Using XSpim

What is XSpim?

• It's a GUI version of the

Spim simulator for

MIPS

Free and available for

Win, Mac and

Linux/Unix

	xsn	im (on ma	ոզօ)			
PC = 00000000 Status = 00000000	EPC = 00 HI = 00	000000	Cause = 000 L0 = 000	00000 : 00000	BadVAddr=	
R2 (v0) = 000000004 R3 (v1) = 00000000 R4 (a0) = 000000011 R5 (a1) = 7fffec94 R6 (a2) = 7fffec9c R7 (a3) = 00000000 FP0 = 0.00000 FP2 = 0.00000 FP4 = 0.00000 FP4 = 0.00000 FP0 = 0.00000 FP6 = 0.00000	$\begin{array}{llllllllllllllllllllllllllllllllllll$	000000 R17 000000 R18 000000 R20 000000 R20 000000 R20 000000 R22 000000 R22 000000 R22 000000 R22 000000 R22 000000 R22 000000 R22 00000 R21 00000 R21 000000 R20 00000 R21 000000 R22 000000 R22 00000 R22 00000 R21 00000 R21 00000 R22 00000 R22 00000 R21 00000 R22 000000 R20 00000 R20 0000 R20 00000 R20 0000 R20 00000 R20 00000 R20 000000 R20 000000 R20 000000 R20 000000 R20 000000 R20 0000000 R20 0000000 R20 00000000 R20 0000000 R20 0000000000	(s0) = 0000 (s1) = 0000 (s2) = 0000 (s3) = 0000 (s5) = 0000 (s5) = 0000 (s7) = 0000 (s7) = 0000 (s7) = 00000 8 = 0.00000 8 = 0.00000 Point Regis 6 = 0.00000	0000 R25 0000 R26 0000 R27 0000 R29 0000 R30 0000 R31 ters FP24 FP26 FP28 FP30 ters	(t9) = 000 (k0) = 000 (gp) = 100 (gp) = 100 (s8) = 004 = 0.00000 = 0.00000 = 0.00000 = 0.00000	00000 00000 058000 ffcc90 00000 000018
	ad (relo		((clear	$ \ge $
(set value) (pr	int) (break;	ioints) (<u>help</u>) ()	terminal)	(mode	
		Text Seg	ments			
[0x00400004] 0xx [0x00400008] 0xx [0x0040000c] 0xx [0x00400010] 0xx [0x00400014] 0xx [0x00400018] 0xx [0x0040001c] 0xx [0x00400020] 0xx	27a50004 addi 24a60004 addi 00041080 sll 00c23021 addu 0c100009 jal 00000000 nop 3402000a ori 0000000c sysc	4, 0(\$29) 1 \$5, \$29, 1 \$6, \$5, 4 \$2, \$4, 2 \$6, \$6, \$2 0x00400024 \$2, \$0, 10 all \$25, \$0, 1	[main]	; 141 ; 142 ; 143 ; 144 ; 145 ; 145 ; 146 ; 148 ; 149	: addiu \$a : addiu \$a : sll \$v0, : addu \$a : jal mair	2, \$a2, \$⊽O 1 10 # sys
		Data Seg	ments			
DATA [0x10000000][0x	10020000]	0x00000000				
STACK [0x7fffec90] [0x7fffeca0] [0x7fffecb0] [0x7fffecc0] [0x7fffecd0]		Dx00000001 Dx7fffefdc Dx7fffef2c Dx7fffeeee Dx7fffee9d	0x7fffed21 0x7fffefb6 0x7fffef1e 0x7fffeed6 0x7fffee7b	0x7fffeeb	6 0x7fffe d 0x7fffe 5 0x7fffe	ef69 efb eaa
Memory and registe	Memory and registers cleared					
Loaded: /opt/spim-6.5/share/spim-6.5/trap.handler SPIM Version 6.5 of January 4, 2003 Copyright 1990-2003 by James R. Larus (larus@cs.wisc.edu). All Rights Reserved. See the file README for a full copyright notice.						

