



Apresentação do Simulador MARS

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Na Aula Anterior ...

- Conceitos Gerais;
- Tipos de Dados;
- Formatos de Instruções;
- Instruções suportadas;
- Registradores;
- Modos de Endereçamento;
- Arquitetura de Memória;
- Interrupções, Traps e Exceções.

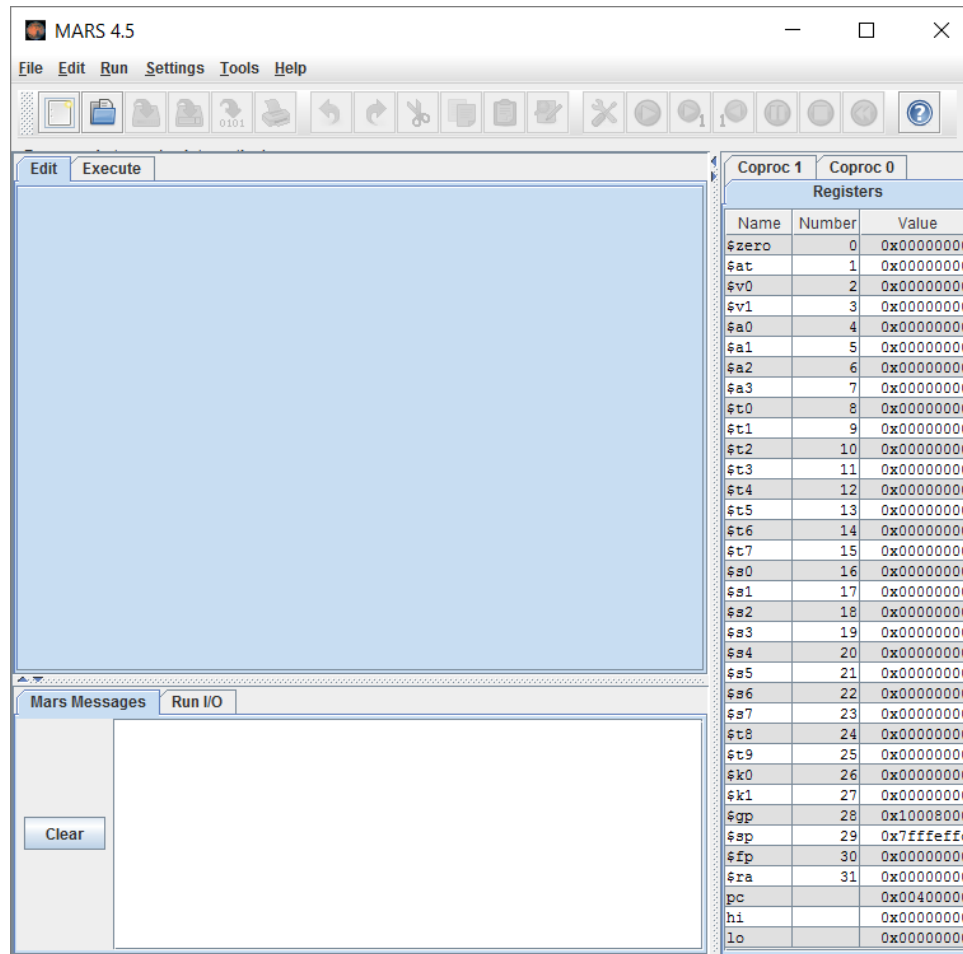
Nesta Aula

- Apresentação do Simulador MARS;
- Estrutura Geral de um programa em Linguagem de Montagem;

MARS

- MARS – MIPS Assembler and Runtime Simulator;
- Escrito em Java → multiplataforma;
- Simula o funcionamento de boa parte do processador MIPS;
- Possui diversos plug-ins interessantes;
- Livre!

Tela Principal do Sistema



Tela de Simulação

D:\Dropbox\lectures\GSI013\programas\assembly-MIPS\quadrado.asm - MARS 4.5

File Edit Run Settings Tools Help

Run speed at max (no interaction)

Execute

Text Segment

Bkpt	Address	Code	Basic	Source
	0x00400000	0x24020004	addiu \$2,\$0,0x00000004	5: li \$v0,4
	0x00400004	0x3c011001	lui \$1,0x00001001	6: la \$a0,str1
	0x00400008	0x34240000	ori \$4,\$1,0x00000000	
	0x0040000c	0x0000000c	syscall	7: syscall
	0x00400010	0x24020005	addiu \$2,\$0,0x00000005	8: li \$v0,5
	0x00400014	0x0000000c	syscall	9: syscall
	0x00400018	0x00022020	add \$4,\$0,\$2	10: add \$a0,\$zero, \$v0
	0x0040001c	0x0c100012	jal 0x00400048	11: jal 11

