons, rather than a TUI (Text-based User Interface). GUI require a good basic graphic design sense: an awareness of layout, color, texture, imagery, signs, icons, symbols and animation.

The role for designing interfaces as listed by Grant are:

- Maximize the similarity of major features of the interface; avoid casual differences.

- Avoid overkill; if there is too much going on in the screen, too many shapes and colors, you are faced with Las Vegas syndrome where every sign and symbol says "look at me".

It may be that a simple black and white functional layout will work better.

- Be aware of the fact that there is a limit to the information that the user's short-term memory can assimilate in one go.

This applies to all levels of information. Economize and hide complexity.

4. Grant, Iran, "Intro The Interface," Design(London, England) October 1992 : 34-35.

- There are around 3000 registered typefaces but many aren't suitable at 100 pixels or less. Use no more than three faces, in different sizes and weights. Rely on tried and tested faces. Lines should not exceed 40-60 characters. Centered lists and justified text in capitals all show the reading speed by around 12%.
 - Good use of color can increase speed of reaction and make computing more enjoyable but if it is used badly it can mess up displays.
 - Make icons intuitive, familiar and easy to learn.
- ("Design" 34-35)

PROCEDURE

The entire interactive educational game was created on a Power Macintosh with a keyboard, a mouse and a number of software packages. The programs used were Macromedia Director, Adobe PhotoShop, Adobe After Effects, Adobe Illustrator, Adobe Premiere, DeBabelizer, and Macromedia SoundEdit. Other equipment used includes a Umax Scanner and a Mac microphone.

Sticker Land is a computer-simulated sticker book on a CD-ROM based on a traditional sticker book. To view its contents, kids must engage the book as an interactive educational game by dragging and dropping its stickers to reveal colorful illustrations with sticker animation. The program also allows users to enter and interact with the individual stickers. With the help of sound and animation, these stickers take on a life of their own and present exciting realms and exploration.

This game starts off with narrative and text instructions. Each single screen of four games has five or six stickers. Only ordered stickers can be dragged and dropped. When the user clicks the ordered sticker, it enlarges twice or more until it is dropped. When the user drops it onto the right place on the black and white illustration, she can see a fancy animation with a "Right" sound as a response. If he drop it wrong place, the

user hears only “Wrong” sound.

As reward, when a player wins a game, the whole black and white illustration is painted from top to bottom with “Congratulations” music. The reward illustration fades out to a black screen.

Every section begins with a simple animated transition with exciting music, followed by narrative and text instruction when a game starts. The “help” section is accessible from any screen in the game, and is a tutorial introduction which shows the role of the game.

All illustrations for animation, icons and backgrounds were done by first drawing with a pencil and scanning as bitmap images, which were then imported into PhotoShop to create the color images. After Effects was used for editing and rendering animation.

Three kid’s songs were used for opening music of the program and opening and ending music of the four games. Narrations of the names of the stickers were used for the responding sound. Special sound effects, surf, airplane, train and fire engine alarm, were used as an aid to the special animation of digital stickers. The music was recorded via a CD-ROM drive using SoundEdit which was also used for editing and mixing of music with narratives. The sounds were recorded using a Mac microphone.

All graphics, text, animation, sound and music were put together using Macromedia Director.

Sticker Land is an interactive game for kids. It is a prototype for

experimenting with graphically illustrated interactive opportunities. These opportunities are richly composed to both challenge and entertain the kids.

Opening

The game starts off with a blank screen showing animation of twelve icons flying (Figure 2). The twelve icons used by the digital stickers in the game come onto screen one by one from left, right, top and bottom. When the icons go through the center of the screen, one letter of the title "STICKER LAND" comes up and then the icons go out from the screen. The twelfth icon comes in with the subtitle "DIGITAL STICKER BOOK" and goes out alone. After the animated opening section, the twelve disappeared icons come up around the title "STICKER LAND", and then the title screen and opening music fade out to a black screen.

