Guidelines for designing
for a gameplay style

Introduction :

The difference between puzzles and games is often quite difficult to identify. According to the game designer Chris Crawford, *"Puzzles are rule-based systems, like games, but the goal is to find a solution, not beat an opponent"[17]*. With this definition, it is clear that puzzles and games share many common points, and it is easy to understand why they can be influenced by each other.

In this document, we will study a style of gameplay from tiling puzzles, which we will simply call tiling.

I - Gameplay Style Definition :

Before defining the gameplay style of tiling, let's briefly review what tiling puzzles are. A definition of the latter is given to us by wikipedia: *"Tiling puzzles are puzzles involving two-dimensional packing problems in which a number of flat shapes have to be assembled into a larger given shape without overlaps (and often without gaps)"[1]*.

Illustration 1: Tangram is one of the most famous Tiling Puzzle

The tiling largely reproduces many features of tilings puzzles. The player has at his disposal a certain number of flat shapes that he must arrange as well as possible in a dedicated space and this, without being able to overlap the different shapes between each other.

The pieces available to the player may be elementary shapes such as circles, triangles or squares, but most often they are polyforms (*A plane figure or solid compound consisting of multiple connected copies of a given base shape[2]*).

The main component in tiling is the player's use of space. The latter must consider the positioning of its tiles in order to achieve certain favourable configurations (which differ according to the game), to reach the objectives specified by the game. Among the most frequent objectives, we find the idea of perfectly filling an area without leaving any empty space, or even making certain associations of tiles.

Thus are distinguished two game mechanics inherent to tiling: Space management and shape positioning[11]. The shape positioning often goes hand in hand with another important game mechanic: the pattern building[10]. One of the advantages of tiling games is to allow the player to create patterns using the pieces at his disposal. These patterns are usually discovered as the games progress. The more a player plays, the more he encounters situations in which he can reuse previously seen associations to progress.

Tiling is based on rather simple game mechanics, but their use in game has made it possible to reveal new ways of thinking about this style of gameplay.

II - Analysis :

Tiling games exist in many forms. Some are simply variations of tiling puzzles, and others present a different view of tiling from deeper variations in the gameplay.

Variations on tiling puzzles :

When we talk about tiling games, the first games that are mentioned are those that take up the concept of tiling puzzles and adapt it to a game.
The latter are most often games played alone, whose objective is to complete a grid with a given set of shapes. These games are extremely accessible due to the simplicity of their gameplay, and still flood today's mobile game download platforms.

This same idea is also found in the board game Pentominoes[9], which is based on the concept of tiling puzzles. It is a game played on an 8×8 grid. The players (two or three) place a pentomino (a polyform made up of 5 squares) one at a time, ensuring that there is no overlap and that each tile is used only once. The winner is the last player to place a tile on the grid.

Tiling is also used as a secondary gameplay in some games. This is particularly the case for the nintendo DS game *"Kingdom Hearts 358/2 days"* and the nintendo 3DS game *"Kid icarus uprising"*. These are both action rpg, but offer the player to manage his inventory using tiling, each piece placed corresponding to an object/skill that has an impact on the main game.

Illustration 3: Kid icarus uprising skill management menu

Illustration 2: Kingdom Hearts 358/2 days inventory menu

Even if all the games mentioned above are interesting, they only repeat the millennial concept of tilings puzzles. Other games have succeeded in appropriating this concept and making it more subtle by imposing constraints on the original model.

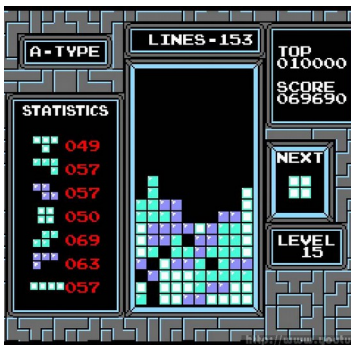**Variations resulting from gameplay evolutions :**

Illustration 4: The famous tetris game, by Alexei Pajitnov

One of the most famous tiling games is Tetris[12]. Its creator Alexei Pajitnov was inspired by the game Pentominoes (mentioned above) and modified its concept by adding some constraints.