Labels

Label	Address
quadrado.asm	
l1	0x00400048
LOOP	0x0040005c
FINISH	0x0040006c
str1	0x10010000
str2	0x10010013

☒ Data ☒ Text

Data Segment

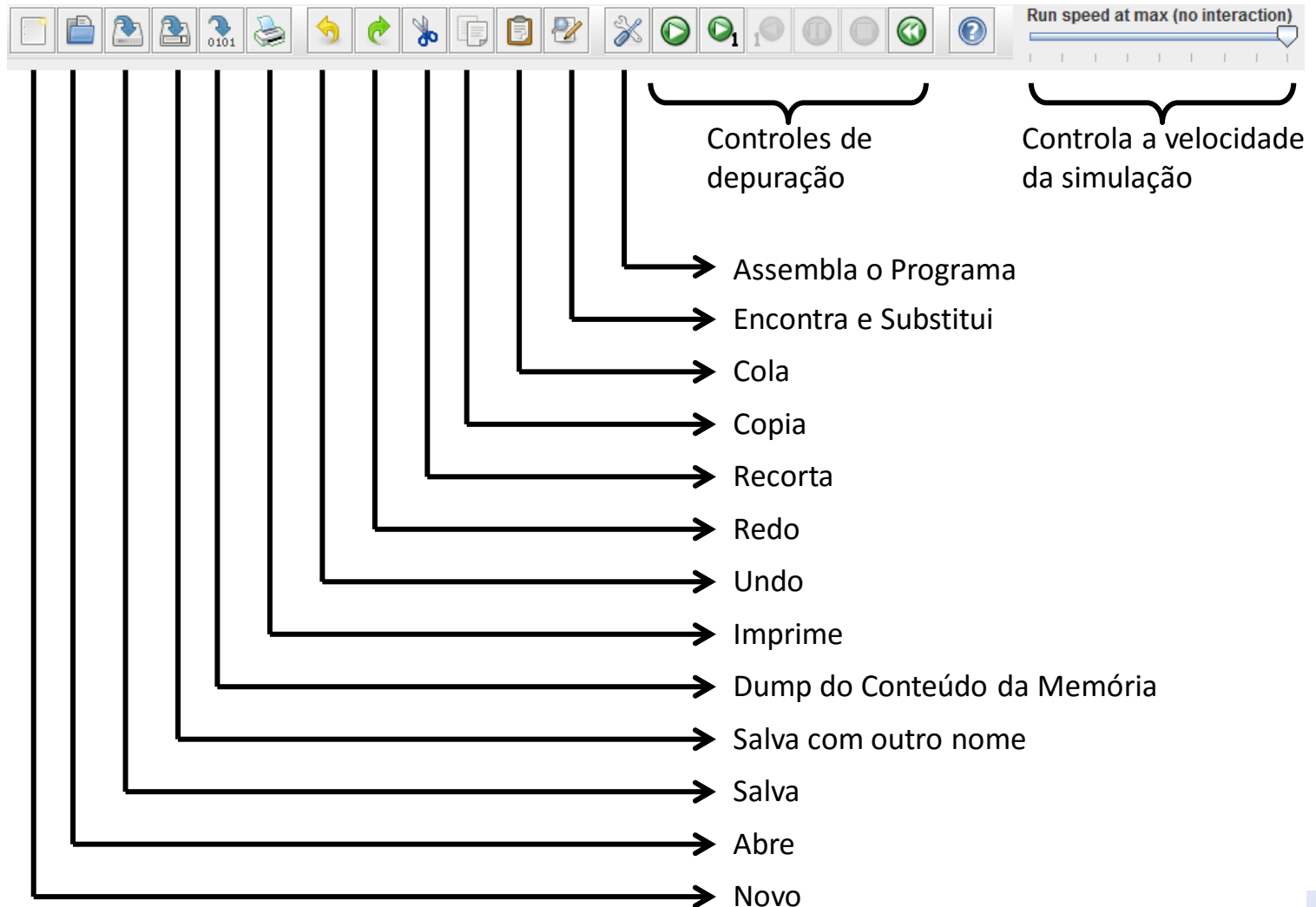
Address	Value (+0)	Value (+4)	Value (+8)	Value (+c)	Value (+10)	Value (+14)	Value (+18)	Value (+1c)
0x10010000	0x69676964	0x75206574	0x6e69206d	0x72696574	0x6f000a6f	0x61757120	0x64617264	0x6f64206f
0x10010020	0x6d756e20	0x206f7265	0x00206865	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000
0x10010040	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000
0x10010060	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000
0x10010080	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000
0x100100a0	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000
0x100100c0	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000
0x100100e0	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000
0x10010100	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000
0x10010120	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000
0x10010140	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000
0x10010160	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000
0x10010180	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000
0x100101a0	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000
0x100101c0	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000
0x100101e0	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000

