

IC220 SlideSet #5 -- SPIM

- 4 basic parts of a program
 1. Initialization - of variables
 2. Get Input - from program itself, from user, from file
 3. Do something - computing part, processing
 4. Give output

Example:

```
int main () {  
    sum = 0;  
    for (j=1; j<4 ; j++ )  
        sum = sum + j;  
    cout << sum << endl;  
}
```

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Complete SPIM Program

save in file with .asm extension

```
.data  
cr:    .asciiz "\n"  
  
.text  
.globl main  
main:  
    li $a0, 0  
    li $t0, 1  
    li $t1, 4  
  
loop: beq $t0, $t1, end  
      add $a0, $a0, $t0  
      addi $t0, 1  
      j loop  
  
end: li $v0, 1 # syscall #1 -- print int in $a0  
      syscall    # does the print  
  
      li $v0, 4   # syscall #4 - print string (address in $a0)  
      la $a0, cr  
      syscall    # does the print  
  
      li $v0, 10 # terminate program  
      syscall  
  
< blank line at end of program >
```

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SysCalls

| 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_char | 11 | \$a0 = char | |
| read_char | 12 | | char (in \$a0) |
| open | 13 | \$a0 = filename (string), \$a1 = flags, \$a2 = mode | file descriptor (in \$a0) |
| read | 14 | \$a0 = file descriptor, \$a1 = buffer, \$a2 = length | num chars read (in \$a0) |
| write | 15 | \$a0 = file descriptor, \$a1 = buffer, \$a2 = length | num chars written (in \$a0) |
| close | 16 | \$a0 = file descriptor | |
| exit2 | 17 | \$a0 = result | |

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DEMO

- Loading program – example.asm
- Running
- Reloading (not Reinitialize. Open file again if error)
- Stepping
- Setting Value
- Breakpoint
- Settings – decimal vs. hex
- SPIM help webpage
 - <http://www.usna.edu/Users/cs/lmcadowel/courses/ic220/spim/>

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