Fundamentals of Computer Systems

An introduction to SPIM

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SPIM MIPS32 Simulator

Download from `http://spimsimulator.sourceforge.net/`

Available for Linux, Mac, Windows

Graphical and text interfaces available

QtSpim latest and greatest

Hello World

```
# Hello World in MIPS assembly for SPIM

  .data
hellostr:
  .asciiz "Hello World!\n"

  .text
  .globl main
main:
  la $a0, hellostr
  li $v0, 4
  syscall                # print_string

  li $v0, 10             # exit
  syscall
```

comment

Assembler Directive

label

newline

0 — 1 byte

put a zero

"text of the program" instructions

Make this visible to the debugger (linker)

label

= print_string

"printf"

instruction

= exit

main: la ...

one of the registers

Running from the command-line

```
$ spim -file hello.s
SPIM Version 8.0 of January 8, 2010
Copyright 1990-2010, James R. Larus.
All Rights Reserved.
See the file README for a full copyright notice.
Loaded: /usr/lib/spim/exceptions.s
Hello World!
```

Some Arithmetic

```
  .data
plus:   .asciiz " plus "
equals: .asciiz " equals "
nl:     .asciiz "\n"
  .text
  .globl main
main:
  li $s0, 17
  li $s1, 25
  addu $s2, $s0, $s1

  move $a0, $s0
  li $v0, 1 # print_int
  syscall
  la $a0, plus
  li $v0, 4 # print_string
  syscall
```

```
move $a0, $s1
li $v0, 1
syscall
la $a0, equals
li $v0, 4
syscall
move $a0, $s2
li $v0, 1
syscall
la $a0, nl
li $v0, 4
syscall

li $v0, 10 # break
syscall
```

Syscall Codes

Function	Code ($v0)	Arguments	Result
print_int	1	$a0 = int	
print_float	2	$f12 = float	
print_double	3	$f12 = double	
print_string	4	$a0 = string	
read_int	5		$v0 = int
read_float	6		$f0 = float
read_double	7		$f0 = double
read_string	8	$a0 = buffer $a1 = length	
sbrk	9	$a0 = amount	$v0 = address
exit	10		