Section 2 / Registers (Simplified)

Overview

There are four highest level ideas relating to floating point operations on AARCH64.

- There is another complete register set for floating point values.

- There are alternative instructions just for floating point values.

- There are exotic instructions that operate on sets of floating point values (SIMD).

- There are instructions to go back and forth to and from the integer registers.

Floating Point Registers

There will be a more detailed discussion of the floating point registers when exotic instructions such as SIMD are discussed. For now, it is sufficient to discuss the less exotic aliases of the floating point registers.

We say aliases because, like the integer registers, how you reference a floating point register determines how it is interpreted.

For example, in the following image, note the overlap of two single precision floats within a single double precision floating point register.

NOTE NOTE NOTE To keep to our promise of simplicity for now, consider only `B0`, `H0`, `S0` and `D0`. The remainder of the image (from The Eclectic Light Company) deals with SIMD, covered later.

ARM64 SIMD Registers, Lanes & Arrangement Specifiers

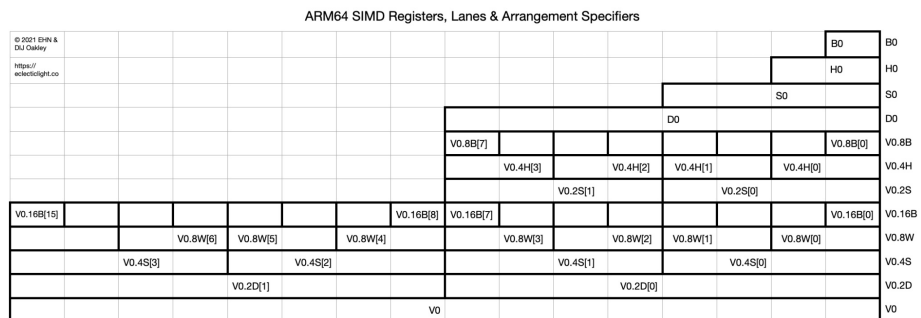|															
© 2021 EHN & DJ Oakley													B0		B0
https:// eclecticlight.co														H0	H0
												S0			S0
									D0						D0
					V0.8B[7]								V0.8B[0]		V0.8B
						V0.4H[3]		V0.4H[2]	V0.4H[1]		V0.4H[0]				V0.4H
						V0.2S[1]			V0.2S[0]						V0.2S
V0.16B[15]					V0.16B[8]	V0.16B[7]							V0.16B[0]		V0.16B
		V0.8W[6]	V0.8W[5]		V0.8W[4]		V0.8W[3]		V0.8W[2]	V0.8W[1]		V0.8W[0]			V0.8W
	V0.4S[3]		V0.4S[2]					V0.4S[1]			V0.4S[0]				V0.4S
		V0.2D[1]							V0.2D[0]						V0.2D
						V0									V0

Figure 1: regs

It is worth noting early and often that you should not mix dealing with different precisions assuming that because of the overlaps in space, you'll get a meaningful result.