Accessing XSpim

- XSpim is available for use on the CUNIX system
 - with the command xspim
 - Need to use Xwindows when connecting
 - See http://www.columbia.edu/~lgw23/cs1004/ for info on connecting to CUNIX and using Xwindows
- Can download to your own system but grading will be done on CUNIX

Creating a File

- Before running XSpim
 you need to create an
 assembly file
- File should be plain
 text, typically with .asm
 extension

```
Example Program:
```

```
.text # signals start of code
```

```
main: # signals start of program
```

```
addi $t9, $zero, 1
beq $t0, $zero, end
```

```
loop:
```

```
and $t2, $t0, $t9
sll $t9, $t9, 1
beq $t2, $zero, loop
add $t0, $t2, $zero
```

Loading File

í 🗖		xspim (on ma	ingo)		
PC = 00000000 Status = 00000000		00000000	Cause = 000 L0 = 000		dVAddr= 00000000
$ \begin{array}{llllllllllllllllllllllllllllllllllll$	$\begin{array}{c} \text{R9} (\text{t1}) = \\ \text{R10} (\text{t2}) = \\ \text{R11} (\text{t3}) = \\ \text{R12} (\text{t4}) = \\ \text{R13} (\text{t5}) = \\ \text{R13} (\text{t5}) = \\ \text{R14} (\text{t6}) = \\ \text{R15} (\text{t7}) = \\ \text{FP8} \text{c1} \\ \text{FP10} = 0.0 \\ \text{FP112} = 0.0 \\ \text{FP14} = 0.0 \\ \text{SFP8} = 0.0 \\ \text{FP8} = 0.0 \\ \text{c1} \\ \text{FP8} = 0.0 \\ \text{c2} \\ \text{FP8} = 0.0 \\ \text{c3} \\ \text{FP8} = 0.0 \\ \text{c4} \\ \text{c4} \\ \text{c4} \\ \text{c4} \\ \text{c6} \\ $	0000000 817 0000000 R19 0000000 R29 0000000 R20 0000000 R23 0000000 R23 0000000 R23 0000000 R23 0000000 FP1 0000 FP2 0000 FP2	$\begin{array}{l} (s0) = 0000\\ (s1) = 0000\\ (s2) = 0000\\ (s3) = 0000\\ (s4) = 0000\\ (s5) = 0000\\ (s5) = 0000\\ (s7) = 0000\\ (s7) = 0000\\ Point Regis\\ 6 = 0.00000\\ 8 = 0.00000\\ 0 = 0.00000\\ 2 = 0.00000 \end{array}$	0000 R25 (t 0000 R26 (b 0000 R27 (b 0000 R28 (c 0000 R29 (s 0000 R31 (r ters FP24 = FP26 = FP28 = FP28 = FP30 = ters	88) = 00000000 99) = 00000001 00) = 00000000 11) = 00000000 pp) = 10008000 pp) = 7fffee90 83) = 00000000 93) = 0000000 94) = 0000000 95) = 0000000 90) = 0000000 90) = 0000000 90) = 000000 90, 00000 90, 00000 90, 00000 90, 00000 90, 00000 90, 00000 90, 00000 90, 00000 90, 00000 90, 00000
0x00400004 0x2 0x00400008 0x2 0x00400000 0x0 0x00400000 0x0 0x00400001 0x0 0x00400014 0x0 0x00400010 0x0 0x00400014 0x0 0x00400018 0x0 0x00400012 0x3 0x00400020 0x0	7a50004 a 4a60004 a 10041080 s 10c23021 a 1c100009 1 10000000 r 4402000a a 10000000 s	Text Seg Lw \$4, 0(\$29) addiu \$5, \$29, addiu \$5, \$5, 4 sddu \$6, \$5, 4 addu \$6, \$6, \$2 jal 0x00400024 opri \$2, \$0, 10 vyscall addi \$25, \$0, 1	4 [main]	; 141: ; 142: ; 143: ; 144: ; 145: ; 145: ; 146: ; 148: ; 149:	<pre>lw \$a0, 0(\$sp)# ar addiu \$a1, \$sp, 4# addiu \$a2, \$a1, 4# all \$v0, \$a0, 2 addu \$a2, \$a2, \$v0 ja1 main nop li \$v0 10 syscall # sys ddi \$t9, \$zero, 1</pre>
		Data Seg	ments		-
DATA [0x1000000][0x1 STACK	.0020000]	0x00000000			
[0x7fffec90] [0x7fffeca0] [0x7fffecb0] [0x7fffecc0] [0x7fffecd0]		0x00000001 0x7fffefdc 0x7fffef2c 0x7fffeeee 0x7fffee9d	0x7fffeed6	0x00000000 0x7fffef86 0x7fffef0d 0x7fffeeb5 0x7fffee64	0x7fffef69 0x7fffeefb 0x7fffeeaa
Memory and register	s cleared				
Loaded: /opt/spim-6 SPIM Version 6.5 of Copyright 1990-2003 All Rights Reserved See the file README	: January 4 by James 	4, 2003 R. Larus (laru	s@cs.wisc.ed	u).	

