

## ISU#2 Write-Up – Game Design Part II

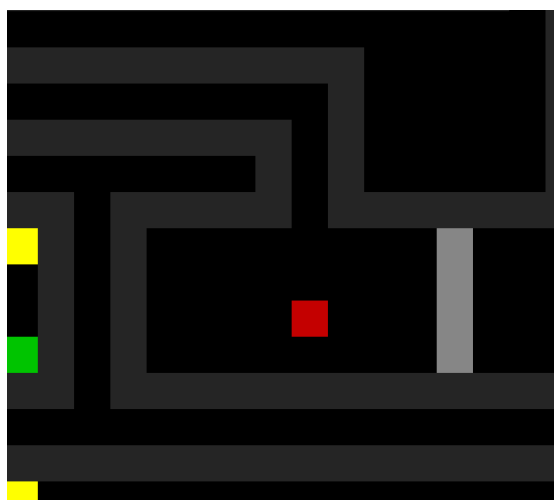
In the previous write-up for my first independent study, I explained how to follow through the Pre-Production and preliminary Production stages of a basic maze game. The final step of development however, is the Post-Production stage. In this stage, the game comes all together as the specific plans in the Pre-Production stage are put into the game. Glitches and bugs are also corrected, and final details are added.

### **Post-Production**

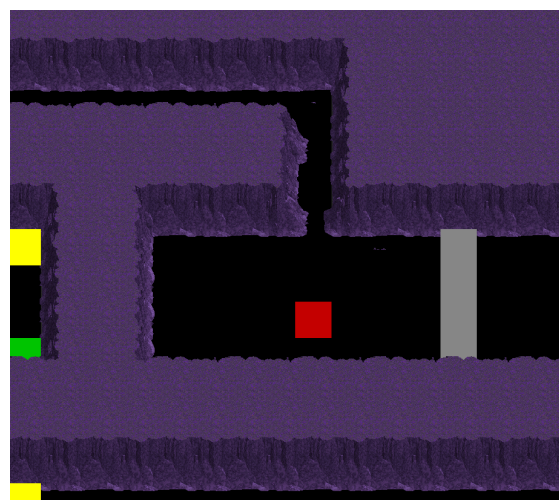
Sometimes it is difficult to mark the line where Production ends and Post-Production begins in game production. Some games will start Post-Production at the end of the basic engine development; whereas other games will start Post-Production once the game is entirely playable and feels essentially complete. The balance of the amount of work it requires to complete various aspects of the game will determine where development is at Production and where development is at Post-Production.

In the case of the maze game I used as an example in the previous write-up, Post-Production involved development of the stages, development of sound effects, and visual details.

When it comes to the production of stage development, one essential attribute of the development is tiling. Tiling is the process in which detail is added using basic images to a two-dimensional stage to give the feel of an original environment which suits the design of the room. Below is an example of a stage without tiling, and then with tiling.