0x10010000 (.data) ☒ Hexadecimal Addresses ☒ Hexadecimal Values ☐ ASCII

Registers

Name	Number	Value
\$zero	0	0x00000000
\$at	1	0x00000000
\$v0	2	0x00000000
\$v1	3	0x00000000
\$a0	4	0x00000000
\$a1	5	0x00000000
\$a2	6	0x00000000
\$a3	7	0x00000000
\$t0	8	0x00000000
\$t1	9	0x00000000
\$t2	10	0x00000000
\$t3	11	0x00000000
\$t4	12	0x00000000
\$t5	13	0x00000000
\$t6	14	0x00000000
\$t7	15	0x00000000
\$s0	16	0x00000000
\$s1	17	0x00000000
\$s2	18	0x00000000
\$s3	19	0x00000000
\$s4	20	0x00000000
\$s5	21	0x00000000
\$s6	22	0x00000000
\$s7	23	0x00000000
\$t8	24	0x00000000
\$t9	25	0x00000000
\$k0	26	0x00000000
\$k1	27	0x00000000
\$gp	28	0x10008000
\$sp	29	0x7fffffc
\$fp	30	0x00000000
\$ra	31	0x00000000
pc		0x00400000
hi		0x00000000
lo		0x00000000

Menu de Controles



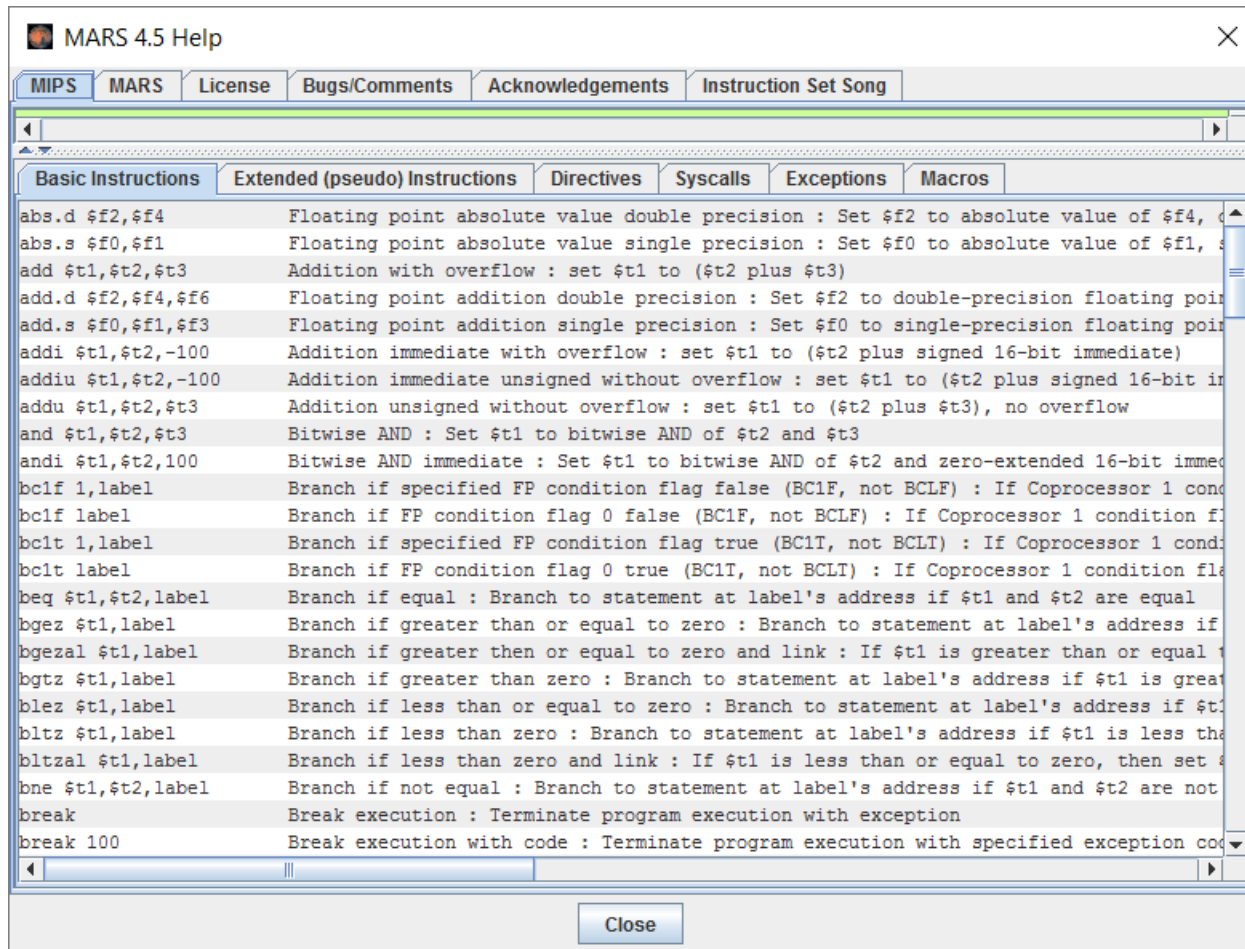
Registradores

Registers		
Name	Number	Value
\$zero	0	0x00000000
\$at	1	0x00000000
\$v0	2	0x00000000
\$v1	3	0x00000000
\$a0	4	0x00000000
\$a1	5	0x00000000
\$a2	6	0x00000000
\$a3	7	0x00000000
\$t0	8	0x00000000
\$t1	9	0x00000000
\$t2	10	0x00000000
\$t3	11	0x00000000
\$t4	12	0x00000000
\$t5	13	0x00000000
\$t6	14	0x00000000
\$t7	15	0x00000000
\$s0	16	0x00000000
\$s1	17	0x00000000
\$s2	18	0x00000000
\$s3	19	0x00000000
\$s4	20	0x00000000
\$s5	21	0x00000000
\$s6	22	0x00000000
\$s7	23	0x00000000
\$t8	24	0x00000000
\$t9	25	0x00000000
\$k0	26	0x00000000
\$k1	27	0x00000000
\$gp	28	0x10008000
\$sp	29	0x7ffffcfc
\$fp	30	0x00000000
\$ra	31	0x00000000
pc		0x00400000
hi		0x00000000
lo		0x00000000

Coproc 1			
Name	Float	Double	