	xspim (a	n mango)		_ 🗆 🗙
PC = 00000000 Status = 00000000	EPC = 00000000 HI = 00000000			dVAddr= 00000000
$\begin{array}{rrrr} R0 & (r0) = 0000000 \\ R1 & (at) = 00000000 \\ R2 & (v0) = 00000000 \\ R3 & (v1) = 00000001 \\ R4 & (a0) = 00000001 \\ R5 & (a1) = 7fffec94 \\ R6 & (a2) = 7fffec9c \\ R7 & (a3) = 00000000 \\ FP0 = 0.00000 \\ FP2 = 0.00000 \\ FP4 = 0.00000 \\ FP6 = 0.00000 \\ FP6 = 0.00000 \\ FP0 = 0.00000 \end{array}$	$\begin{array}{llllllllllllllllllllllllllllllllllll$	R17 (s1) = 0000 R18 (s2) = 0000 R19 (s3) = 0000 R20 (s4) = 0000 R21 (s5) = 0000 R22 (s6) = 0000	0000 R25 (t 0000 R26 (k 0000 R27 (k 0000 R29 (s 0000 R30 (s 0000 R31 (r ters FP26 = FP28 = FP28 = FP30 = ters	8) = 00000000 9) = 00000001 1) = 0000000 1) = 0000000 p) = 7.676e90 8) = 0000000 8) = 00400018 0.00000 0.00000 0.00000 0.00000 0.00000
	oad (reload) (run) (step) (clear) -
(set value) (p	rint (breakpoints)		terminal	mode
				_
		on mango) 🗙		-
[0x00400004] 0x [0x00400008] 0x [0x0040000c] 0x [0x00400010] 0x [0x00400014] 0x [0x00400018] 0x [0x0040001c] 0x [0x0040001c] 0x [0x0040001c] 0x [0x0040001c] 0x	c27a50 c27a50 c27a50 input filename c00041 test asm c00023 cassembly file c000000000000000000000000000000000000	: (abort command)	; 141: ; 142: ; 143: ; 144: ; 145: ; 145: ; 146: ; 148: ; 149:	lw \$a0, 0(\$sp)# ar addiu \$a1, \$sp, 4# addiu \$a2, \$sl, 4# sll \$v0, \$a0, 2 addu \$a2, \$a2, \$v0 jal main nop li \$v0 10 syscall # sys di \$t9, \$zero, 1
	Dai	ta Segments		
DATA [0x1000000][07 STACK [0x7fffec90] [0x7fffec00] [0x7fffec00] [0x7fffec00]	x10020000] 0x0000 0x7fff 0x7fff 0x7fff 0x7fff 0x7fff	00001 0x7fffed21 efdc 0x7fffefb6 ef2c 0x7fffef1e eeee 0x7fffeed6	0x00000000 0x7fffef86 0x7fffeb5 0x7fffeeb5 0x7fffee64	0x7fffefea 0x7fffef69 0x7fffeefb 0x7fffee54 0x7fffee54
[ovvirrecao]				
	re cleared			
Memory and registe	ers cleared -6.5/share/spim-6.5/t			

