Encyclopedia of Video Games: The Culture, Technology, and Art of Gaming
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emulators

An emulator is a program used to play video games originally designed for another system. The most common usage for these programs is to emulate older game **consoles** (**Atari VCS 2600**, **Nintendo Entertainment System (NES)**, **SEGA Genesis**, etc.) or older operating systems (such as DOS) through a modern computer OS (such as Windows or Mac OS). The program mimics the way the older machine renders **graphics** and **sound** so that the game experience is as similar as possible to what it was on the original system. Games are enclosed in ROM files (which replace the **cartridges**) and then read by the emulation program (which plays the role of a specific console) to be played within the newer **interface**.

Although the original software is often accurately embedded in a snapshot file, the newer hardware can be very different. Processors, **sound technology**, and monitors all have an impact on the output. Therefore, the final appearance of the game might be affected by the emulation process: aspect ratios, colors, sound, speed, for example. In addition, the **controllers** of the console (such as **arcade joysticks** or home gamepads) must be replaced in the newer hardware configuration (which is often mouse

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and keyboard), inevitably altering the gameplay. For example, the NES Zapper, a pistol-shaped controller used for *Duck Hunt* (1985), has no suitable replacement on the average home computer setting. The easiest way to replace it—aiming with your mouse—leads to a completely different gaming experience. Yet much effort is invested to improve the illusion: USB adaptors are available so that, for example, original SEGA Genesis gamepads can be used for home computer gaming.

Moreover, rather than only trying to mimic the original experience of a game, most emulators add new possibilities or features that were not present in the old system. These include fast-forward and backward functions; by pressing a key, the player can reverse gameplay for few seconds, going back to a time before being hit by an enemy, thus avoiding losing lives, or using "continues" or restarting all over. Fast-forwarding allows the player to skip parts of the game sometimes judged uninteresting (such as **cut-scenes**). The possibility to save states everywhere in the player's path—probably the most common of these new features—makes obsolete all **game design** effort to control the frequency of save points, and decreases the difficulty of games that originally did not offer any **save function.**

If the emulator program itself isn't really involved in legal issues, the files of game code reproducing them (referred to as "game images") are usually unauthorized by copyright owners, forcing ROM files into underground circulation. But the emulation process is not always subject to legal issues. For example, the **Microsoft Xbox 360** has emulation

software to offer original Xbox compatibility. The same principle applies for the Nintendo's Virtual Console on the **Nintendo Wii** and **Sony PlayStation** games sold on the PlayStation Network for **PlayStation 3** and PlayStation Portable. Microsoft, **Nintendo**, and **Sony** can release games for some of their older consoles without having to change the original code. These ways of using emulators show their importance for the **retrogaming** movement. Old game consoles may no longer be functional, but emulation gives a way for nostalgic players to access their games nevertheless. With the **Multiple Arcade Machine Emulator (MAME)**, an emulator of different arcade systems, some early video games mostly unavailable by any other means are now playable.

Emulators also increased the possibility of user-generated content related to old games. For example, emulators gave birth to homemade translations (such as the English translation of *Final Fantasy V* [1992] from **Japanese** before it was released in North America within *Final Fantasy Anthology* [1999] on the PlayStation). New games are also designed as if they were working on old **platforms** sometimes using emulators, thus combining nostalgia and novelty.

Of course, emulation is a useful way for researchers to discover games sometimes unavailable by other means. Game states can easily be exchanged between players or researchers by e-mail. Nonetheless, one must remember that what is experienced with emulation programs is not exactly what was originally experienced with the original platforms.

Simon Dor

Further Reading

Camper, Brett. "Retro Reflexivity: *La-Mulana*, an 8-bit Period Piece," in Bernard Perron and Mark J. P. Wolf, eds. *The Video Game Theory Reader 2*. New York: Routledge, 2008, pp. 430.
Wen, Howard. "Why Emulators Make Video-game Makers Quake." *Salon.com*, June 4, 1999, available at http://www.salon.com/tech/feature/1999/06/04/emulators.

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