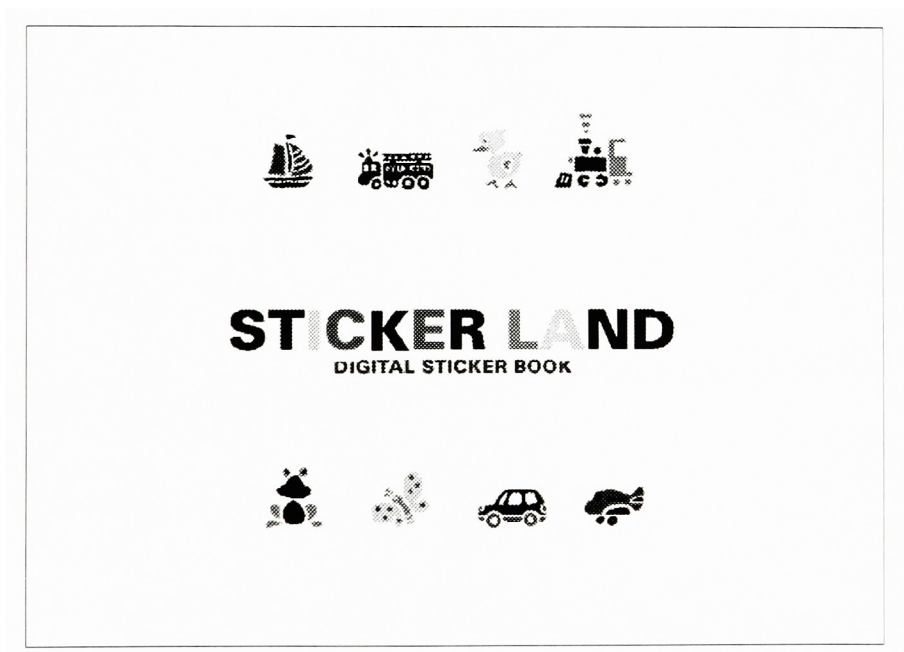


Figure 2. Opening Screen

Menu

The menu of Sticker Land begins with a simple animation. With an exciting kid's song, four different color circles fade in one by one from four corners of the screen and smoothly move on the center of the screen. In the fourth circle, four different color icons pop up, and then two small icons pop up from the left and right edge of the screen. The kid's song fades out with a funny narration "Are you ready for today's lesson? Yes, Peter!"

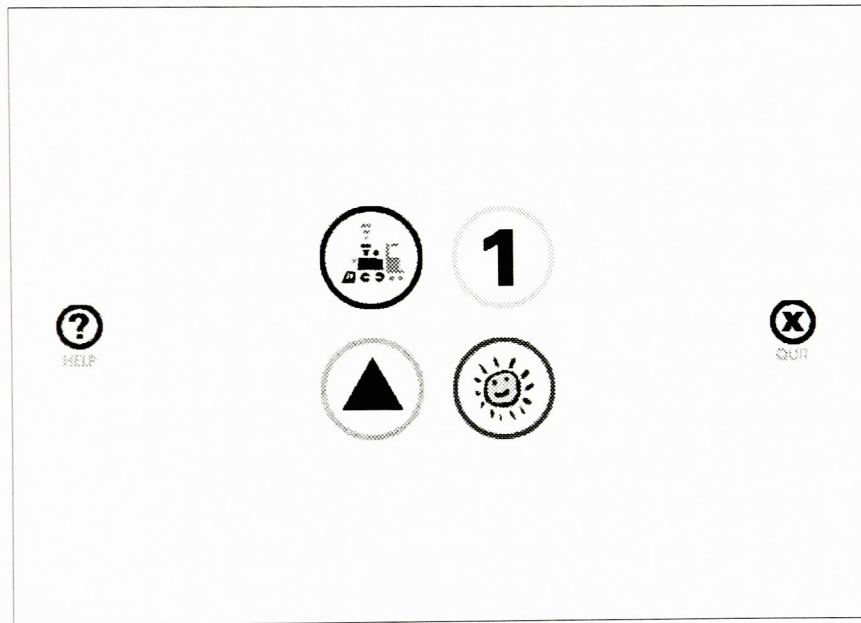


Figure 3. Menu

The screen design of the menu is extremely simple and not busy (Figure 3). The background is black and there are no other elements

except six buttons. Navigation buttons are distinguished by size and interactivity. Navigation buttons which directly access the four game sections are larger than the assistant buttons, help and quit. Four navigation buttons would animate and the names of them pop up at the center of the screen whenever the mouse cursor is on any of the four icons. Each animation of the buttons shows three solid color icons used as a sticker in each game. The narration of the names of four sections will not play until the user clicks on it.

