EE334 Computer Architecture **Spring 2007**

Homework 3: C/ F and meters/feet Conversions

The purpose of this homework is for you to get familiar with MIPS assembly language.

Please write an assembly program that converts temperature from C to F and from F to C. In your program please use only integer instructions (mul, div, add,…). To convert from Celsius to Fahrenheit, you can use the equation given below.

$$F = \frac{9}{5}C + 32$$

A program that could help you to get inputs/outputs from/to the console is in the following page. It is necessary to have system calls in order to use the console. If you are interested on learning more about system calls please see pages A-44 and A-45 of the textbook. The system services table is shown below.

Service	System call code	Arguments	Result
print_int	1	$a0 = integer	
print_float	2	$f12 = float	
print_double	3	$f12 = double	
print_string	4	$a0 = string	
read_int	5		integer (in $v0)
read_float	6		float (in $f0)
read_double	7		double (in $f0)
read_string	8	$a0 = buffer, $a1 = length	
sbrk	9	$a0 = amount	address (in $v0)
exit	10		
print_char	11	$a0 = char	
read_char	12		char (in $a0)
open	13	$a0 = filename (string), $a1 = flags, $a2 = mode	file descriptor (in $a0)
read	14	$a0 = file descriptor, $a1 = buffer, $a2 = length	num chars read (in $a0)
write	15	$a0 = file descriptor, $a1 = buffer, $a2 = length	num chars written (in $a0)
close	16	$a0 = file descriptor	
exit2	17	$a0 = result	

After getting the temperature conversion program you are to modify this program to have conversion from meters to feet and vice versa.

REPORT

Please include the following items in your report.

1. Explain how your program works. You may use a flow chart, pseudo C program, or other way to explain the program.
2. Show a couple of examples.
3. Conclusion section. Explain what you learned.
4. A print out of your program. # ***Include comments in your program.***

REPORT IS DUE: Friday, February 16 (in class).
You can always give the report to your TA before the deadline.

Program “Shell”

```
          .text
          .globl __start
__start:
          la $a0,conv    # print conversion on terminal
          li $v0,4
          syscall

          li $v0,5       # syscall 5 reads an integer
          syscall
                   ### if v0=0
                   ###   then C_to_F
                   ###   else F_to_C

          la $a0,prompt  # print prompt on terminal
          li $v0,4
          syscall

          li $v0,5       # syscall 5 reads an integer
          syscall

                   ## conversion is done here
                   ## C = 5/9 (F-32)
                   ## make sure your result is put in register $t0

          la $a0,ans1    # print string before result
          li $v0,4
          syscall

          move $a0,$t0   # print  result (that is in register $t0)
          li $v0,1
          syscall

          la $a0,endl    # system call to print
          li $v0,4       # print a new line
          syscall

          li $v0,10
          syscall        # exit


################################################
#           data segment                       #
################################################

          .data
conv:     .asciiz "C-->F (0)  or  F-->C (1): "
prompt:   .asciiz "Enter temperature in Celsius: "
ans1:     .asciiz "Temperature in Fahrenheit is: "
prompf:   .asciiz "Enter temperature in Fahrenheit: "
ans2:     .asciiz "Temperature in Celsius is: "
endl: .asciiz "\n"
```