Pixel Artist's Beginner Booklet

Chpt. 4

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There's more to pixel art than just sprites, so let us take a moment to introduce ourselves to the world of tiles. Tiles are basically square images which are used collectively to construct a larger image. To help understand this concept you can think of lego. Each unique lego piece would be equal to a tile, and you can have a bunch of these pieces which you may use to construct various types of structures any which way you please. The same is so with tiles and allows game developers to save file space and allow for more flexibility. To think of it another way, if you remember the indexed palettes we discussed previously, a tileset consists of a bunch of tiles which are numbered (similar to how a palette consists of a bunch of colors which are numbered), and a tilemap which is two dimensional, would have each of its (x,y) coordinates correlate with a number of a tile in the tileset(similar to how an image's pixels correlate to the indexed palette of colors). Below are screenshots from the Fire Emblem 7 game for the gameboy advance handheld.
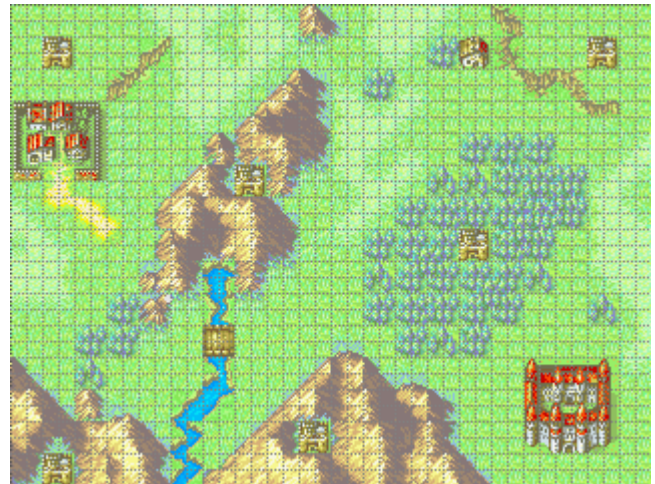

8x8pixel sized tile grid

Without looking at the image which outlines the grid for the tiles, you may not have even known that there were tiles being used, or if you did, it would be hard to distinguish where one tile ends and another begins. Try studying the screenshots to find how the tiles are used in more than one place to construct the whole image. If the whole image wasn't constructed in pieces but was rather a single image, that image would be larger in file size than the collection of tiles which could have made up the image. Also, if that were the case, you wouldn't be able to construct any additional areas without creating another large image for it. By utilizing tiles as the pieces which construct your game's world, you can reuse them in endless configurations to provide endless possible areas to explore.

For those interested in game development, let us look at the process of creating a tile. Tiles are not as straight forward as a sprite in that a sprite is simply an object, but tiles on the other hand usually consist of more than one thing, and require more than one tile to represent those things. Tiles can be dependant, non-dependant, independent, or a mix between them. A dependant tile is a tile which depends upon other tiles and their placement in order to produce a specific visual feature, for instance; you may have two tiles which consist of the top and bottom portions of a door. To have a door, you must have both the top and the bottom

Fire Emblem 7

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portions of it; hence both tiles would be dependant upon the other. You could also have an additional tile where the top portion of the door has a window, allowing two combinations from the total 3 tiles. In this case, the door with the window, and the window-less door would both be using the same bottom tile and so both those tiles would be dependant upon the bottom tile to be present. The bottom tile however would have a split dependency between the two other tiles. The more instances a tile can be used, the more valuable the tile becomes as well as the variety you can produce in the game. Below is an example of some door tiles which are each 16x16 pixels, notice how two doors which take up 4 tiles require only 3 tiles. If another bottom door tile was created which could be used with both top door tiles, you would be able to create 4 separate types of doors with only 4 tiles.


Door Tiles   *200% Magnified*
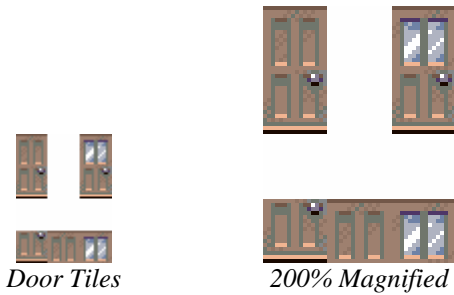
There are also less dependant tiles such as grass tiles. These types of tiles usually repeat or get mixed among other similar types of tiles since their placement is not as important in relation to other tiles. With a tile which can repeat (a tile which can get placed next to a tile of the same type), there is a key issue which arises. The issue is in how the grid in which the tiles are ordered can become apparently clear. You can notice a grid when the tiles produce horizontal or vertical lines where they don't transition well between each other. This issue can arise in other types of tiles, but it is more commonly seen in repetitive tiles. The reason for the visible lines is because one side of the tile does not seamlessly transition into the adjacent tile; therefore you are left with what seems like seams. A way to

