

Computer Science and Engineering

University of Nevada, Reno

Shape Fitter - Team #12

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## Abstract

Shape cover is an fun and engaging brain puzzle meant for people of all ages. Shape cover consists of a large shape (circle, triangle, rectangle etc) in the background which the user will have to fill by smaller variations of the circle. The user will succeed in doing so once the entire shape in the background is filled and no longer very visible. This team aims to implement the general gameplay as well as try to incorporate some features such as a timer and leaderboard to make the project more enticing.

## Project Description

Our goal is to create an interesting and fun brain teaser that challenges the way users perceive different sized shapes. The background will have a big circle.

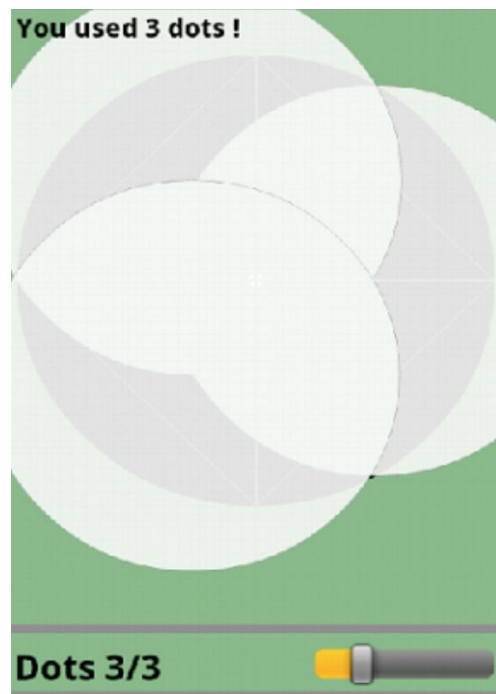


Fig. 1: This is an example of a user succeeding at Level 1 when given three smaller circles that must somehow fill up the darker circle in the background.

The user will have an unlimited amount of smaller circles that to be placed in a strategic manner so that the circle in the background is completely filled by the smaller circles. Figure 1 shows a successful gameplay. The overall motivation for the user is to fill the background with lesser smaller circles as well as quickly since there will be a timer feature added. The first level will consist of 3 small circles that need to be strategically placed so the background is covered. The fourth level will consist of 4 circles that are smaller than the previous level's circles.

The intended user is anyone who is above the age of 13 and has access to a computer. Shape cover would be fun for anyone who wants a slight mathematical challenge as it essentially will focus on how an area can be filled.

Figure 2: This photo represent an unsuccessful attempt on covering the big circle with three smaller circles. The play will be able to tell that the big is uncovered as the black is still showing.

Likewise, this game can be challenging to those with a computer and mouse as well as those with a touchscreen. This game could be especially profitable if there also ads on the top as the user could accidentally touch once when placing a circle, thus making ad revenue for the team members (but this is just an idea and will not be implemented for now).

Shape cover will be developed through Unity by the members. The members will learn how to create a timer as well as a leaderboard to add complexity to this project. The members may also design their own graphics as they have experience in that as well.

### Reliability

The game will be thoroughly tested through ad hoc tests as this game is very user interactive. The members will want to make sure that were they choose to place is the button is accurate to their click or touch response.

## Security

There is no significant security risk involved with data as there is no significant data used for this project. There might be component of users logging or registering for an account, however that will happen most likely with some API calls. The login system is used for the leaderboard so the game can keep track of the scores its users are playing and rank them amongst each other.

## Safety

There is no real danger to this project in the sense that it cannot cause danger to the users playing it.

## **Significance**

Shape cover is an interesting and fun project for team 12 to pursue. Team 12 has members that are interested in creating and implementing games. Both members have taken game design courses at their time at University of Nevada, Reno and therefore have experience. This game will challenge the members to use unity to create Shape Cover as well as challenge the members to design to game itself to have more features for an enticing game play for users. Having this unity project on our resume, can open the pathway for the members to land game design jobs at IGT and other gaming companies such as EA.

Shape cover is innovative in the sense that it is basically using geometrical concepts such as congruent geometry in order to figure out where the circles should be place in relation to the big circle in the background. Likewise, the members will have to do some calculations regarding the size of the smaller circles so they are placed in a way where the user must deeply think about the placement.

The game is similar to Tetris, where players had to strategically place shapes with other shapes in a way that they fit without any overlaps. However, this game is different in that it is flat and focuses primarily on utilizing one shape at a time for each level. The timer aspect will make it similar to candy crush and will hopefully entice users to make the game.

This game could have business market potential. The game may have an undo button incorporated. However if the game gets extremely popular, users could be potentially be charged for add features, such more time in the timer, and more opportunities to undo placement of the button. Likewise, if released for touchscreen devices, the members could also take advantage of incorporating ads on the top and bottom of the screen, so if the user accidentally touches it, there will be ad revenue for the members. There could potentially be a version of the game that users can buy with limited or no ads as well.

