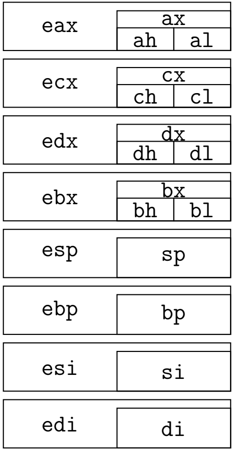
64 Bit vs. 32 Bit

- 64 Bit Wortbreite
- 64 Bit Adressen
  - 2^{64} Byte $\approx$ 16 EB Hauptspeicher adressierbar
- 64 Bit Register

32 Bit Register



eax ax ah al

ecx cx ch cl

edx dx dh dl

ebx bx bh bl

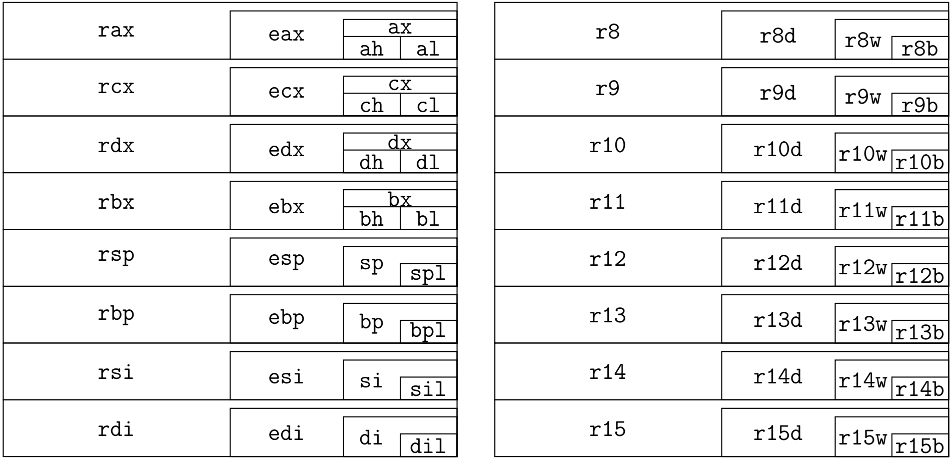
esp sp

ebp bp

esi si

edi di

64 Bit Register



rax	eax	ax	ah	al
rcx	ecx	cx	ch	cl
rdx	edx	dx	dh	dl
rbx	ebx	bx	bh	bl
rsp	esp	sp		spl
rbp	ebp	bp		bpl
rsi	esi	si		sil
rdi	edi	di		dil

r8	r8d	r8w	r8b
r9	r9d	r9w	r9b
r10	r10d	r10w	r10b
r11	r11d	r11w	r11b
r12	r12d	r12w	r12b
r13	r13d	r13w	r13b
r14	r14d	r14w	r14b
r15	r15d	r15w	r15b

Immediate-Operanden

- x86-32: Alle Immediates 32 Bit, also im Wertebereich $[-2^{31}, 2^{31} - 1]$
- x86-64: 64 Bit Immediates nur bei `mov`-Instruktionen erlaubt
  32 Bit Immediates sign-extended

```
mov rax, 0xaaaabbbbccccdddd     erlaubt
add rax, 0xaaaabbbbccccdddd     nicht erlaubt
```

Quiz

Wie kann man `rax = rax + 0xffffffff` berechnen?

□

```
add rax, 0xffffffff
```

□

```
mov rcx, 0xffffffff
add rax, rcx
```

□

```
mov ecx, -1
add rax, rcx
```