

## MIPS system calls

(from SPIM S20: A MIPS R2000 Simulator, James J. Larus, University of Wisconsin-Madison)

SPIM provides a small set of operating-system-like services through the MIPS system call (syscall) instruction. To request a service, a program loads the system call code (see Table below) into register \$v0 and the arguments into registers \$a0, ..., \$a3 (or \$f12 for floating point values). System calls that return values put their result in register \$v0 (or \$f0 for floating point results).

Service	System Call Code	Arguments	Result
print integer	1	\$a0 = value	(none)
print float	2	\$f12 = float value	(none)
print double	3	\$f12 = double value	(none)
print string	4	\$a0 = address of string	(none)
read integer	5	(none)	\$v0 = value read
read float	6	(none)	\$f0 = value read
read double	7	(none)	\$f0 = value read
read string	8	\$a0 = address where string to be stored \$a1 = number of characters to read + 1	(none)
memory allocation	9	\$a0 = number of bytes of storage desired	\$v0 = address of block
exit (end of program)	10	(none)	(none)
print character	11	\$a0 = integer	(none)
read character	12	(none)	char in \$v0

For example, to print "the answer = 5", use the commands:

```
.data
str: .asciiz "the answer = "
.text
    li $v0, 4      # $system call code for print_str
    la $a0, str     # $address of string to print
    syscall         # print the string

    li $v0, 1      # $system call code for print_int
    li $a0, 5       # $integer to print
    syscall         # print it
```

- **print int** passes an integer and prints it on the console.
- **print float** prints a single floating point number.
- **print double** prints a double precision number.
- **print string** passes a pointer to a null-terminated string
- **read int**, **read float**, and **read double** read an entire line of input up to and including a newline.
- **read string** has the same semantics as the Unix library routine fgets. It reads up to  $n - 1$  characters into a buffer and terminates the string with a null byte. If there are fewer characters on the current line, it reads through the newline and again null-terminates the string.
- **sbrk** returns a pointer to a block of memory containing  $n$  additional bytes.
- **exit** stops a program from running.