## **Legal and Ethical Aspects - Ryan**

There are some legal and ethical aspects that the team must keep in mind during this project. One legal aspect is that the team could be developing something similar to another game without realizing it. Since there are so many games out there, it is likely that someone else has a similar concept as the team. To address this, the team will come up with some unique aspects so that the game is truly unique as well as looking for games that are similar to what the team is making. In order to ensure that the product meets the highest professional standards, the team will get their work checked often by the TA's of the class. With their guidance the team will be able to provide a product that is high quality. In addition, the team will have the product tested by a variety of people. This will give the team an outside perspective to the product that will improve the quality.

## **Changes and Progress since the Initial Project Concept**

There has been significant change since the project concept. For various reasons, the team has moved away from their original project and decided to move to a completely new project. Major progress on the actual project has not started yet, but the team plans to implement a ton over the spring break.

## **Project Responsibilities**

This game will consist of lots of revised documentation and actual implementation. Since the team will be utilizing their spring break to jumpstart this project, this section will be very general right now.

Sanya will be responsible for developing the graphics related to this game as well as doing the math for the circles. She will be leading all the ad hoc testing and documentation regarding the project as well as assisting Ryan on the implementation of the project through the unity game engine. She will be focusing primarily on getting the actual project concept implemented first before working on features.

Ryan will be in charge of leading all the implementable aspects of this project as he knows unity the best. He is in charge of creating the actual game play with the graphics and implementing assistance Sanya provides. He will assist Sanya with project documentation papers and testing.

Both will be in charge of getting third party users to test the game and incorporate their feedback (if any) into the game.

The three components of this project so are:

Graphics (Sanya)

- Creation of circles for each level
- Creation of background w/ grid

Main Gameplay (Ryan and Sanya)

- Touch being recognized
- Touch meaning that a circle is placed on the grid, accurately
- Algorithm to check if circles are covering all the background circle
- Creating more levels with more but smaller circles

#### Features (Ryan and Sanya)

- Account creation to keep track of score and time
- Timers
- Leaderboard
- More shapes, triangles, rectangles etc.

Testing & Documentation (Primarily Sanya, but Ryan as well)

### Project Monitoring and Risks

In order to monitor the project's progress, the team plans to meet with the instructors regularly. This will ensure that the team is making good progress as well as producing good software.

Risk ID	Risk Name	Risk Description	Likelihood	Impact	Severity	Status	Mitigation
RP-01	Scope Creep	Since the project concept and implementation are being done so close together, there is not much time to think about all features that will be added.	4	4	3	Open	Discussing the project every step with other team members and instructors
RP-02	Not enough features	The overall concept of the game is simple, so there may not be features to make the game interesting	3	3	3	Open	Have testers give ideas on what to add to the game
RP-03	Sprites not looking good	Since this game is being made to be played by the public, the game sprites need to look appealing to users	2	2	2	Open	Try to get someone to make professional looking sprites for the game
RP-04	Not enough testing	The project will be completed relatively late so there might not be enough time to do extensive	3	2	3	Open	Try to get play testers as soon as features are added

		testing					
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Table 1: The risk register for the project. This table shows possible problems the team might run into during development of the project. Likelihood, impact, and severity scores rate from one being the lowest to five being the highest.

## Team Overview

Ryan Devaney - Ryan is a Senior Computer Science student. Ryan has knowledge of several programming languages and is in the process of learning C#, java, and swift in order to make apps for smartphones.

Sanya Gupta - Sanya has a passion for front-end and mobile application development. Over summer 2017, she had the opportunity to intern at GE, enhancing the Scout 200 mobile application through the AngularJS framework. Sanya is highly experienced in C/C++/C# and has developed and delivered projects in JavaScript, CSS, and HTML.

## Contributions of Team Members

Ryan Devaney

- Changes made since Initial Project Concept
- Legal Aspects
- Project Monitoring and Risks
- References

Total: 6 hours

Sanya Gupta

- Abstract
- Project Description
- Significance
- Project Responsibilities

Total: 6 hours

## References

*Tetris*

Designers: Alexy Pajitnov and Vladimir Pokhilko

This game is a good representation of what the team wishes to accomplish for the project. It has elements of puzzling and strategy that should be similar to the team's project.

*Introduction to Game Design, Prototyping, and Development: From Concept to Playable Game with Unity and C#*

Author: Jeremy Gibson Bond

This textbook offers concepts of game design as well as tutorials for Unity specific development.

*What is your game*

*How we switched gears*

*How many weeks we had to switch*

*Talk about, what is it? Lead into the 10 levels -> 50 levels*

*Stress the difficulty, anyone can play it, Devrin & Dascalu can play it. (stress them)*

*Idea of it: Planning process and the Game Aspect as well as the backend*

*Significant amount of research, learning, and coding to make it possible*

*Talk about the mistakes you made along the way*

*Section for Ryan and Sanya (Mistakes and Lessons Learned)*

*Talk about Contest*

*Possible Rewards*

*Talk about the gimmicks and the input from everyone (CIL lab, chris lewis, advisors, other groups, friends)*

*DEMO leave some time for them to play*

*Final section: improvements to be made for demo day*