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System Calls

Table: System services.

Service	System Call Code	Arguments	Result
print_int	1	\$a0 = integer	
print_float	2	\$f12 = float	
print_double	3	\$f12 = double	
print_string	4	\$a0 = string	
read_int	5		integer (in \$v0)
read_float	6		float (in \$f0)
read_double	7		double (in \$f0)
read_string	8	\$a0 = buffer, \$a1 = length	
sbrk	9	\$a0 = amount	address (in \$v0)
exit	10		
print_character	11	\$a0 = character	
read_character	12		character (in \$v0)
open	13	\$a0 = filename,	file descriptor (in \$v0)
		\$a1 = flags, \$a2 = mode	
read	14	\$a0 = file descriptor,	bytes read (in \$v0)
		\$a1 = buffer, \$a2 = count	
write	15	\$a0 = file descriptor,	bytes written (in \$v0)
		\$a1 = buffer, \$a2 = count	
close	16	\$a0 = file descriptor	0 (in \$v0)


exit2	17	\$a0 = value	
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SPIM provides a small set of operating-system-like services through the system call (`syscall`) instruction. To request a service, a program loads the system call code (see Table ) 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). 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` is passed 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` is passed a pointer to a null-terminated string, which it writes to the console. `print_character` prints a single ASCII character.

`read_int`, `read_float`, and `read_double` read an entire line of input up to and including the newline. Characters following the number are ignored. `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. `read_character` reads a single ASCII character. **Warning:** programs that use these syscalls to read from the terminal should not use memory-mapped IO (see Section )

`sbrk` returns a pointer to a block of memory containing n additional bytes. This pointer is word aligned. `exit` stops a program from running. `exit2` stops the program from running and takes an argument, which is the value that `spim` or `xspim` uses in its call on `exit`.

`open`, `read`, `write` and `close` behave the same as the Unix system calls of the same name. They all return -1 on failure.



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