

# Exam 2 Cheatsheet **DRAFT**

## Syscall

rax	System Call	rdi	rsi	rdx
0	read	file descriptor	buffer	number of bytes
1	write	file descriptor	buffer	number of bytes
60	exit	exit code	—	—

## Calling C library functions

- Parameters are stored in registers in the following order: rdi, rsi, rdx, rcx, r8, r9. (If there are more parameters, they are pushed onto the stack)
- Most C functions return an integer or a pointer (which is just an integer). The return value is placed in the rax register
- The called functions may use or destroy the content of the following registers: rax, rcx, rdx, rsi, rdi, r8, r9, r10, r11
- Other registers may be used, but the called function is responsible for saving them.

## General Purpose Registers

64-bit	32-bit	16-bit	8-bit low	8-bit high	Calling Convention	May be destroyed by called function?
rax	eax	ax	al	ah	Return Val/Accum	Yes
rbx	ebx	bx	bl	bh	—	No
rcx	ecx	cx	cl	ch	4th argument	Yes
rdx	edx	dx	dl	dh	3rd argument	Yes
rsi	esi	si	sil	—	2nd argument	Yes
rdi	edi	di	dil	—	1st argument	Yes
r8	r8d	r8w	r8b	—	5th argument	Yes
r9	r9d	r9w	r9b	—	—	Yes
r10	r10d	r10w	r10b	—	—	Yes
r11	r11d	r11w	r11b	—	—	Yes
r12	r12d	r12w	r12b	—	—	No
r13	r13d	r13w	r14b	—	—	No
r14	r14d	r14w	r14b	—	—	No
r15	r15d	r15w	r15b	—	—	Yes

## Special Purpose Registers

Register	64-bit	32-bit	16-bit	8-bit low	May be destroyed by called function?
<b>Stack Pointer</b>	rsp	esp	sp	spl	No
<b>Base Pointer</b>	rbp	ebp	bp	bpl	No
<b>Instruction Pointer</b>	rip	eip	ip	—	
<b>Flags and Conditions</b>	rflags	eflags	flags	—	Yes

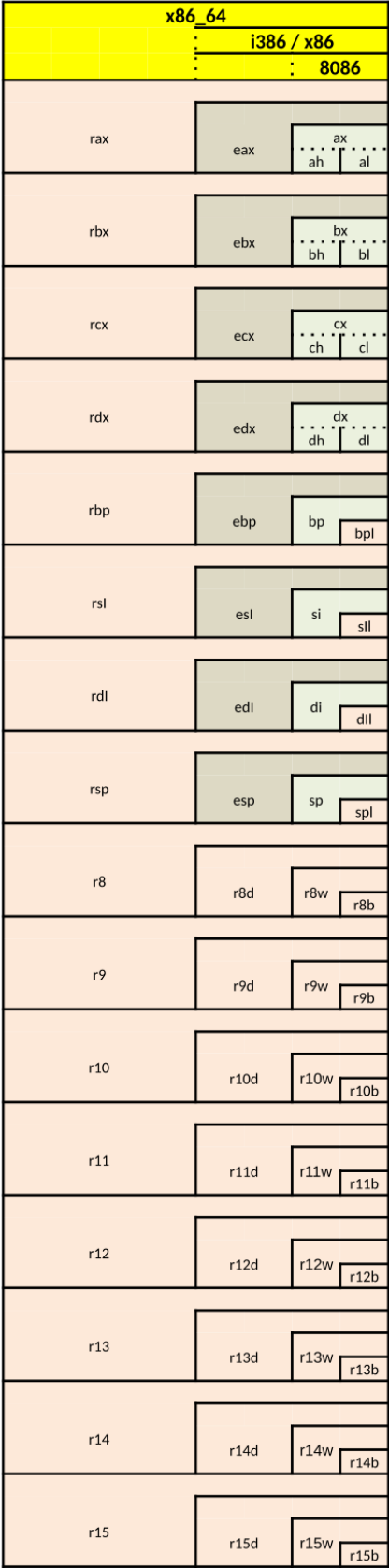
This is the cheatsheet from the first exam. It probably will not be on the second exam.

n	$2^n$	Other
0	1	$8^0$ and $16^0$
1	2	
2	4	
3	8	$16^1$
4	16	
5	32	
6	64	$16^2$
7	128	
8	256	
9	512	1 Kilobyte
10	1024	
11	2048	
12	4096	$16^3$
13	8092	
14	16,384	
15	32,768	$16^4$
16	65,536	
17	131,082	
18	262,144	$16^5$ 1 Megabyte
19	524,288	
20	1,048,576	

The counting in hex and binary is going to be on the exam itself

Multiplication	Result
$16 \cdot 0$	0
$16 \cdot 1$	16
$16 \cdot 2$	32
$16 \cdot 3$	48
$16 \cdot 4$	64
$16 \cdot 5$	80
$16 \cdot 6$	96
$16 \cdot 7$	112
$16 \cdot 8$	128
$16 \cdot 9$	144
$16 \cdot 10(a)$	160
$16 \cdot 11(b)$	176
$16 \cdot 12(c)$	192
$16 \cdot 13(d)$	208
$16 \cdot 14(e)$	224
$16 \cdot 15(f)$	240
$16 \cdot 16$	256

## x86\_64 Registers Map



The following is probably a placeholder, and it won't show up on the exam version.

function	arguments	return value	notes
puts	char *s	size_t length	does not count null byte
strcpy	char *dest, char *src	char *dest	dest must be big enough
strncmp	char *s1, char *s2, size_t n	int	0 if equal, <0 if s1<s2, >0 if s1>s2
strncpy	char *dest, char *src, size_t n	char *dest	dest must be big enough
strcat	char *dest, char *src	char *dest	dest must be big enough
strncat	char *dest, char *src, size_t n	char *dest	dest must be big enough
strcmp	char *s1, char *s2	int	0 if equal, <0 if s1<s2, >0 if s1>s2