Running Program

	xspim (on	mango)			
PC = 00000000 Status = 00000000	EPC = 00000000 HI = 00000000	Cause = 0000000 LO = 0000000			
$\begin{array}{rrrr} R0 & (r0) = 0000000 \\ R1 & (at) = 0000000 \\ R2 & (v0) = 0000000 \\ R3 & (v1) = 00000001 \\ R5 & (a1) = 7fffec9 \\ R6 & (a2) = 7fffec9 \\ R7 & (a3) = 0000000 \\ FP0 = 0.00000 \\ FP4 = 0.00000 \\ FP6 = 0.00000 \\ FP6 = 0.00000 \\ FP6 = 0.00000 \\ \end{array}$	$\begin{array}{llllllllllllllllllllllllllllllllllll$	Registers R16 (s0) = 00000000 R17 (s1) = 0000000 R18 (s2) = 0000000 R19 (s3) = 00000000 R20 (s4) = 00000000 R21 (s5) = 00000000 R22 (s6) = 000000000 rpg Point Registers FP16 = 0.00000 FP22 = 0.00000 FP22 = 0.00000 Fp22 = 0.00000 rpg Point Registers FP16 = 0.00000	R26 (k0) = 00000000 R27 (k1) = 00000000 R28 (gp) = 10008000 R29 (sp) = 7fffec90 R30 (s8) = 00000000 R31 (ra) = 00400018 FP24 = 0.00000 FP26 = 0.00000 FP28 = 0.00000 FP30 = 0.00000		
	oad (reload	run ste	p (clear)		
set value p	rint breakpoints	help termi	nal mode		
	Text	Segments			
0x00400004j 0x [0x00400008] 0x [0x0040000c] 0x [0x00400010] 0x [0x00400014] 0x [0x00400018] 0x [0x0040001c] 0x [0x0040001c] 0x	k8fa40000 lw \$4, 0 (\$2 c27a50004 addiu \$5, \$ c24a60004 addiu \$5, \$ c00041080 s11 \$2, \$4, \$0 c00c23021 addu \$6, \$6 c01c00009 jal \$0,000400 c0000000 nop c30020000 nop c30020000 ori \$2, \$0, \$0 c0000000 ori \$2, \$0, \$0	29, 4 5, 4 2 2 . \$2 D24 [main] 10	<pre>; 140: lw \$a0, 0(\$sp)# ar ; 141: addiu \$a1, \$sp, 4# ; 142: addiu \$a2, \$a1, 4# ; 143: sll \$v0, \$a0, 2 ; 144: addu \$a2, \$a2, \$v0 ; 145: jal main ; 146: nop ; 148: li \$v0 10 ; 149: syscall # sys ; 3: addi \$t9, \$zero, 1</pre>		
300001	Data	Segments			
DATA [0x10000000][0>	<10020000] 0x00000	000			
STACK [0x7fffec90] [0x7fffeca0] [0x7fffecb0] [0x7fffecc0] [0x7fffecd0]	0x00000 0x7fffe 0x7fffe 0x7fffe 0x7fffe	fdc Ox7fffefb6 Ox7 f2c Ox7fffef1e Ox7 see Ox7fffeed6 Ox7	0000000 0x7fffefea fffef86 0x7fffef69 fffef0d 0x7fffeefb fffeeb5 0x7fffeeaa fffee64 0x7fffee54		
Memory and registe	ers cleared		8		
Loaded: /opt/spim-6.5/share/spim-6.5/trap.handler SPIM Version 6.5 of January 4, 2003 Copyright 1990-2003 by James R. Larus (larus@cs.wisc.edu). All Rights Reserved. See the file README for a full copyright notice.					

	xspim (on mango)
PC = 00000000 EPC Status = 00000000 HI	= 00000000 Cause = 00000000 BadVAddr= 00000000 = 00000000 L0 = 00000000
$ \begin{array}{llllllllllllllllllllllllllllllllllll$.00000 FP20 = 0.00000 FP28 = 0.00000
quit load (reload (run) step (clear)
(set value) (print) (breakpoints) (help) (terminal) (mode)
	🗖 prompt (on mango) 🗵
[0x00400000] 0x8fa40000 [0x00400004] 0x27a50004 [0x00400008] 0x27a50004 [0x0040000c] 0x00041080 [0x0040000c] 0x00041080 [0x00400014] 0x0023021 [0x00400018] 0x0000000 [0x00400018] 0x30000000 [0x00400012] 0x30000000 [0x00400020] 0x0000000c	run program Iw \$a0, 0 (\$sp)# ar starting address: 0x00400000 args: test.asm ok abort command addu \$25, \$0, 1 ; 3: addi \$49, \$zero, 1
	Data Segments
DATA [0x1000000][0x10020000] STACK [0x7fffec90] [0x7fffec30] [0x7fffecb0]	0x00000000 0x00000001 0x7fffed21 0x00000000 0x7fffefea 0x7fffefdc 0x7fffefb6 0x7fffef86 0x7fffef69 0x7fffef2c 0x7fffef1e 0x7fffef0d 0x7fffeefb
[Ox7fffecc0] [Ox7fffecd0]	0x7fffeeee 0x7fffeed6 0x7fffeeb5 0x7fffeeaa 0x7fffee9d 0x7fffee7b 0x7fffee64 0x7fffee54
Memory and registers cleared Loaded: /opt/spim-6.5/share, SPIM Version 6.5 of January	d /spim-6.5/trap.handler 4, 2003 s R. Larus (larus@cs.wisc.edu).