picture this is if you had a piece of paper with a drawing on it. If you sliced up the drawing without moving any of the pieces, it would look fine, but if some pieces were to be shifted then the picture would not look seamless. This is true for tiles as well. When the details along the edge of a tile do not align well with details on the edge of another, you see a visual discrepancy between them which suggests a separation.

Tiles   *200% Magnified*

Visible edges selected
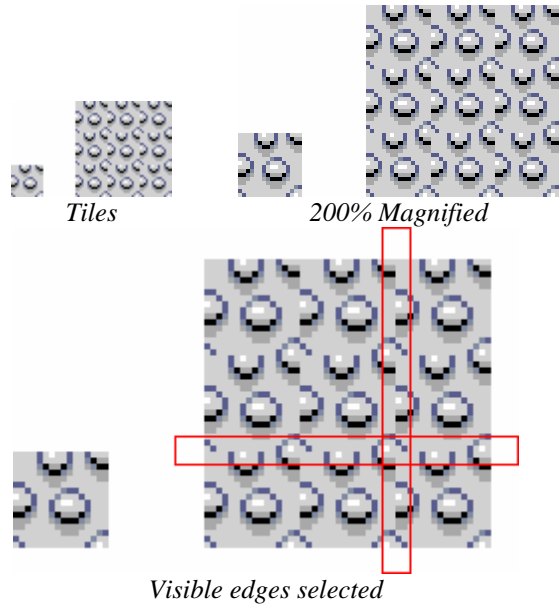
The above images consist of a single tile which doesn't seamlessly transition among itself. The effect can exist in various degrees, in this case, there is a strong suggestion of vertical edges between the tiles due to the areas where the shapes on the tile do not wrap around to the other edge, but rather simply get cut off. This doesn't look good, and if it were seen within a game, it would detract from the emersion the player would have had (hey, those 2d games can be mesmerizing!). Below I have fixed the seams by allowing the tile's details to wrap around to the other side.

Tiles   *200% Magnified*
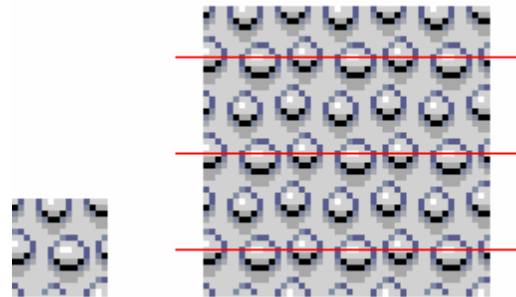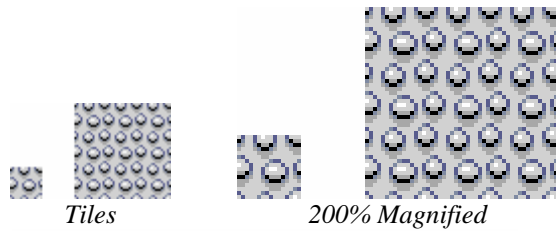
Repetitive artifacts highlighted

As you can see, the image looks much smoother transitioning between tiles. One thing though which I have highlighted in the last image is some repetitive artifacts occurring which are producing imaginary lines. There are more occurrences of this in the image, yet for simplicity sake, I have highlighted only three. A way to fix this is to not make details within the graphic have such linear order, because if it does, the linear order of the detail tends to suggest a line when the tile is repeated. An alternative way of dealing with this problem is to create additional tiles which can be switched up with the current tiles so that any linear/repetitive artifacts become broken up. In the following image, I have shifted some details around to reduce any repetitive artifacts within the tile. As you will see, the details will look more random than orderly.