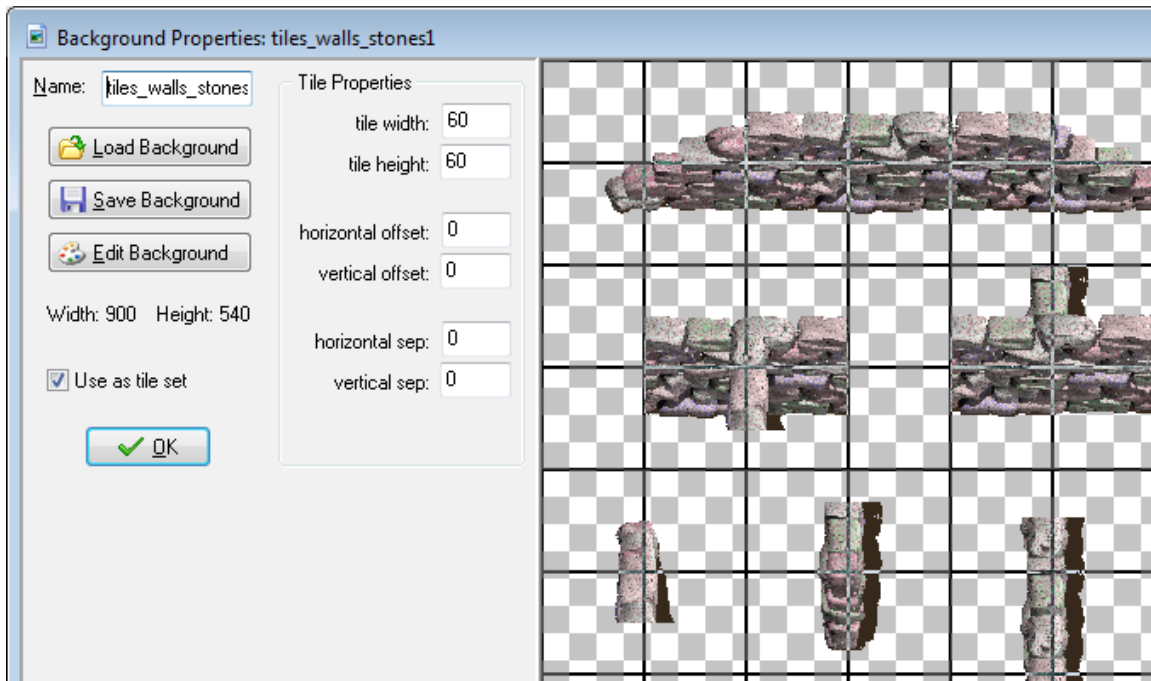


**Without Tiling**



**With Tiling**

Assuming you've already created or found the tiles you would like to use, the very first step to working with your tiles in Game Maker is importing the tile as a background. Then select the "Use as tile set" checkbox (see Diagram 1).



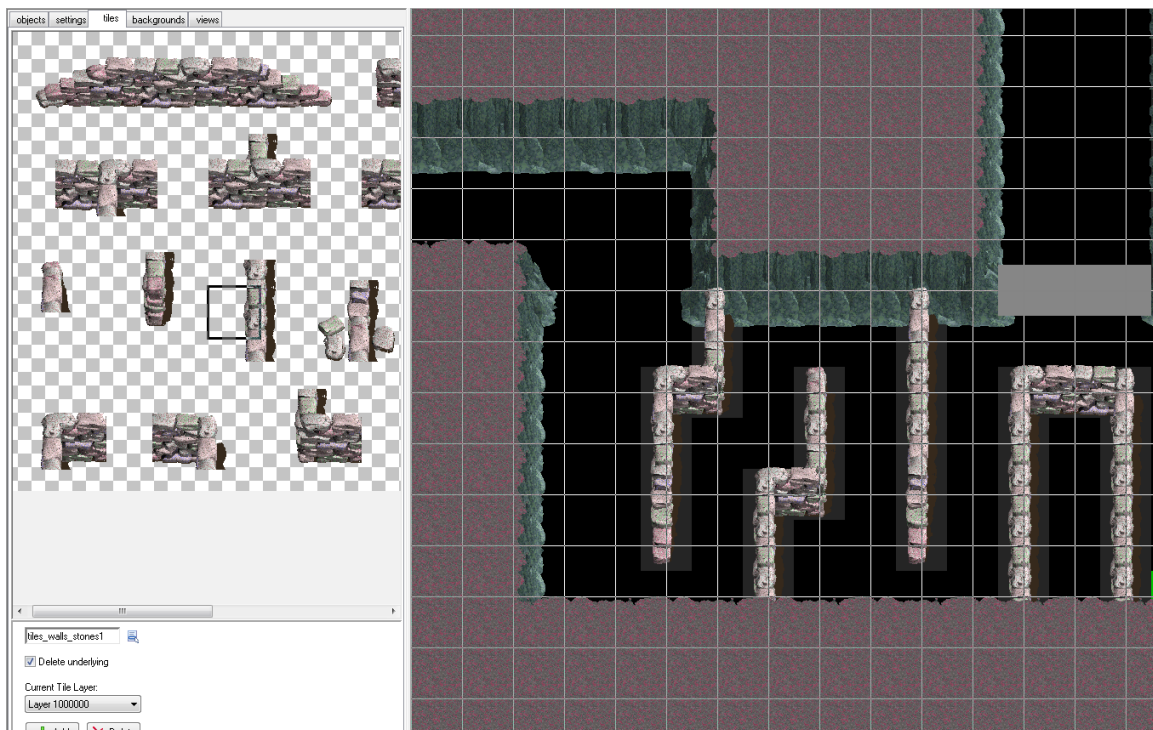
**Diagram 1: This is the Background Properties window for a tile set.**

