Tiger Zone Software Development Plan

I. Domain of Tiger Zone (Work in Progress)

Tiger Zone is a board game based on the French board game Carcassonne.The players place land tiles turn by turn. As they do so, the GameTrails(Roads), Lakes(Lakes), Jungles, and Dens(Cloisters) emerge and grow. On these, the players can deploy their tigers to earn points. Players score points during the game and at the end. The player with the most points after the final scoring is the winner.

A. Scoring

1. During the Game

a) GameTrail(Roads): A GameTrail is complete when the GameTrail segments on both ends connect to a crossing, a Lake segment, or a Den, or when the GameTrail forms a complete loop. There may be many road segments between the ends. If a player has a tiger on that road, a player earns one point for each tile the road covers

b) Lakes(Lakes): A Lake is complete when the Lake is surrounded by a Lake shore with no gaps in the shore nor holes in the Lake. A Lake may have many city segments. Each pennant on segments in the Lake earns the player 2 points.

c) Den(Cloister): is complete when the tile it is on is completely surrounded by land tiles. The player with a tiger in the Den earns 9 points (1 for the Den tile and 1 each for the other tiles).

d) Important Note: When a GameTrail or Lake is completed, the player with the most followers on the completed feature earns all the points

2. End of the Game

a) Incomplete GameTrails: The player who has the most tigers on the GameTrail get the points. One point for each tile.

b) Incomplete Lakes:The player who has the most tigers in the Lakes get the points. One point for each tile.

c) Incomplete Den: one point for each tile that surrounds the Den

d) Jungles: 3 points for every completed Lake a Jungle is connected to

e) Important Note: The player with the most followers on the completed feature earns all the points. If two players have the same amount of tigers, both players get the same amount of points.

B. Finishing the Game

The game is finished when 76 tiles have been placed. The player with the most points wins.

II. Architecture

A. Players

1. Players are able to place tiles
2. Keep track of tigers
3. Keep track of crocodiles
4. Keep track of score

B. Tile Manager

1. Keep track of a total count and specific count of tiles already been placed
2. Keep track of where tiles can be placed on the board (edges)

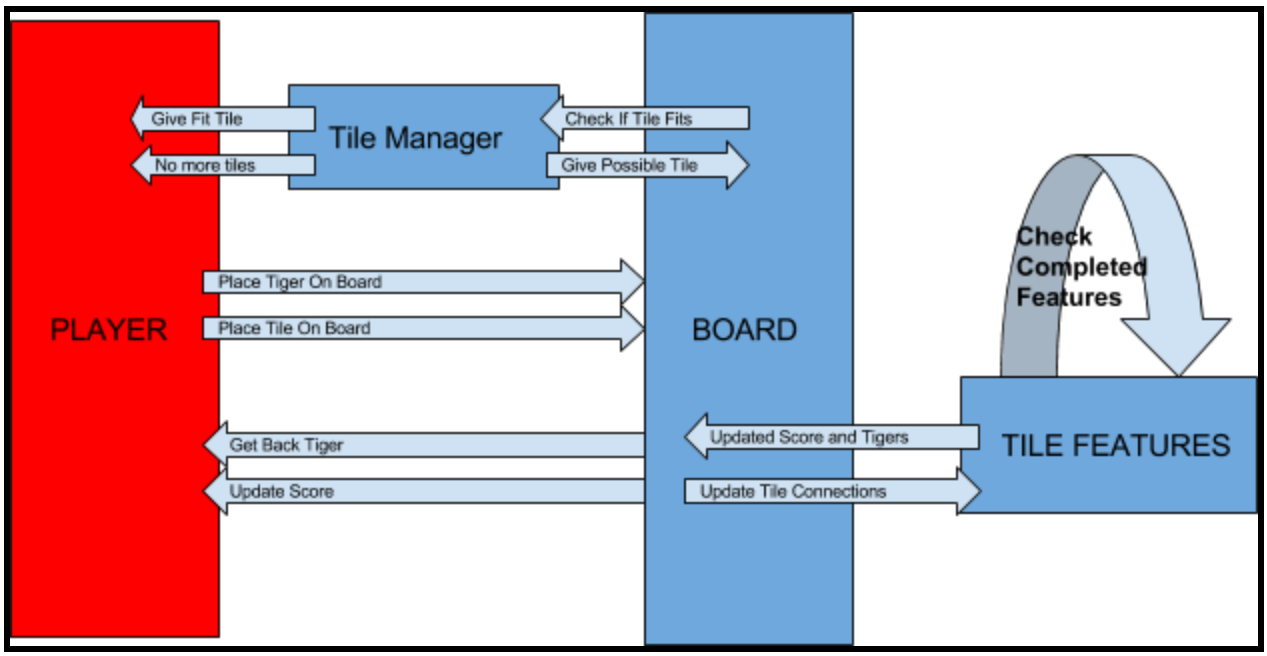
3. Check to see if a tile can fit on the board
4. Rotate the tile to fit the board