Layout and Grid

A standard layout was used for all the sections to maintain a sense of consistency and to avoid confusion; however, a different background image was used to make it more interesting. All background images are related to the section and treated with a texturizer filter in PhotoShop to provide a sense of three dimensional space.

A grid also was used for positioning elements in the layout. It helps to ensure accurate alignment of elements within a single screen, and consistent placement of elements that appear on multiple screens.

A black and white illustration is at the center of all game screens and sticker icons are situated at the bottom of the screen with a gray background. Help and Quit buttons are placed at left and right bottom of the screens.

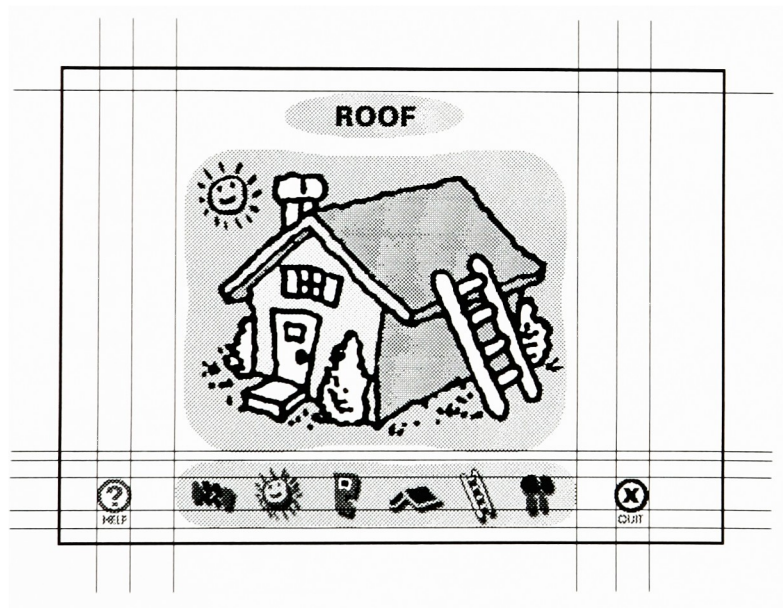


Figure 4. Layout & Grid

Navigation

In terms of navigation, all choices are displayed clearly. The icons, the main menu buttons, were increased and arranged at the center of the screen to allow kids to use easily use them. Users can access four games only from the menu. Even though users can go back to the menu from the quit screen, they can't directly access the menu screen from all the game screens. When players finish a game, they automatically return to the menu. Every screen has a quit button, so players can leave the game whenever they want. The flowchart of Sticker Land presents the clear path of navigation.