Once you've imported the tile set, you can change the settings of the tiles using the Tile Properties panel that appears. You may need to change the tile width and height, and possibly the horizontal and vertical offset and separation.

Once you have your tile set all ready to go, you can then place it in the room, under the "Tiles" tab in the Room Properties window. In this tab, you are able to select and place tiles similarly to placing instances in a room. With this detail added, it adds a completely new feel unique to the environment (see Diagram 2).

Aside from tile sets, another important part of the Post-Production process of developing a game comes with the production of sound effects. Development of sound effects can certainly be an interesting process, but sometimes creating them can be harder than you might expect. I usually consider the process of creating my sound effects to be split up into 3 parts: recording, cutting, and enhancing. The first step is to grab your microphone that is most appropriate to record the specific sound effect that you would like to achieve. I use the software *Audacity* to create my sound effects. Once I have my equipment ready, I then begin to conceptualize the sound effect that I want to create. First, what is it going to sound like? Then, what makes that sound, or what sounds similar to

that? Sometimes coming up with this answer takes a lot of thinking and perhaps a bit of experimentation. Once you're satisfied with what you're hearing, it is then time to record what you are able to produce. I usually record the same sound multiple times so that I have a couple takes to work with in case I either realize one doesn't work, and/or if I want to layer the sound to create an effect. Once the recording is completed, it is then time to go through the sound and cut out exactly what it is that you need. In *Audacity*, you can achieve this by simply selecting a section of the sound and cutting with (CTRL+X) then delete what you do not need, and paste what is attached to your clipboard with (CTRL+V).



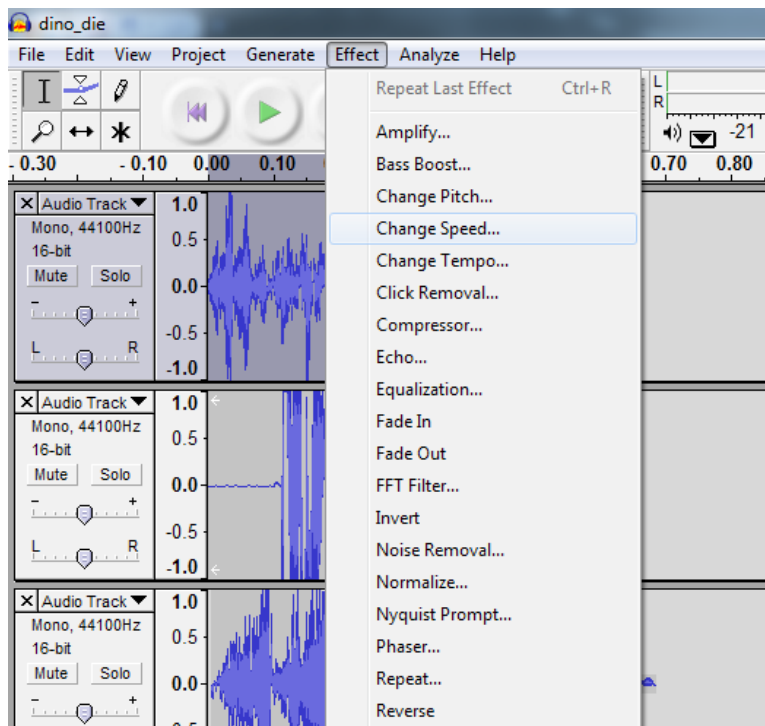
**Diagram 2: This is the Tiles tab in the Room Properties window.**