Other Useful Buttons

- Set value set the value of a register
- Step step through the code, line by line
- Clear reset registers back to zero
- Reload reload last assembly program

		xspim (on m	iango)			_ O ×
PC = 00000000 Status = 00000000		00000000 00000000	Cause LO	= 00000000		dVAddr= 00000000
$ \begin{array}{llllllllllllllllllllllllllllllllllll$	R9 (t1) = R10 (t2) = R11 (t3) = R12 (t4) = R13 (t5) = R14 (t6) = R15 (t7) =	00000000 R: 00000000 R: 00000000 R: 00000000 R: 00000000 R: 00000000 R: 00000000 R: 00000000 R:	(6 (s0) 17 (s1) 18 (s2) 19 (s3) 20 (s4) 21 (s5) 22 (s6) 23 (s7)	= 0000000 = 0000000 = 0000000 = 0000000 = 0000000 = 0000000 = 0000000 . Registers	R25 (t) R26 (k) R27 (k) R28 (g) R29 (s) R30 (s) R31 (r)	
FP2 = 0.00000 FP4 = 0.00000 FP6 = 0.00000	FP10 = 0.0 FP12 = 0.0 FP14 = 0.0	10000 FI	218 = 0. 20 = 0. 222 = 0.	00000	FP28 =	0.00000 0.00000 0.00000
FP0 = 0.00000		ingle Floatin		Registers		0.00000
	ad C	reload	run	ste		clear
set value) p	rint br	reakpoints) (help	termi	nal	mode
	<u> </u>		noip			
		Text Se	gments			
[0x00400004] 07 [0x00400008] 07 [0x0040000c] 07 [0x00400010] 07 [0x00400014] 07 [0x00400018] 07 [0x0040001c] 07 [0x0040001c] 07	x27a50004 a x24a60004 a x00041080 a x00c23021 a x0c100009 - x00000000 r x3402000a a x0000000c a	w \$4, 0(\$29) addiu \$5, \$29 addiu \$6, \$5, 11 \$2, \$4, 2 addu \$6, \$6, : al 0x0040002 ori \$2, \$0, 10 syscall addi \$25, \$0,	. 4 4 \$2 4 [main])		; 141: ; 142: ; 143: ; 144: ; 145: ; 146: ; ; 148: ; 149:	li \$v0 10
		Data Se	egments			
DATA [0x10000000][0>	10020000]	0x000000	1			
STACK [0x7fffec90] [0x7fffeca0] [0x7fffecb0] [0x7fffecc0] [0x7fffecd0]		0x0000000 0x7fffefd 0x7fffef2 0x7fffeee 0x7fffee9	c Ox7ff c Ox7ff e Ox7ff	fefb6 0x7 fef1e 0x7 feed6 0x7	D000000 fffef86 fffef0d fffeeb5 fffee64	Ox7fffefea Ox7fffef69 Ox7fffeefb Ox7fffeeaa Ox7fffee54
Memory and registe	rs cleared					
Loaded: /opt/spim- SPIM Version 6.5 c Copyright 1990-200 All Rights Reserve See the file READM	of January 4)3 by James ed.	l, 2003 R. Larus (la:	rus@cs.w			

Additional Tips

- Avoid clicking the 'x' button on windows to close them as this will crash XSpim
 - Use 'abort command' buttons instead
- When typing data into a field, make sure your mouse cursor is over the field
 - Moving away will require you to select the field again
- A comprehensive discussion of MIPS and XSPIM can be found in the Appendix of P&H