CS 201 (David Gerhard): Introduction to Digital Systems


David Gerhard

a5

Submit to urcourses, in PDF, DOC(X), or text format. PDF is preferred. Be sure to follow all assignment expectations.

Question 1

Write a sequence of MIPS instructions to find the absolute value of the value in register $s0 and store it into register $t0. Assume you do not have access to multiplication instructions. Use as few instructions as possible. You do not have to assemble your code for this question.

Question 2

(a) Using the MIPS sheet provided, assemble the following instructions in to 32 bit binary numbers, and provide the HEX equivalent encoding. Indicate, in your own words, what each instruction does

subu $s3 $t9 $v1

sra $t7,$a3,2

You may use the simulator in the lab or https://www.eg.bucknell.edu/~csci320/mips_web/ to check your work, but keep in mind that you will not have the simulator or the website on the exam.

(b) The following hex value represents a MIPS instruction. Disassemble the hex and indicate the complete instruction that it represents, including all parameters

0x144C0012

(c) In many programs, the instruction "la" is used to load an address indicated by a label into a register. For example, in lab 9, the first instruction in the main segment is

la $t2,str

This instruction, and the related "li" (load immediate) are listed on our MIPS sheet as pseudo instructions. la and li are also used to set up system calls. Explain, in your own words, the function of the la and li instructions, and why they cannot be regular instructions. What real instructions would be assembled corresponding to the instruction:

li $t0, 0

Question 3

Write a MIPS program to demonstrate the operation of the following switch statement.

```
switch (S) {
   case  5: A = A + 1; break;
   case 25: A = A - 1; break;
   default: A = A * 2; break;
}
```

Implement and simulate your solution. Allocate .data locations for the variables S and A, and load these values into registers before performing the switch statement on the registers. Run your program several times with different values for these variables, to ensure that your program works as expected. Bonus marks if your program prompts the user for the values of S and A, and displays results of the computation to the user.

Assignment deliverables:

all files must have the indicated filenames (replace 200200000 with your student number):

1. Assignment file named “A5_200200000.docx” or “A5_200200000.pdf” containing your complete solution for all questions, including screenshots of your compiled code and output (just like in the lab)

2. Code file A5Q30000.s (using the last four digits of your student number) for question 3

Submission status

Submission status	Submitted for grading
Grading status	Graded
Due date	Friday, 18 November 2016, 11:55 PM
Time remaining	Assignment was submitted 12 hours 47 mins early
Last modified	Friday, 18 November 2016, 11:07 AM
File submissions	A5_200312488.pdf A5Q32488.s
Submission comments	Comments (0)

Feedback

Grade	26.00 / 30.00
Graded on	Monday, 28 November 2016, 4:57 PM
Graded by	 Zhi Cao
Annotate PDF	Mandeep Singh_696897_0.pdf View annotated PDF...

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