The innovations brought by Tetris are numerous and demonstrate the ability of the same gameplay style to be represented in a wide variety of forms. We will mainly use the innovations introduced in tetris to show different variations on tiling games and their consequences on the game experience.

- Gravity:

The addition of gravity to the game changes the way the player thinks about the positioning of his pieces. These scroll vertically until they are stopped by an obstacle. This element has several important consequences. Indeed, once a piece is played, it is impossible to move it again. The player cannot take a piece back and reposition it as he would in a classic tiling puzzle, giving a much more important place to decision making.

Also, this vertical movement imposed by gravity limits the different possible positioning of the pieces. Tetris is not the only one to use gravity, there are many similar video games (puyo puyo and Lumines for example) but also board games with a similar functioning. "Fits"[6] is a game that basically reproduces the functioning of tetris, using an inclined game grid.

Another more original game is "Drop it"[8].

Players must drop simple shapes such as circles, triangles, and various other quadrilaterals into a green game board. Since the shapes do not fit perfectly, "Drop it" is more a game of dexterity than reflection. Also the fact that the pieces bounce off each other adds a certain form of randomness to the game.

Illustration 5: Drop it

- Score and combos:

Scores[13] and combos[14] are very effective design patterns to motivate the player to play. Many tiling games only give the player the objective of making the highest possible score. This is found in the tiling game "NMBR 9"[7] whose objective is to make the highest possible score by positioning different tiles according to precise rules.

In parallel with the use of scores, combos are frequently used. It is a set of actions more or less easy to carry out, generally granting a score bonus. They are mainly used in tiling video games such as Tetris or Puyo Puyo, with combos being a major part of the game experience.

Illustration 6: NMBR-9

- The degrees of freedom of the tiles:

Another way to vary the gameplay of tiling is to restrict the degrees of freedom of the pieces. If in tiling puzzles the pieces can be flipped or rotated, this is not always the case. In many tiling video games, parts cannot be flipped. This increases the complexity of some problems and reduces the potential of a piece. Restricting the degrees of freedom of the pieces also makes the game more accessible by limiting the number of actions that the player can perform. Generally speaking, most video games do not allow you to return parts, unlike board games.

- The randomness:

In order to guarantee their replayability, many tiling games introduce some randomness[15]. This can mainly be applied to two elements: the game board or the pieces that the player has at his disposal. In the "Ubongo"[5] board game, each player must cover a randomly shaped board with pieces. On the other hand, in Tetris, the board is always the same, but the player is forced to position randomly determined pieces among a defined set.

In most tiling games similar to tetris, the player is informed of the next pieces he will have (usually between 3 and 6 pieces), introducing design patterns such as limited foresight and anticipation.
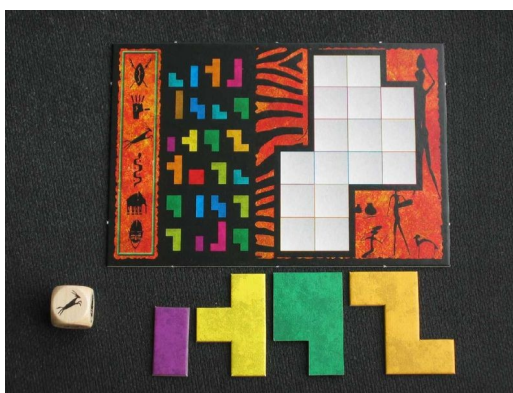

Illustration 7: A Ubongo randomly chosen board

- Limited time :

Using time as a constraint is a practice often observed in tiling games. This adds a form of pressure to the player, who must make decisions much more quickly. In tetris, the player's reflection time is limited by the falling speed of the piece. The faster the piece falls, the faster the player has to make decisions, and has no choice but to anticipate his actions several turns in advance.
In the board game "Ubongo", each player has a limited time to complete their board. Here it is more the speed of execution than the anticipation of the player that is challenged.
Simply adding a time constraint to the player is enough to move from a calm and relaxed gaming experience to something much more frenetic, more demanding in terms of speed of execution and much more prone to error.