C. Board

1. Update connected components
2. Check to see if user can place a tiger

D. Tile Features

1. Tile features are GameTrail, Lake, Jungle, Den
2. Check the scoring guidelines of each tile feature



3. Return scoring and tigers

III. How Does The System Work?

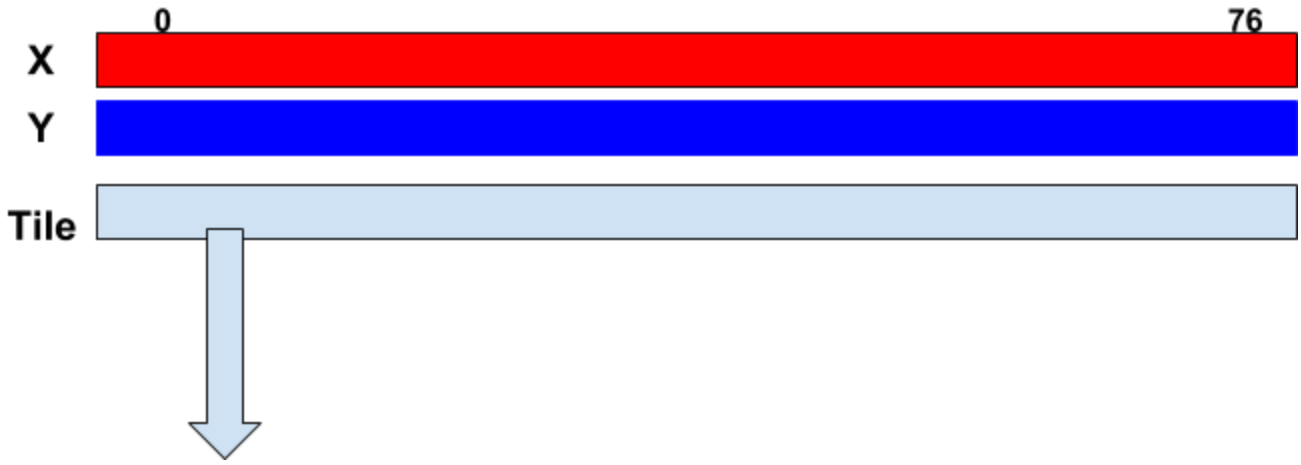
A. Important Notes

1. The possibility of connecting two or more tiles is based on what the middle feature at the edge of the tile is
2. All of the scoring of features is based on graph traversals and relationships
3. Scoring only happens on the features affected by the most recent placed tile (except for Dens)
4. Only the Jungle relies on another separate feature for its scoring

B. Board When Placing Features

1. The first tile to be placed is at the x,y position 0,0
2. Iterate through the tiles to see what edges have not been placed on x,y position
3. Board is based on the 72 total number of tiles
4. Inserts will be O(1) and finding edges O(n)
5. The board can be increased to any total tile size
6. The board can fit all the x,y relationships possible between the tiles
7. Empty tiles are at position (-1,-1)

8. Tile Pointers are used to keep the 2-D Feature array



Jungle 1	GameTrail 1	Jungle 2
Jungle 1	NULL	GameTrail 1
Jungle 1	Lake1	Jungle1

C. Tile Manager

1. The tile manager randomly pulls out a tile, storing already used tiles in an array
2. The tile manager gets edges from the board and checks to see if a tile can be placed at the x,y position
3. If it can't be placed at the x,y position it will rotate to tile at most 3 times to check the new orientation
4. Here is an example