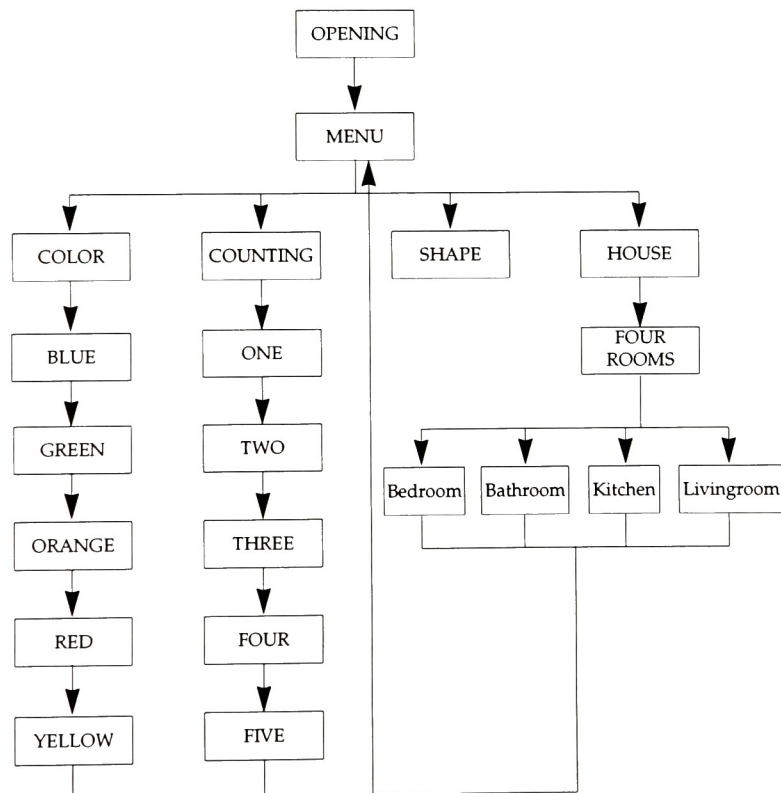


Figure 5. Flowchart of Sticker Land

Animation

Animation is a common element in many multimedia programs. It is the creation of moving illustrations that help users visualize a process, idea, or abstract concept in a way that is not easily communicated through words or single pictures.

Simple animation can call attention and provide understandable representation of a topic (Figure 6). As a graphical representation, simple animation was used in the color and counting games. After users drag an icon and drop it right place, a simple animation is provided with a special sound or music.



Figure 6. Animation "Blue"

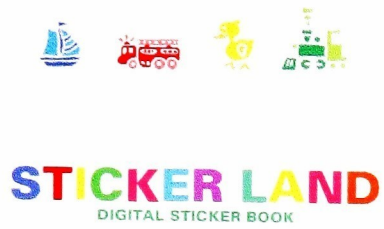
Conclusion

Education is an extremely powerful application for multimedia. Multimedia not only offers the ability to integrate this same audio-visual experience directly with text, but adds the power of interactivity. Students can learn at their own pace. They can be automatically tested for comprehension at strategic points and seamlessly taken back through remedial lessons when unacceptable results are detected.

Multimedia brings new paradigms to education. The term “edutainment” has been coined to describe the embodiment of educational content in entertainment genres that appeal to a generation raised on video games, arcades, and music television.

The success or failure of an educational software often depends on its user interface. In order to achieve effective education, the interface design and user-interactivity of an educational game has to be user friendly and under user control.

