

Background Tile Sprites for a 2D Game Environment

SPRITES are 2D images or animations integrated into a larger scene. By creating a tile sprite background, you can create large, complex game worlds efficiently and with relatively few assets. This allows you to create reusable complex images. Also, tile sprites allow you to save RAM and increase real-time rendering performance. Although 3D gaming is becoming more popular on home systems, portable systems and mobile devices are starting a comeback of 2D images.



Objective:



Describe tile sprites and their use in a game environment, and evaluate different programs to create tile sets for use in games.

Key Terms:



2.5D
GIF
PNG

sprite
tile-based video game
tile engine

tile set
tiles

Understanding Tile Sprites

Tiles are small rectangular, square, or hexagonal graphic images used in video games. A **tile engine** is a computer graphics technique that generates a larger graphic from reusing a number of smaller graphics to save RAM and increase real-time rendering

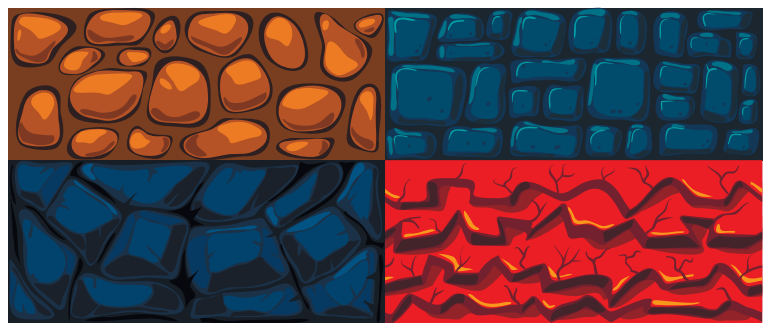


FIGURE 1. Tiles are small rectangular, square, or hexagonal graphic images used in video games.

performance. In the early days of video game development, proper RAM economy was a must for a successful game engine.

TILE SET

A **tile set** (sprite sheet) is a collection of smaller images called tiles (typically of uniform size) that have been combined into a single larger graphic. A **sprite** is a 2D image or animation integrated into a larger scene. Tile sets often are used in 2D video games to create complex maps from reusable tiles within the set.

Numerous versions of sprite sheets are available for download and for royalty-free use as long as credit is given to the source. Using tile sets reduces the amount of system memory required to display maps because it allows for the same tiles to be reused multiple times in a map. It reduces the amount of artwork needed for individual maps because many different ones can be created from the same tile set.

For maps made from tile sets to appear more distinctive, games typically display them with a different tile set for each unique environment. This method is implemented in many 2D games as well as applications meant for game creation.

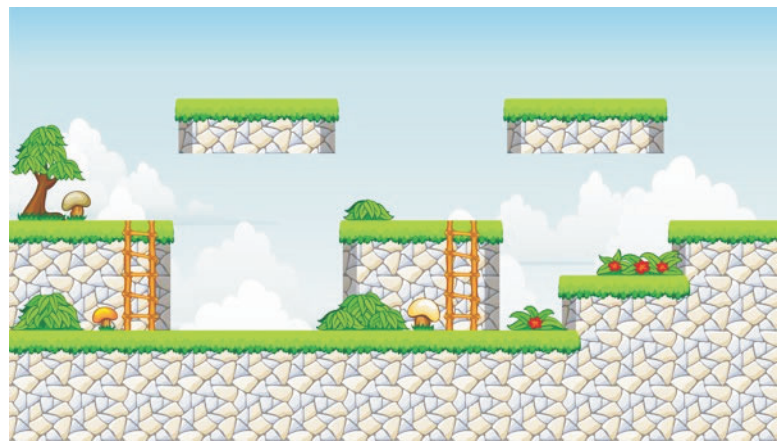


FIGURE 2. Ground tiles and objects.

WHERE TILE SPRITES ARE USED

Tile sprites are used primarily in tile-based video games. A **tile-based video game** is a type of video or video game in which the playing area consists of small rectangular, square, or hexagonal graphic images. Tile-based engines allow developers to create large, complex game worlds efficiently and with relatively few assets. These games usually simulate a top-down or “2.5D” view of the playing area. They are almost always 2D views. **2.5D** (“two-and-a-half-dimensional”) is a $\frac{3}{4}$ perspective, mainly in the video game industry.

Tile sets are often used in modern 2D video games to create complex maps from reusable tiles within the set. This technique is seen in games designed to run on portable systems (e.g., Nintendo’s Game Boy Advance system) and on cellular phones. In this set up, when a tile-set-based map is displayed, the tiles stored within it are used to reassemble the map for display.

HISTORY OF TILE SPRITES

Early video game consoles (e.g., Mattel’s Intellivision) were designed to use tile-based graphics because their games had to fit into video game cartridges as small as 4K in size. Early tile-based games allowed for the creation of easy-to-use map editors. Also, many tile-based games came with an editor that allowed players to construct their own levels.

