

Addressing and Basic Machine Language

Note Title

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On 32-bit systems (x86) logical addr space is 64 GB

$$\Rightarrow 36 \text{ bit addr } 2^{36} = 2^6 \times 2^{30} \\ \approx 64 \times 10^9$$

segment-offset addressing

36 bits of addr on 32 bit arch

"segment" is 4 GB range of memory space
within segment only need 32 bits

individual segments used for:

code
data
stack

CS, DS, SS 32-bit reg. store segment addr

bits of seg. reg. are high order bits of seg. addr
low 4 bits are 0.

offset addresses identify specific mem. location
within segment

these are "addr" manipulated by program

Notation: pair is written segment: offset

e.g.

0A7C312E: 00007F38

logical addr. segment $\times 2^4$ + offset

$$\begin{array}{r} 0A7C312E \\ + 00007F38 \\ \hline 0A7C3928 \end{array} \leftarrow \text{logical addr.}$$

seg. reg. managed by OS

only worry about offset