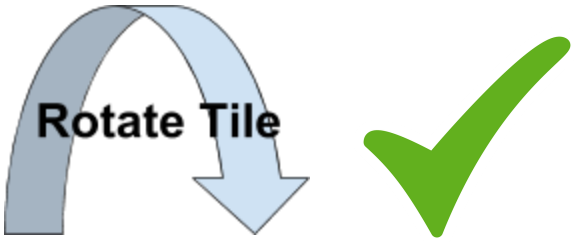
Jungle 1	GameTrail 3	Jungle 2
Jungle 1	NULL	GameTrail 3
Jungle 1	Lake 6	Jungle 1

New Tile

Jungle 1	GameTrail 1	Jungle 1
Jungle 1	NULL	GameTrail 1
Jungle 1	Lake 1	Jungle 1

Jungle 1	GameTrail 5	Jungle 1
GameTrail 5	NULL	Road 2
Jungle 2	Lake 9	Jungle 2

Jungle 1	GameTrail 3	Jungle 2
Jungle 1	NULL	GameTrail 3
Jungle 1	Lake 6	Jungle 1



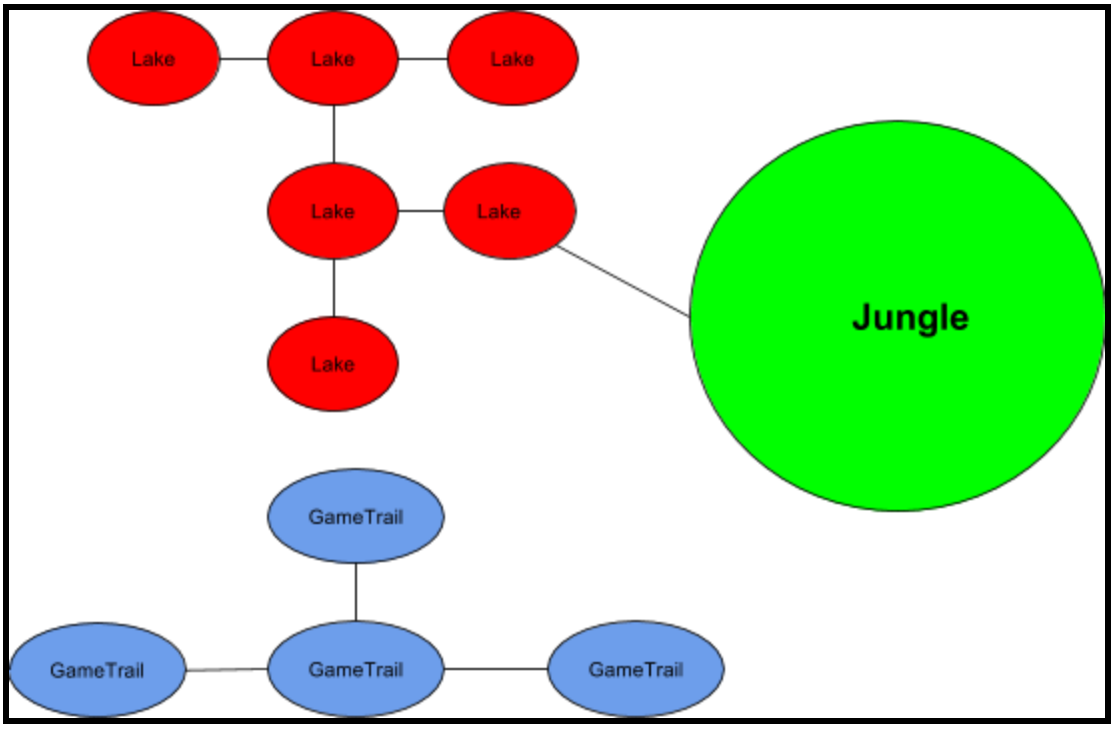
New Tile

Jungle 1	Lake 6	Jungle 1
GameTrail 5	NULL	Jungle 1
Jungle 1	GameTrail 5	Jungle 1

Jungle 1	GameTrail 5	Jungle 1
GameTrail 5	NULL	Road 2
Jungle 2	Lake 9	Jungle 2

