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System Architecture
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NES Lecture Notes

History:

The NES was originally released in 1983. It came to the US in 1985. Although 16 bit CPU were common at this time Nintendo made the decision to use an 8 bit CPU in order to lower the price of the console.

CPU:
- 2A03, variant of the 6502 that could handle sound, little endian addresses.
- 3 kinds of memory, RAM, I/O Registers, cartridge ROM.
- 3 kinds of Buses, 8 bit data, 8 bit control, 16 bit address.
- Because of 16 bit address bus could store 64 KB in those addresses.
- Stack Pointer is an 8 bit register, worked top down, no stack overflow detection, just loops.
- 56 different instruction, multiple modes of addressing, 151 valid opcodes.
- 1, 2, 3 byte long instructions. Opcode, operand, operand.

PPU:
- 2C02 processor. 16KB of RAM, can address 64 KB of memory.
- 16 bit addresses but only 8 bit I/O register means it takes 2 writes to set an address.
- 52 possible colours, not all usable at once.
- 2 palettes, each with 13 usable entries. Image palette and sprite palette.
- Image palette is for background colors. Sprite palette is for sprites.
- A sprite is either 8x8 pixels or 8x16 pixels. Most characters are multiple sprites.
- Sprite data is stored in pattern tables and sprite attributes are stored in SPR-RAM.
- Maximum of 64 sprites, each sprite uses 4 bytes.
- Sprite position in SPR-RAM is important. First sprite has highest priority, lowest priority are drawn first.
- Scrolling is achieved by taking the background of 2 name tables and creating a composite image from them.

Controller:

The first player controller is connected to the I/O ports at $4016, second player is at $4017. The NES checks the status of each button in this order: A, B, Select, Start, Up, Down, Left, Right.

Source:
http://nesdev.com/NESDoc.pdf