*Tiles*   *200% Magnified*
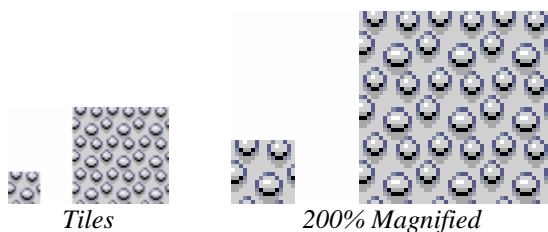
Sure, that looks good, but it isn't very interesting. We just have one tile with what

looks like some pebbles scattered about evenly. What if we wanted to spice things up a bit? Well, we could go and add more tiles of varying details which we could integrate with the rest of the tiles. For instance, let's create two more tiles. One tile will have a pebble removed, while the other will have the pebble enlarged. By doing this, we will have added some diversity to the tiles, and it won't look that repetitive/plain anymore.



Tiles   *200% Magnified*
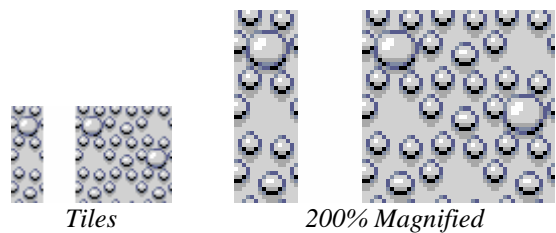
Ah, that looks better now. It is much more interesting to look at as it is more organic looking than artificial. All three tiles are different, yet they can be easily tiled next to each other because each one seamlessly transitions into any other. The reason they can do this is because they all share similar edges, for example; the left edge details closely match any details on the right edge of any tile, so that whenever the left edge is next to the right edge, it will look connected rather than disconnected. How well you want a tile to transition into another tile depends upon how you make the details near the edges. Some tiles you may not want to transition well, like a wall for example. A wall may not require any transition near the bottom of it where it hits the ground unless the ground somehow extends into the wall, but it is entirely up to you to decide whether it should or not. Below are some examples of how a wall may transition to some ground or how it may not.

*Tiles*   *200% Magnified*
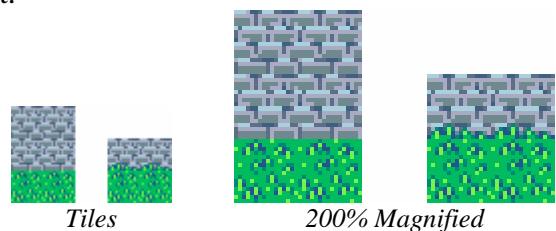
As you can see, the wall tiles on the left do not have any transition into the grass, yet they still look considerably fine. The wall tiles on the right, however do transition into the grass tiles and look slightly more sensible since one would think that the blades of grass would be poking up in front of the wall. The downside of this though is that you can not reuse this tile to extend the wall up higher since it would have bits of grass stuck in the wall because it would be trying to transition into the grass tile, yet instead of a grass tile, it would be a wall tile. The tiles on the left on the other hand show how the wall tiles which do not transition into a grass tile may be reused to extend the wall up higher. In the case of the tiles on the right, you would need to create an additional tile like what is used on the left in order to extend the wall higher. This is what a pixel artist must think about when designing tiles for games. If they only have a certain limit of tiles that they can create, they must sacrifice some sensibility/detail for more generalizations. The more tiles you can use, the easier it is to add more variety and detail into the game as well as having less occurrences of seams and repetitive artifacts which would more likely occur with lesser tiles.

With that being said, let's look at how we can go about creating transitional tiles. We use tiles to define spaces within a game world, but having each space end with a harsh separation from one space to another doesn't look good and in nature there are hardly any straight lines. The tiles unfortunately are square, which is also a really good thing since it allows us to easily manage them like blocks. The problem arises as we have described just recently is how the grid produces this obvious square ness of everything, but if all the tiles are restricted to this form and organization, how do we give the illusion that it is not. The answer is through means of transitional tiles, tiles which are a change or variance from one type of tile to another. It can be a change in location, shape, color, or anything else which is necessary to produce the

desired result. First let us look at an example of some basic tiles which do not transition into each other.