\$f0	0x00000000	0x0000000000000000	
\$f1	0x00000000		
\$f2	0x00000000	0x0000000000000000	
\$f3	0x00000000		
\$f4	0x00000000	0x0000000000000000	
\$f5	0x00000000		
\$f6	0x00000000	0x0000000000000000	
\$f7	0x00000000		
\$f8	0x00000000	0x0000000000000000	
\$f9	0x00000000		
\$f10	0x00000000	0x0000000000000000	
\$f11	0x00000000		
\$f12	0x00000000	0x0000000000000000	
\$f13	0x00000000		
\$f14	0x00000000	0x0000000000000000	
\$f15	0x00000000		
\$f16	0x00000000	0x0000000000000000	
\$f17	0x00000000		
\$f18	0x00000000	0x0000000000000000	
\$f19	0x00000000		
\$f20	0x00000000	0x0000000000000000	
\$f21	0x00000000		
\$f22	0x00000000	0x0000000000000000	
\$f23	0x00000000		
\$f24	0x00000000	0x0000000000000000	
\$f25	0x00000000		
\$f26	0x00000000	0x0000000000000000	
\$f27	0x00000000		
\$f28	0x00000000	0x0000000000000000	
\$f29	0x00000000		
\$f30	0x00000000	0x0000000000000000	
\$f31	0x00000000		
Condition Flags			
<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3
<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6	<input type="checkbox"/> 7

Coproc 0		
Name	Number	Value
\$8 (vaddr)	8	0x00000000
\$12 (status)	12	0x0000ff11
\$13 (cause)	13	0x00000000
\$14 (epc)	14	0x00000000

Help



Estrutura de um Programa Assembly

- No mínimo duas palavras reservadas **.text** e **.data**;
- O caractere '#' é utilizado para comentários, equivalente a '//' no C;

```
1 #####
2 #estrutura.asm
3 #
4 #DDA 23.08.2016
5 #####
6
7 .data
8 #declaração de variáveis estáticas globais
9
10 .text
11 #código (texto) do programa
12
13
```

Diretivas

