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Computer Science Division — EECS

Spring 2003 John Kubiatowicz

Homework Quiz (HW #2)

February 12, 2003
CS152 Computer Architecture and Engineering

This quiz covers one of the problems from homework #2.
Good Luck!

Your Name:	
SID Number:	
Discussion Section:	

Total:	

General Base Conversions

In homework problem 3.22, you were asked to write a MIPS assembly language program to convert an ASCII *decimal* string to an integer. For this quiz, construct a similar program which can convert a string of *any* base (from 2 to 16) to an integer. The specifications are as follows:

- The first argument (a0) contains a pointer to a null-terminated string
- The Second argument (a1) contains the base and will be such that: $2 \le a1 \le 16$
  (you can assume that this is true)
- On exit, v0 will contain the result.
- This procedure (call it "convert") must adhere to all MIPS conventions

If any character in the string (before the final null character) is not a legal character for the specified base, then the result should be –1. Also, a zero-length string (no characters at all) should return –1. Ignore overflow errors.

Examples:

If the input string is "B6" and the base is 16, the result register (v0) should contain 182
If the input string is "B6" and the base is 12, the result register, should contain 138
If the input string is "B6" and the base is 10, the result register, should contain –1
If the input string is "" (i.e. first character is null), the result register should contain –1
If the input string is "10110" and the base is 2, the result register, should contain 22.

The important portion of the ASCII character table is as follows (Note that values are in HEX notation):

Character	ASCII Value
"0"	0x30
"1"	0x31
"2"	0x32
"3"	0x33
"4"	0x34
"5"	0x35
"6"	0x36
"7"	0x37
"8"	0x38
"9"	0x39

Character	ASCII Value
"A"	0x41
"B"	0x42
"C"	0x43
"D"	0x44
"E"	0x45
"F"	0x46

We have included the MIPS instruction set as an attachment. Write this routine in as few instructions as possible on the following page. Assume the virtual MIPS machine (no branch delay slots).

[This page is for your answer]