APPENDIX



Title

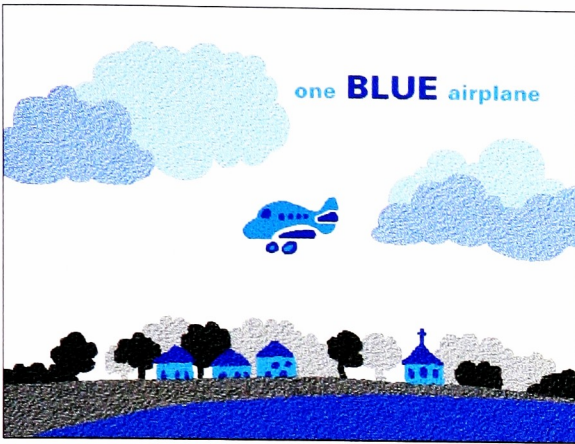
Menu



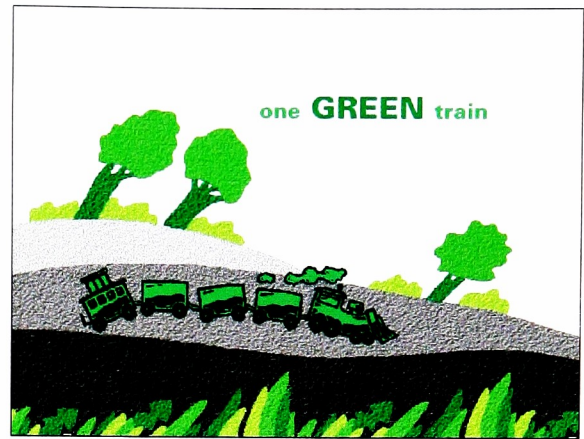
Credit



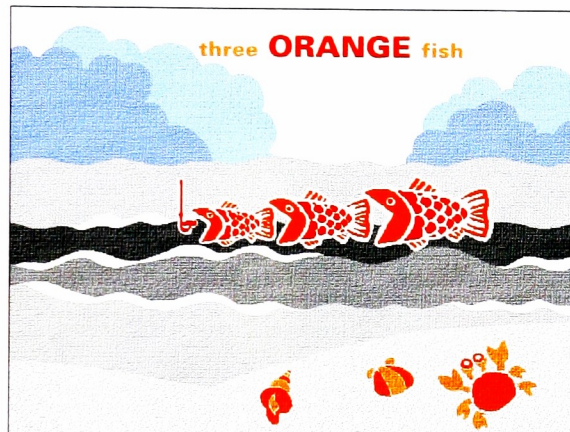
Color



Blue



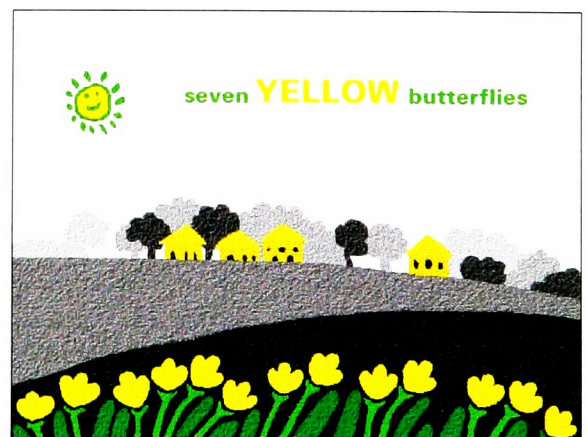
Green



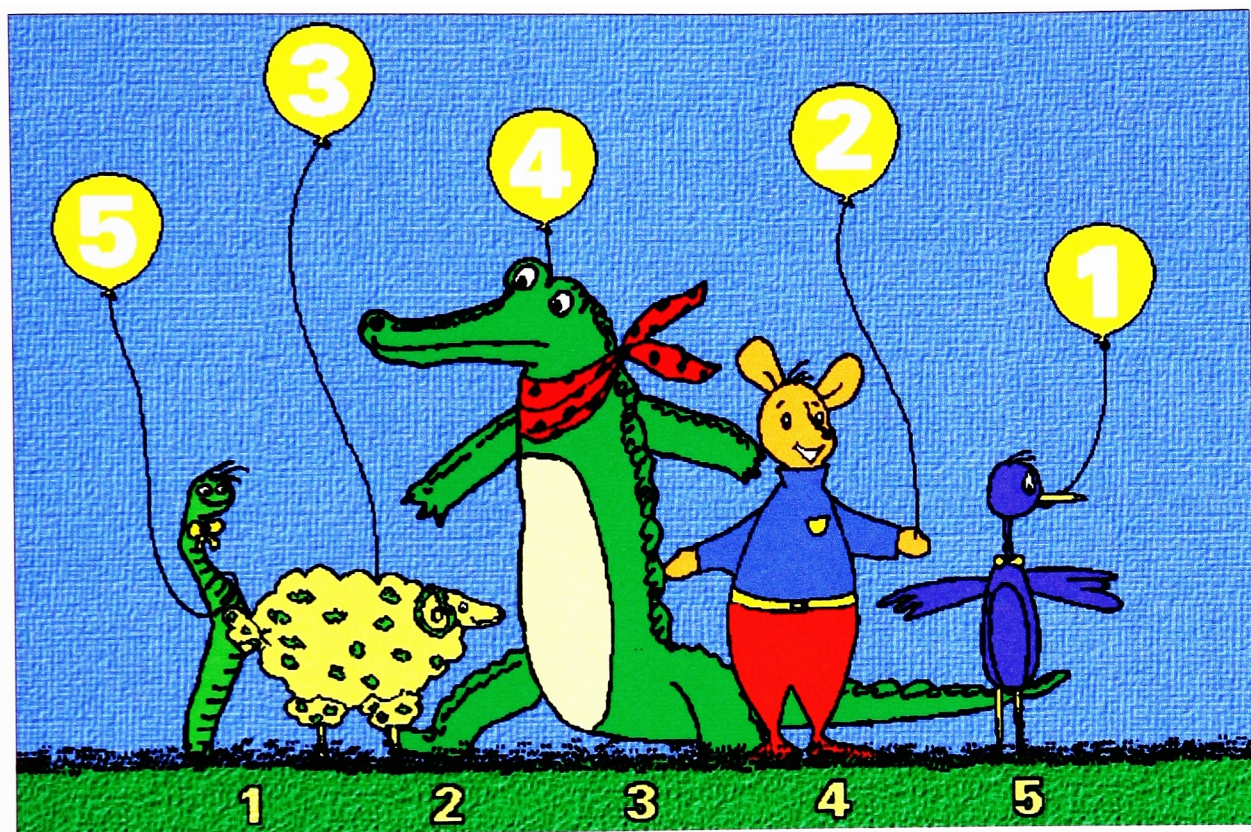