Now that we've managed to cut the section of the sound that we want to use, there is a lot that we can do to our sound effect to enhance and change it up. I will go through some of the different effects you may want to play around with to achieve some of the obvious stuff.

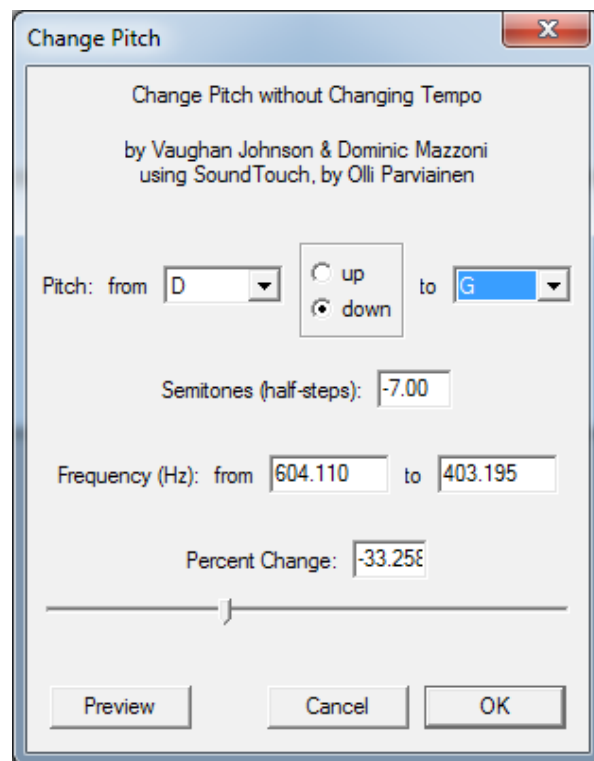
If you select the Effect menu in *Audacity*, the menu that appears includes many different basic effects that you can apply to your recorded sound (see Diagram 3).

For example, the "Change Speed..." option allows you to (quite obviously) change the speed of a sound. Consequently, changing the speed of a sound also changes the pitch. If you would like to speed up or slow down the sound while keeping the sound at the same pitch, you would probably be more successful

using the "Change Tempo..." option. Alternatively if you would like to only change the pitch, there is also a "Change Pitch..." option.



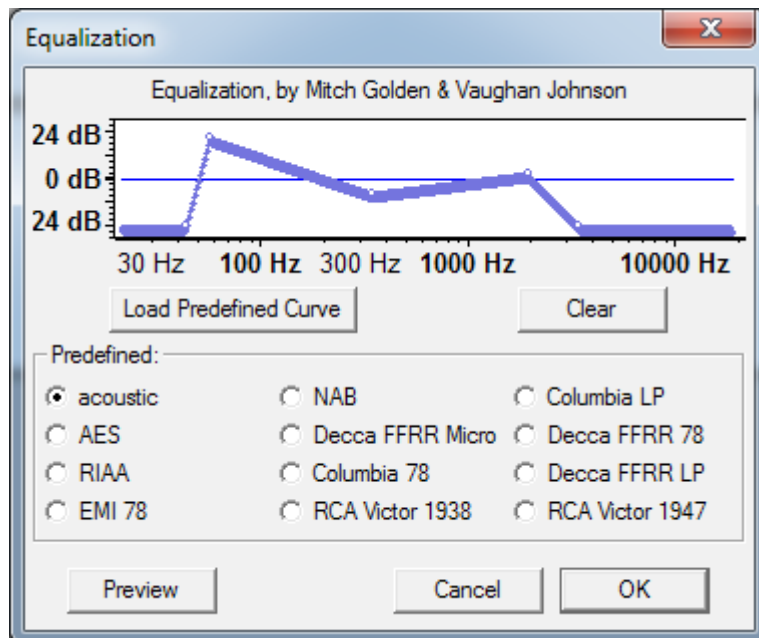
**Diagram 3: The Effect menu in Audacity**