D. Board When Scoring

1. The Board is consisted of many components that look like a collection of graphs

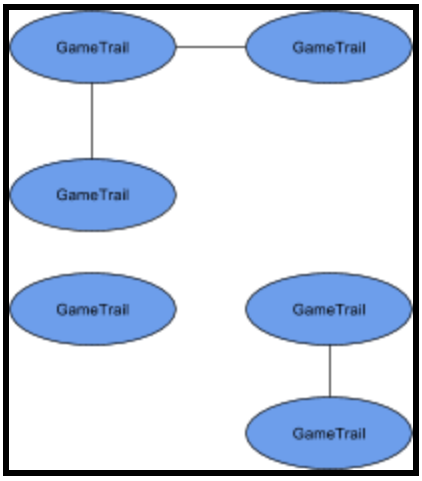


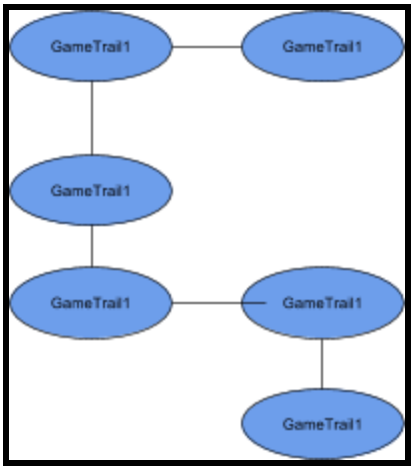
E. Tile Features

1. GameTrails

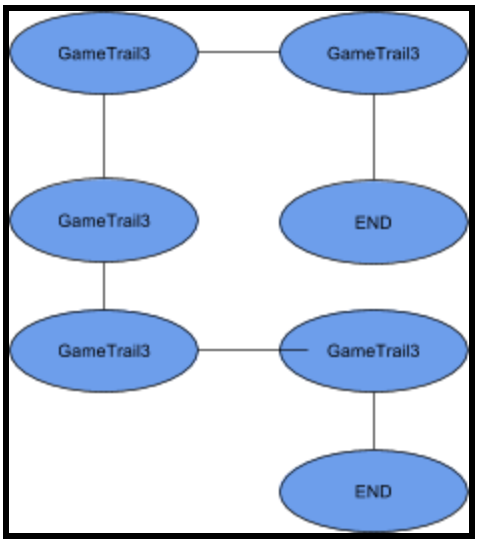
a) Merging of GameTrails

b) Before and After Merging

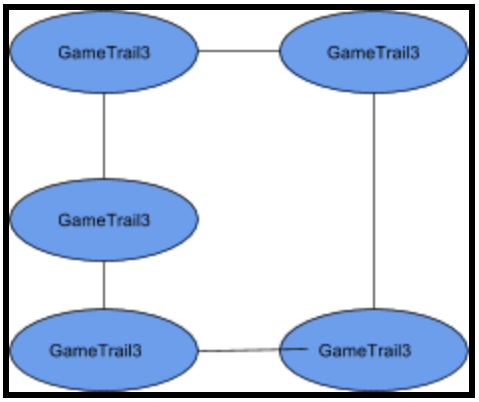




c) Scoring Finished Road Trace Back from End to End and Count the Number of Nodes



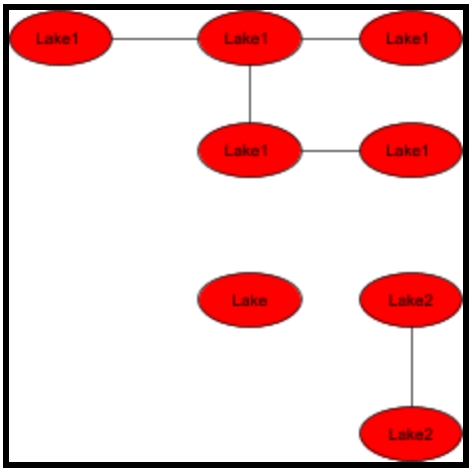
d) Scoring Road Where It Creates A Loop Trace Back Until You are Pointing to the Same Node