Most early tile-based games used a top-down perspective. The top-down perspective evolved to a simulated 45-degree angle, allowing the player to see the top and one side of objects to provide more sense of depth. This style was dominated by the older 8- and 16-bit console role-playing games (e.g., Ultima Online and Civilization II). With newer mobile devices, casual gaming is gaining in popularity. The classic 2D game is returning.

PROGRAMS TO CREATE GAME ENVIRONMENTS

Some programs can help you create background tile sprites for use in a 2D game environment.

Adobe Photoshop

Photoshop is a raster graphics editing program developed and published by Adobe Systems. With Photoshop, simple tile sprites can be created by using the screen grid and importing textures of other images. The grid should be set to 32 pixels (px) by 32 pixels (px) in size. The selection tool or the free transform should be used to scale the desired image to size. Any desired effects (e.g., color, bevels, and textures) should be added to obtain the desired results. To save, go to File/Save for Web and Devices. Then save the selected sprite as a GIF format for inclusion into game engines (e.g., GameMaker). **GIF** is a graphical interface file, which is a low-resolution, color file format for digital and Web site applications. Photoshop can be used to edit existing sprite sheets into individual elements for use in video game engines and software.

Adobe Illustrator

Illustrator is a vector graphics editor developed and marketed by Adobe Systems. Illustrator enables people to draw simple-shaped and geometrical images that can be used as tile sprites. Sprites can be created using Illustrator symbols (included in the software) for creating shapes, borders, and other elements. Border art can be separated to create individual tile sprites and corners. Other symbols include elements grouped by categories (e.g., science, nature, decorative, and others). When drawing with Illustrator, turn on the drawing grid (View/Grid) to have screen reference available. In the preferences menu, the grid size should be reset to 32 px by 32 px to use as a reference to scale sprites. The free transform tool should be used to scale the selected tile image to the correct size. To save, go to File/Save for Web and Devices. Then the selected sprite can be saved as a GIF format for inclusion into games engines (e.g., GameMaker and other programs).



UNDER INVESTIGATION...

LAB CONNECTION: Creating a Tile Map Engine

Using resources that may be found on the Internet, as well as textbooks, briefly outline the steps to create a tile map engine. You can choose from open source art, or you can create your own tiles. Make sure the tiles fit together well, but add variations to keep them interesting. Several software options might make designing easier. Tutorials on a game development Web site can walk you through the process completely.

GameMaker

GameMaker is a Windows and Mac IDE program originally developed by Mark Overmars in the Delphi programming language. It is currently developed and published by Yo-Yo Games. While primarily a video game engine, GameMaker incorporates some simple drawing tools that allow the user to create some simple geometric shapes that can be used as tile sprites. To create a tile sprite, with the program open, go to Resources/Create Background and select the “Tile Set” option. The tile size should be set to 32 px by 32 px. Then the “Edit Background Option” should be chosen, and the drawing tools should be used to create the desired tile sprite shape, color, and other options. The file should be closed and saved as a PNG for use in GameMaker. A **PNG** is a portable network graphic that is a low-resolution, color file format for digital applications.

Summary:



Tiles are small rectangular, square, or hexagonal graphic images used in video games. A tile engine is a technique used to generate a larger graphic by reusing a number of smaller graphics. This helps save time and RAM while increasing real-time rendering performance. A tile set is a collection of tiles that have been combined into a larger graphic.

A sprite is used to integrate a 2D image or animation into a larger scene. Tile sprites are used primarily in tile-based video games. Although 3D is becoming the most popular form of sprites in the game world, 2D are still used for portable and mobile devices. Popular programs to help you create background tile sprites are Adobe Photoshop, Adobe Illustrator, and GameMaker.

Checking Your Knowledge:



1. When drawing with Illustrator, it is essential to turn on what tool?
2. Tile sets are often used to create what?
3. What are the two reasons tile engines are used?

4. Most early tile-based games used what perspective?
5. A Photoshop grid should be set to what size?

Expanding Your Knowledge:



Create your own tile sprite background. A good place for complete tutorials is the Game Design Novice Web site. Sprite Art 101 Brick Wall I describes how to make a perfect brick wall, while II and III add to the content. Build your own brick wall, or create your own design using the simple instructions in this tutorial.

Web Links:



A World of Tiles

<http://opengameart.org/content/chapter-8-a-world-of-tiles>

Tiles

http://docs.yoyogames.com/source/dadiospice/001_advanced%20use/more%20about%20rooms/tiles.html

Font and Tiles

<http://www.instructables.com/id/Sprites-Graphics-On-the-Micromite-Companion/step11/Working-with-Font-and-Tiles/>