**Diagram 4: The Change Pitch window in Audacity**

Once you've selected one of these three effects, a window will appear which will allow you to change the speed/pitch/tempo of the sound. A slider will allow you to adjust the effect to the value you like. A nice feature with the "Change Pitch..." option is that you can even select the exact note you would like to change the pitch to. I find this commonly useful when I am particularly looking for a sound effect to go up or down exactly one tone or semitone (see Diagram 4).

Another effect in *Audacity* that I find gets commonly used is the "Equalization" option. Using equalization, you can change the volumes of different frequencies, and even completely remove frequencies. To adjust what frequencies are heard simply create points by clicking on the graph and moving them to create louder tones and quieter tones depending on frequency (see Diagram 5).



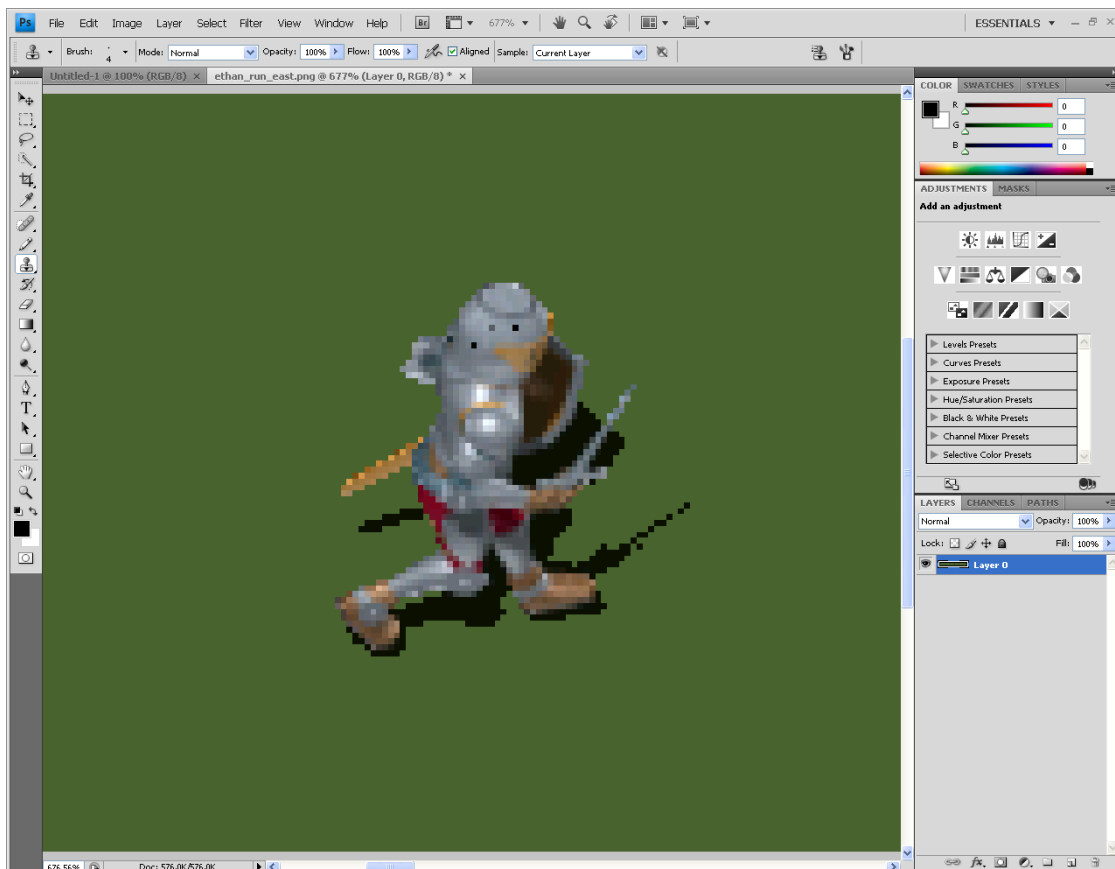
**Diagram 5: The Equalization window in *Audacity*; this specific graph will achieve lower frequencies being the most dominant in the sound with extremely low frequencies and high frequencies being completely removed and some of the mid tones a little quieter**