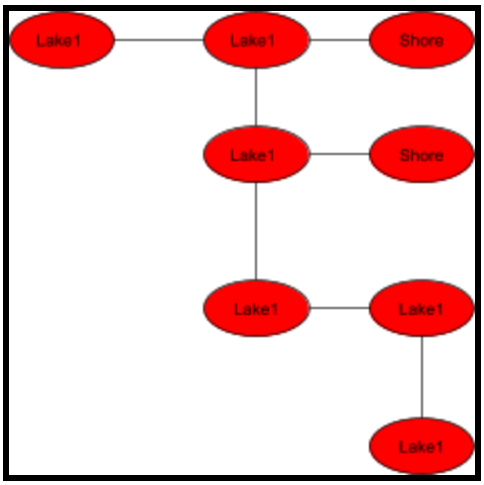


2. Lake

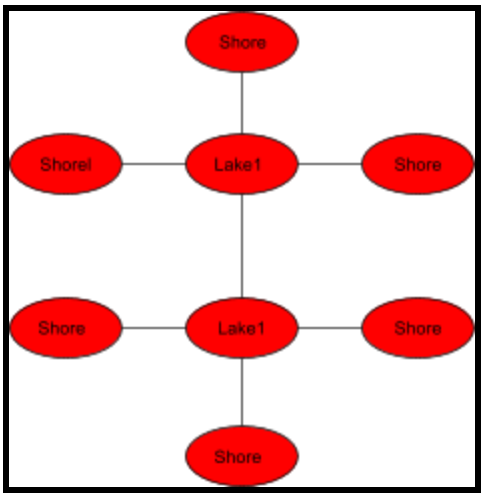
a) Merging of Lakes

b)





c) Lakes are Completed When The Ends of The Lakes Graph Are All shores



3. Den

a) Scored when all directions from the x,y positions are filled with tiles

4. Jungle

a) Keep the Lakes the Jungles touch in the Jungle object

IV. Testing

A. Unit(Acceptance Testing)

1. Tile Testing

a) Print Out Tile to See If Looks Like Selected Tile

2. Board Testing

a) Print Out Board with x,y position

3. Tile Manager Testing

a) Find Edge
b) Place Tile at Edge, Print Board
c) Check for Invalid Placement and Valid Placement (1,4) Tiles
d) Check To See All Tiles Are Used
e) If A Tile Can't Be Placed, Rotate It At Most 3 Times

4. Lake Testing

a) Check Connections Are Correct
b) Iterate Through Lake To See If It Is Completed or Incomplete
c) Iterate Through An Incomplete Lake To See If Is Not Finished
d) Get size of Lake by Tiles
e) Check to see who owns the Lake

5. GameTrail Testing

a) Check Connections are correct
b) Check score when it loops around on itself
c) Check score when there is two endpoints
d) Get size of GameTrail by Tilesf
e) Check to see who owns GameTrail

6. Den Testing

a) Check who owns Den
b) Check if the tiles surrounding tiles are full, add point to score

7. Jungle Testing

a) Check if connections of Jungle objects are correct
b) Check who owns Jungle
c) Check if Jungle are touching incomplete and complete Lakess

8. Final Score Testing

a) Test Jungle Scoring
b) Test Incomplete Tile Scoring for the other features

V. Development Progression

A. Tile

B. Board

C. Tile Manager

D. Tile Features

1. Den
2. Road
3. Lakes
4. Jungle

VI. User Stories

https://www.pivotaltracker.com/blog/principles-of-effective-story-writing-the-pivotal-labs-way/

As a player, I want to see the tile I am placing, and other tiles left to place so that I can determine the best tile to place in an area	- The tiles will be shuffled and dealt out randomly
As a player, I want to place the tile so that I can place it in the optimal position to expand or complete segments	- The tile must be placed adjacent to an existing tile on the Jungle - The tile may be discarded if no legal placement is possible - Rotation of a tile may be possible - Placing the last tile results in the end of the game - Placing a tile in an illegal place results in the forfeiting of the game - Strategically placing a tile can result in the claiming or sharing of other players' lands
As a player, I want to place the followers so that I can earn the greatest amount of points	- Each player receives 7 followers to place - Followers on city or road segments are scored differently depending on completion - Followers are not returned to the player until a segment is complete - Followers placed on farms are not returned to the player - Followers on farms are not scored until the end of the game - Strategic placement of followers results in the claiming or sharing of other players' lands - Players with the most amount of followers in a completed segment earns all the points; players with the same amount of followers in a completed segment each earn all the points
As a player, I want to keep score so that I can...	-Win the game