Orange



Red



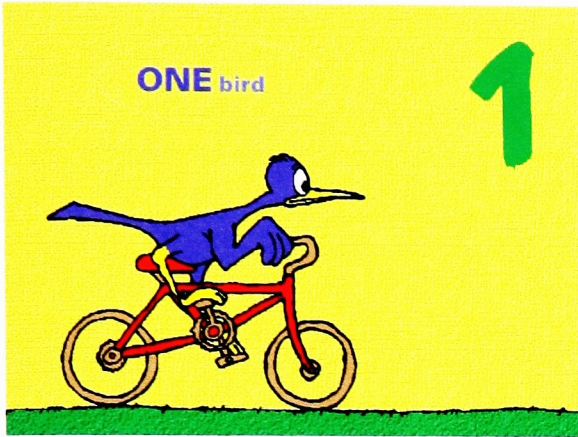
Yellow



COUNT



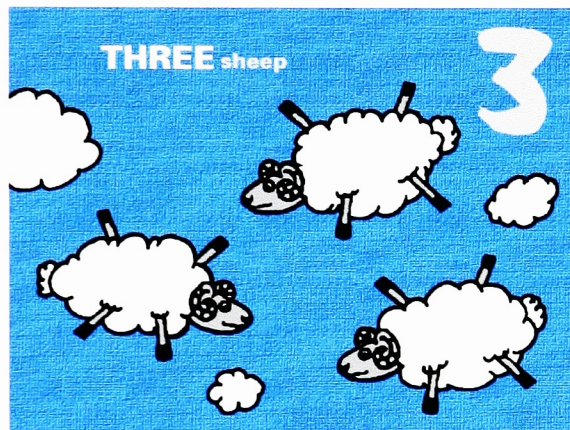
Counting



One



Two



Three

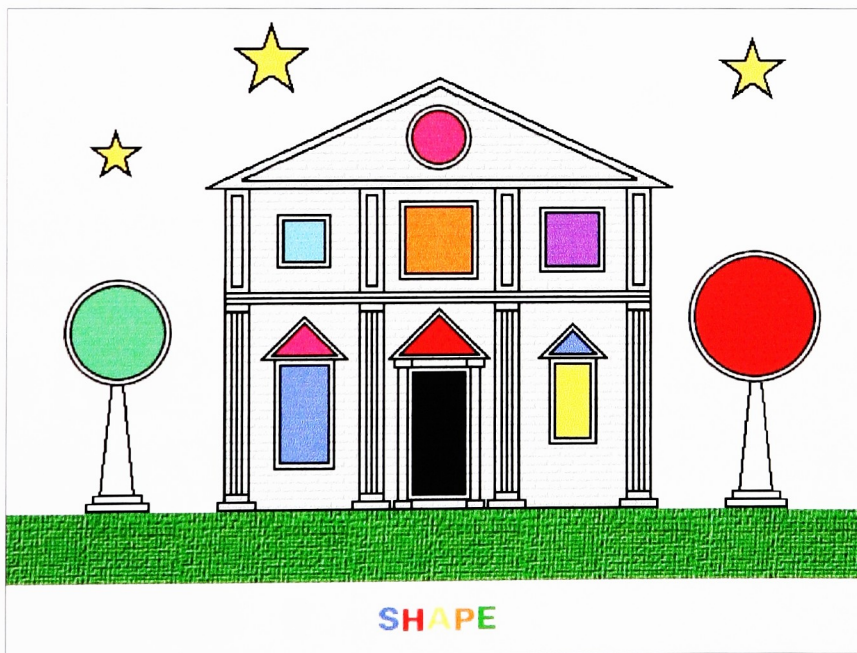
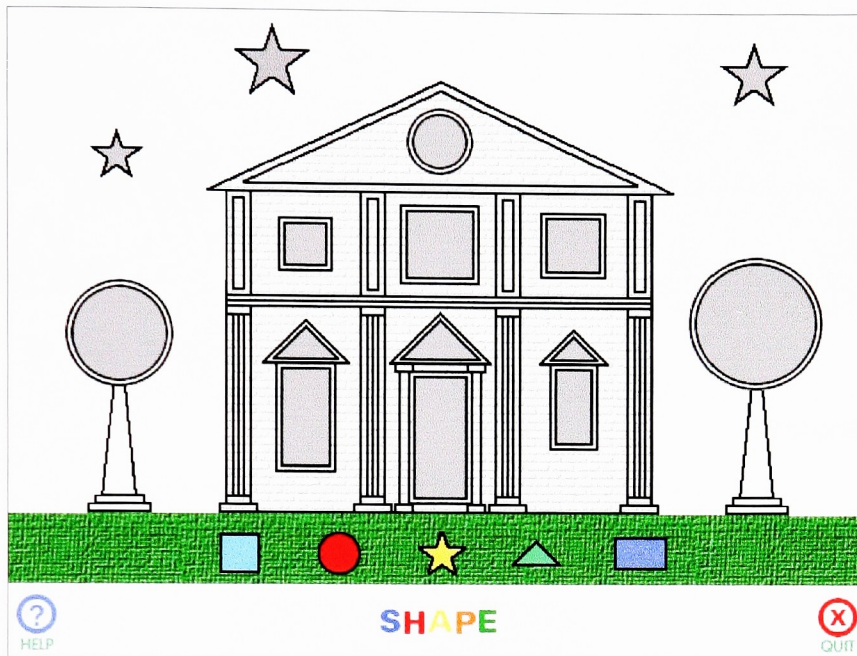