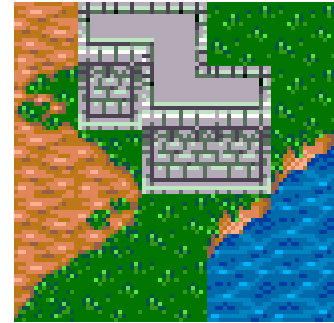*Tiles*   *200% Magnified*
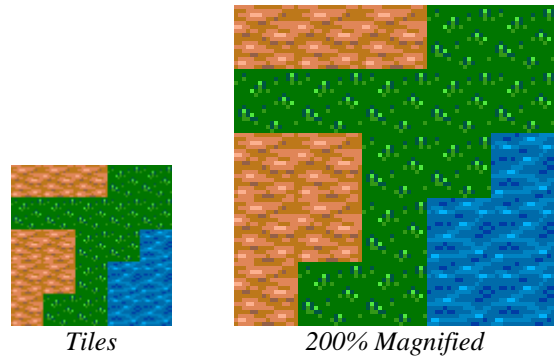
So here we have some tiles which define three types of areas within the map(the representation of our tiles). There is one grass tile, dirt tile, and water tile, but with just these tiles you can plainly see how blocky each area looks. To fix this, we'll create some new tile variations which integrate together more than one type of area, and by using these new tiles, the map will look less blocky. First let us understand the mechanics involved in any type of tile transition. For there to be a tile transition, there must be a change in the subject matter displayed within the tile. With blocky tiles which consist of a solid form encased within straight horizontal and vertical edges, it creates a separation, a divide between tile areas. It's ok to have edges, even horizontal and vertical edges are ok depending upon the situation. Let us take a look at the above image with some various edges which aren't horizontal or vertical to see how this helps rid the areas from their blockiness.

Tiles   *200% Magnified*
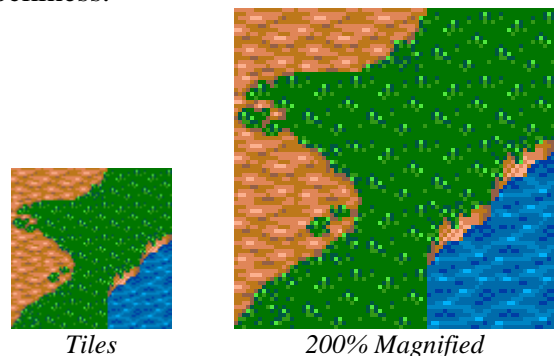
As you can see with this updated version, the areas have lost their blockiness. This is due to the additional tiles which were added. These new tiles defined the transitional areas between forms so that it wouldn't be simply a straight line, but instead something interesting and dynamic. For instance, with the grass, we have now diagonal edges which allow the previous horizontal and vertical edges to curve. These curves allow our areas to dance among its neighboring areas where as the blockiness from the previous picture kept them rigid and separate. There is also a tile in the upper left where the grass and dirt seem to mesh together. This effect allows the edge between grass and dirt to disappear, because they are intertwined with each other. The more intertwined something becomes, the more blended it is, which could be either good or bad depending upon the intended result. If you remember the tile dependency properties we discussed earlier we can see that these new edge tiles which connect areas together in interesting ways are somewhat dependant upon the specific areas in which they are transitioning between. In other words, in order to use a tile which transitions from one type of area to another, it is important that both areas are presently next to the tile so that the tile actually transitions between them. There are of course exceptions to this, in that there could be tiles which lack any need for transition, and if these tiles were to be used next to the transition tiles it would still work even if the areas in which those transition tiles needed weren't there. To help get this point across, the previous image is provided below with some additional tiles which border a couple transition tiles.

Tiles   *200% Magnified*

Looking at the above image, you can see that the wall which was added does not transition at all into the grass, dirt, or water, yet it borders all these areas. The tiles bordering the wall area which should transition into grass does not, yet it still looks fine and makes sense, because the tile which is in replace of the grass tiles over-rule the expectation of any grass needing to be there. Now, you may be thinking, why have a transitional tile which doesn't transition into the tile it was meant to transition into? The answer is simple. The transition tile which was created in an effort to transition between the two areas in effect is in among itself a single tile which consists of two areas rather than one. This simply is a concentration of both the areas it was designed in mind with to become a single tile which interprets both a specific way. By using it separate from the area which it was intended to connect to, we are instead using it for the details it supplies. In this way, we provide more variety and detail to the map, because instead of just using a dirt tile for instance, we use a dirt and grass tile as one to suggest there is both dirt and grass next to the wall.

Overlooking those issues, we are presented with another. If you recall the pebble tiles we worked with earlier, there was an instance when the single tile produced a repetitiveness which required some diversity within it in order to spice it up. Here we have that same issue within our dirt, grass, and water areas. Depending upon how many tiles you are allowed to work with (if you were developing a game which had some

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specific limitations), you may want to consider adding some more variety to break the areas up a bit from their monotony. Below I have added some rocks and planets which do just this.

Tiles   *200% Magnified*

In the next chapter we will look at some examples of different styles produced with tiles and investigate the area of isometric geometry and how it relates to pixel art.

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