Other than a few of the other effects that may be useful such as "Echo", "Delay", and "Reverse" there are a few effects that we can achieve if we are careful following a few important steps. For instance, what do you do if you want to create a flanger effect? Well... because flanger effects are achieved with a speed change and duplicate track we will simply copy the track and make a duplication of it on another track, and then speed up the first one to 99.9%. Once you combine the sounds together, you will have an overall flanger effect.

Once you've perfected your sound, you can export as a WAV from the File menu and include it in your game. Remember to include your new sound in your game by adding it as a Sound resource from the resources menu.

Often, considering visual details are one of the final steps to completing a game. It is important to review sprite subimages, backgrounds, tiles, and image speeds to review visual quality, but it is also often important to include static objects in rooms that are simply there to set the atmosphere of the setting.

So first of all, how exactly do we review sprite subimages? If you've been working on your game for a while now, you've probably tested the game enough times to notice if there are any animations that look a little bit out-of-place. If not, I would best recommend testing your game and going through all of the animations of various objects to check that they look clean. If you would like a more thorough check, you can always open the resources in the *Game Maker* Sprite Editor and analyze every single sprite. Once you've found an image or two that needs a little bit of cleaning, open it up in the *Game Maker* Sprite Editor or Adobe Photoshop and improve the look of the image with the tools in the program (see Diagram 6).



**Diagram 6: Fixing a sprite in *Adobe Photoshop***

Similarly, backgrounds and tiles are evaluated analogously except that there tends to be much fewer images to review. In this case, it might be more appropriate to manually view all of the backgrounds and tiles as Game Maker Resources in *Game Maker*.

Now, you might be wondering what I am referring to when I say 'image speeds'. The image speed refers to the speed at which an animation plays in *Game Maker*. A speed of 1 refers to the speed of one frame per step. Remember that a step by default is a 30<sup>th</sup> of a second. If you would like to double the speed of the animation, you could change the image speed to 2. If you would like to cut the speed in half, you can otherwise set the image speed to 0.5 to accomplish this. The best way to check for image speeds is to just simply to play the game. When you find that a specific animation plays too quickly or too slowly, change the character's image speed while that action is happening.

Finally, the last step of Post-Production that I will be talking about is creating visual details to set the atmosphere of the room. Some good examples of this might include placing a torch on cave walls, adding a skull to a deadly area, or lava in an underground area. You can easily do this by creating new objects with those images as sprites, and then adding them to the room. Often you do not need to program these objects to even do anything, if anything, you might just need to program them the same way that the walls behave so that the player cannot go over them.

Post-Production includes the final steps involved with completing your game. Once this stage is completed, your game should feel entirely finished. This is a good stage to fix up little problems that you may be having, and finally get **other** people to test your game. Getting other people to test your game is essential for two reasons. First, people who have never played your game before will easily be able to find errors and glitches that you may have never noticed because they will do things that you may never have thought of trying. Secondly, other people also do not understand your game as well as you do. Getting other people to try your game will give you a good idea of how difficult your game is and how easy it is to understand how the game is played.