

# **GARDENER - MAX PHILL**

**CS451: Computer Graphics and Game Design**

**Project Concept: Cover Max**

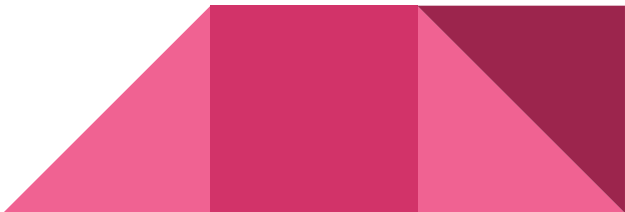
**Group-2**

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# Problem Statement

A bounded 2D region  $D$  is said to be covered by a set of 2D items  $I$  if  $D$  is a subset of the union of all the items in  $I$ . In other words, each point of  $D$  is contained in the union of the items in  $I$ . The union of two 2D shapes is simply the union of the points of the two shapes. Here, the number and the shapes of the items of  $I$  are fixed. Also,  $D$  is given. The objective before the player is to arrange the items in  $I$  so as to maximize the area covered. While arranging an item of  $I$ , the player must be allowed all the rigid motions in 2D. No other transformation may be permitted.



# STORY LINE

There is a gardener named Max Phill. He owns a piece of land which is in the shape of a rectangle (like a 2D map). He bought some flower patches in the form of different shapes. He wishes to fill the rectangular patch with the flower patches which he bought from the market and he wants to do so in such a way that maximum land is covered. He is not able to come up with an efficient solution. Help him to plant his flower patches such that all his needs are met.



**Before the demo of Game, let us discuss  
some details about the Game.**



# Game Logistics

- There are six levels in the game.
- Given a 2D garden and a certain number of flower patches with different shapes.
- Player has to place the patches in the garden so that they cover the maximum possible area of the garden.
- Player can move the patch anywhere in the garden. But will not be able to move the patch outside the garden. Although relaxation has been provided at the boundaries.



# Game Logistics

- Player can rotate every patch to any arbitrary angle that he wants.
- To clear the current level, the player has to get points more than the minimum points specified by that level with certain number of shapes.
- There are three powers in the game that the player may use to cheat and clear the round.
- With help of store and coins, more powers can be purchased.
- If two patches overlap, then penalty will be made based on the area of overlap.



# Patches Used in the Game

- There are seven patches that will be used: **square**, **circle**, **triangle**, **ellipse**, **pentagon**, **hexagon** and **star**.

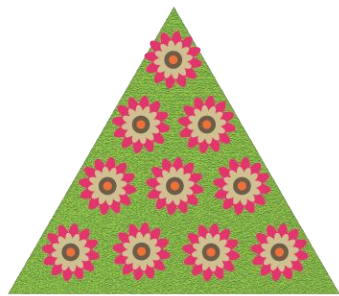


Square Patch

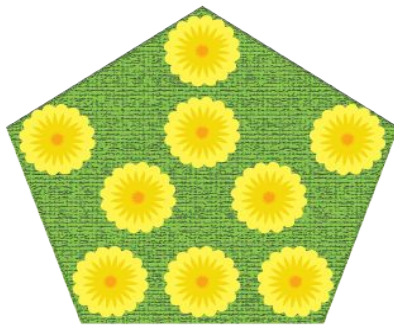


Circular Patch

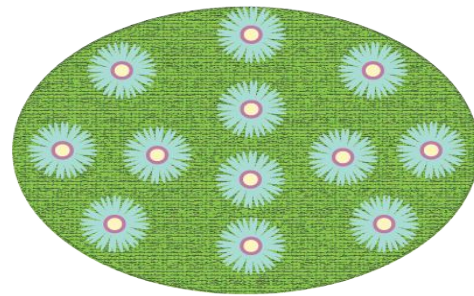
# Patches Used in the Game



Triangular Patch



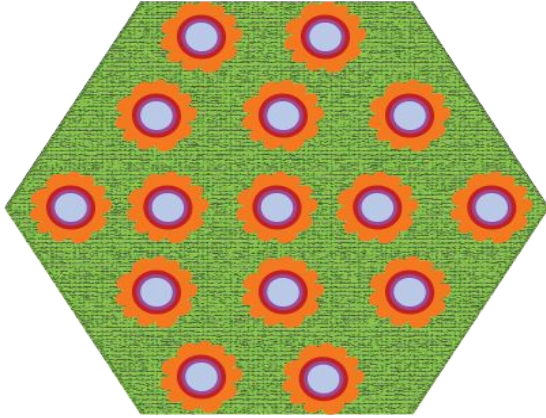
Pentagonal Patch



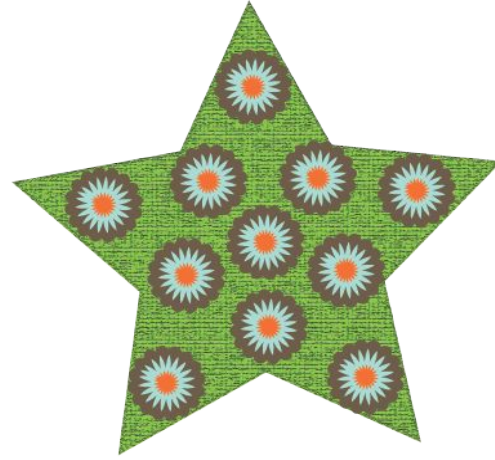
Elliptical Patch



# Patches Used in the Game



Hexagonal Patch



Star Patch

# Powers provided to the Player

There are three powers in the game that the player may use to cheat and clear the round.

- Cover
- Scissor
- Crop



# Cover Power

A big rectangular patch will be inserted on the ground and thus,

- Incrementing the total points by 60
- Decrementing the available cover powers by 1



# Scissors Power

Selected Patch will be removed from the rectangular garden.

- Decrementing the total points by points of the selected patch
- Decrementing the available scissor powers by 1



# Crop Power

- Selected Patch will be divided into two halves.
- Decrementing the available crop powers by 1



# Store to buy powers

There is a store implemented in the game where player can buy the extra powers that he/she wishes to purchase to clear the levels.

1000 coins have been provided to the player and thus, he/she can purchase the power according to the price of the power.



# Penalties in the Game

If there will be overlap of two patches, it will result in penalty in the points earned by the person and in the penalty section, penalty will be displayed.



# Game Over Conditions

For each level certain number of points are set as threshold.

Following cases are possible for the player in any level:-

- **Case 1:-** No patch is left and points earned by the player is more than or equal to threshold
- **Case 2:-** No patch is left and points earned by the player is less than threshold





# Case 1: No patch is left and points earned by the player is more than or equal to threshold

Game Over Message will be displayed along with points earned by the player.

Player will have three options:-

- Go to Next Level
- Go to Level Explorer
- Go to Main Menu



## **Case 2:- No patch is left and points earned by the player is less than threshold**

Game Over Message will be displayed along with points earned by the player.

Player will have two options:-

- Go to Level Explorer
- Go to Main Menu



# Game End Condition

When the player will clear the last level i.e. 6th level, he will be shown

- Congratulations Message
- Option to go to Main Menu



The background is a solid dark blue color. In the top right corner, there is a decorative pattern of overlapping triangles in various shades of blue, ranging from dark navy to a lighter sky blue.

**THANK YOU**

**LET'S SEE THE DEMO OF THE  
GAME NOW**