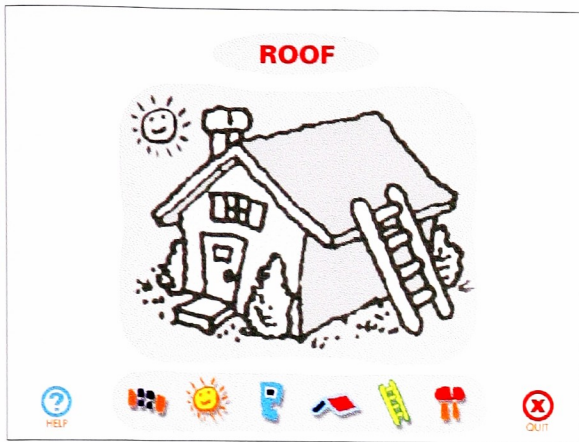
Four



Five

Shape





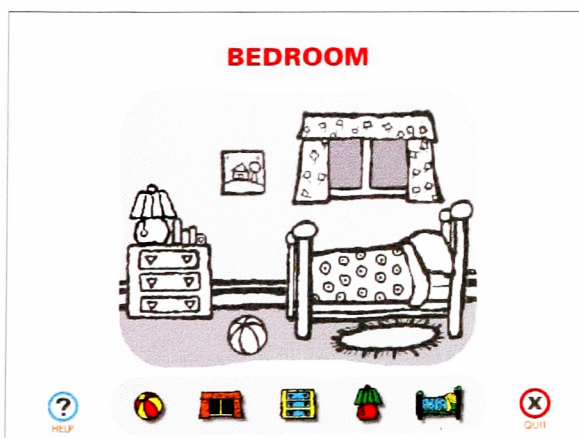
House



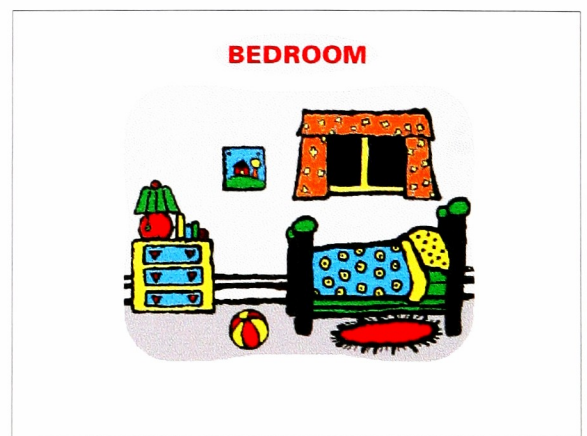
House-Win



Four Rooms



Bedroom



Bedroom-Win

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