It would be impossible to present all the gameplay variations applicable to tiling games. However, the few examples presented above show that tiny variations of the original gameplay can create very diverse game experiences.

Player progress and learning:

All tiling games have one thing in common: the player has a feeling of improvement as the games progress.

This progress can be visualized through a score (mentioned above) and/or a level of difficulty[16]. It is common to provide several levels of difficulty to renew the player's experience.

The difficulty can be increased by modifying different aspects of the game. A frequently used method is to increase the number of pieces and/or the size of the game board. This is the case in katamino, where the player solves a series of tilings puzzles, the more the player advances the more pieces and game space there are.
Another way to make a tiling game more difficult is to impose a time constraint (see above) and increase this constraint according to the player's progress.
The increasing rate of falling pieces in tetris is an example of increasing difficulty as the game progresses.

However, over the course of his games in a tiling game, the player will develop automatisms and understand implicit rules specific to tiling games.

After a few games of a tiling game, the player will be confronted with a number of similar situations. The more the player encounters this kind of situation, the more he will learn to solve them and develop reflexes, automatisms in response to a certain pattern that he will have been able to recognize. Introducing pattern building mechanisms in some games.
In some cases, it is also his dexterity that will improve as the games progress.

III - How to design a tiling games?

Guidelines:

What are the essential elements to design a tiling game? When creating such a game, it will be necessary to pay attention to various elements in order to be able to recreate the desired experience.

The first question to ask is the game experience. Depending on whether you are looking for an experience centered on reflection, dexterity, or speed of execution, you will have to adapt the game board as well as the different pieces available to the player.

Special attention should be paid to the number of options the player faces during a game. The more options there are, the more time the player has to think. For a game based on speed of execution, too many choices could affect badly the game expe   rience. This is one of the reasons why the creator of Tetris chose to use tetraminos instead of pentominoes, restricting the different options presented to the player and giving a fast and dynamic gaming experience.

On the contrary, if you are looking for a more reflection-based experience, then you can choose a larger number of pieces so that the tiling is not trivial to solve. The larger the number of pieces, the more association of different pieces can be created, and the more complex the game will be.

Also, we can play on the size of the game board. As with the number of pieces, the more pieces you can put on the game board, the more options the player will have.

So depending on the rhythm we want to give to the game, it will be necessary to pay particular attention to the number of different pieces in the game as well as to the size of the board.

A tiling game must also allow the player to have a long enough game experience to understand the different patterns he can create and use in the game. It is important to avoid a repetitive and monotonous game experience at all costs. The player must feel a sense of progress, whether through the game, or through his ability to play. For this purpose, two methods are mainly used. The first consists in using randomness to generate different situations for each game. The other method is to offer different levels of difficulty to challenge the player and maintain his attention.

Design method:

As we saw in the previous section, a good way to create a tiling game is to start from a classic tiling puzzle. A good starting point is to restrict certain aspects of the game, such as the degrees of freedom of the pieces (preventing rotation for example), or changing the game board.

In general, it is a good idea to add "rules restricting actions" to make a tiling game style emerge from a tiling puzzle.

Playtesting a tiling game:

When playtesting a tiling game, there are a number of elements to watch out for.

First of all, it is necessary to ensure that the player is not confronted with too many possibilities. In such a case, the player may remain blocked in front of the game and not succeed in advancing. Ideally, the player should be introduced with progressive difficulty so that he or she has time to adapt to the game. Then it is necessary to make sure that the player is well aware of all the actions he is allowed to do with the pieces. Can he flip them ? Rotate them? Overlap them?

Does the player learn from his games? Does he manage to release patterns that help him in the game?

Conclusion:

Although originally tiling came from the world of puzzles, this gameplay style has found its way into many of today's games. Over time, many variations of tiling have emerged, offering a range of varied game experiences: reflexion, address/dexterity, rapidity/frenzy. These experiences, although different, share a common base: the placement of a specific set of pieces on a dedicated board. However, designing a tiling game is not so simple, a lot of consideration must be given to the difficulty of the game, but also its replayability and pattern building.

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