COMPUTER ARCITECHTURE AND ORGANIZATION



PROJECT REPORT

UNIT CONVERTER IN MIPS

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UNIT CONVERTER IN MIPS

CODE:

.data

choice: .asciiz "Enter your conversion.\n1-Temperature.\n2-Length.\n3-Weight.\nYour Choice:>"

text1: .asciiz "Enter the temp unit you want to convert from:\n1-celsius.\n2-fahrenheit.\n3-Kelvin.\n\nyour choice: "

text2: .asciiz "\nTemperature: "

text3: .asciiz "\nEnter the temp unit you want to convert the temp into:\n1-celsius.\n2-fahrenheit.\n3-kelvin.\n\nyour choice: "

msg1: .asciiz "Enter the unit you want to convert from:\n1-Kilometer.\n2-Meter.\n3-Centimeter.\n4-Feet.\n5-Inch\n\nYour choice:>"

msg2: .asciiz "\nvalue:"

msg3: .asciiz "\nEnter your choice you want to convert the unit into:\n1-Kilometer.\n2-Meter.\n3-Centimeter.\n4-Feet.\n5-Inch.\n\nYour choice:>"

msg4: .asciiz "\nMenu:\n(1)Convert another one\n(2)Go Back\n(3)Exit\nYour Choice: "

msg5: .asciiz "Enter the unit you want to convert from:\n(1)grams\n(2)killograms\n(3)ounces\n(4)pounds\nyour choice: "

msg6: .asciiz "Enter the unit you want to convert to:\n(1)grams\n(2)killograms\n(3)ounces\n(4)pounds\nyour choice: "

action\_invalid: .asciiz "\nInvalid Response !\n"

d1: .float 30.0

d2: .float 12.0

d3: .float 1000.0

d4: .float 100.0

d5: .float 9.0

d6: .float 5.0

d7: .float 32.0

d8: .float 273.15

d9: .float 1000.0

d10: .float 28.34952

d11: .float 453.592

.text

main:

la $a0, choice # prompts the user to select the desired unit of conversion (temp, length, weight)

li $v0, 4

syscall

li $v0 5 # gets the option from the user

syscall

move $s4 $v0 # $s5=option

li $s5 1 # $s6 = 1

li $s6 2 # $s7 = 2

li $s7 3 # $s8 = 3

beq $s4 $s5 L1 # compares $s5 and $s6

beq $s4 $s6 L2 # compares $s5 and $s7

beq $s4 $s7 L3 # compares $s5 and $s8

#---------------

la $a0, action\_invalid

li $v0, 4

syscall

j main

#----------------------

# if temperature is selected

L1:

la $a0, text1 # prompts the user to select the unit ot temp (celsius, fahrenheit, kelvin)

li $v0, 4

syscall

li $v0, 5 # get the option from user

syscall

move $t1, $v0 # $t1 = option

la $a0, text2 # prompts the user to input the temperature, he/she wants to convert

li $v0, 4

syscall

li $v0,6 # get the temperature

syscall

mov.s $f2, $f0 # $f2 = tempertaure

# converts any given temperature unit to celsius

li $t3, 1 # $t3 = 1

li $t4, 2 # $t4 = 2

li $t5, 3 # $t5 = 3

beq $t1, $t3, celsius # compares $t1 and $t3

beq $t1, $t4, fahrenheit # compares $t1 and $t4

beq $t1, $t5, kelvin # compares $t1 and $t5

la $a0, action\_invalid

li $v0, 4

syscall

j L1

fahrenheit: # converts fahrenheit to celsius

l.s $f3 d5 # $f3 = 9.0

l.s $f4 d6 # $f4 = 5.0

l.s $f5 d7 # $f5 = 32.0

sub.s $f2, $f2, $f5 # $f2 = $f2 - $f5

div.s $f2, $f2, $f3 # $f2 = $f2 / $f3

mul.s $f2, $f2, $f4 # $f2 = $f2 \* $f4

j request # go to loop request

kelvin: # converts kelvin to celsius

l.s $f3, d8 # $f3 = 273.18

sub.s $f2, $f2, $f3 # $f2 = $f2 - $f3

j request # go to loop request

celsius:

j request # go to loop request

request: # asks the user to input the unit they want to convert into

la $a0, text3 # prompts the user to select the unit ot temp (celsius, fahrenheit, kelvin)

li $v0,4

syscall

li $v0, 5 # get the option from the user

syscall

move $t2, $v0 # $t2 = option

beq $t2, $t3, celsiusfinal # compares $t1 with $t3

beq $t2, $t4, fahrenheitfinal # compares $t1 with $t4

beq $t2, $t5, kelvinfinal # compares $t1 with $t5

celsiusfinal: #converts celsius to celsius

la $a0, text2 # display "temperature:"

li $v0, 4

syscall

mov.s $f12, $f2

li $v0, 2 # display converted temperature

syscall

j exit # jump to exit for menu

fahrenheitfinal: #converts celsius to fahrenheit

l.s $f3 d5 # $f3 = 9.0

l.s $f4 d6 # $f4 = 5.0

l.s $f5 d7 # $f5 = 32.0

div.s $f4, $f3, $f4 # $f4 = $f3 / $f4

mul.s $f4, $f4, $f2 # $f4 = $f4 \* $f2

add.s $f4, $f5, $f4 # $f4 = $f4 + $f4

la $a0, text2 # display "tmeperature: "

li $v0, 4

syscall

mov.s $f12, $f4

li $v0, 2 # display converted temperature

syscall

j exit

kelvinfinal: # converts celsius to kelvin

l.s $f3 d8 # $f3 = 273.15

add.s $f2, $f2, $f3 # $f2 = $f2 + $f3

la $a0, text2 # display "temperature: "

li $v0, 4

syscall

mov.s $f12, $f2

li $v0, 2 # display converted temperature

syscall

j exit # jump to exit for menu

# if length is selected

L2:

la $a0, msg1 # prompts the user to select the unit ot length (killometer, meter, centimeter, feet, inch)

li $v0, 4

syscall

li $v0, 5 # get the option selected by the user

syscall

move $t0 $v0 # $t0 = option

la $a0, msg2 # gets the value that is to be converted

li $v0, 4

syscall

li $v0, 6

syscall

mov.s $f2 $f0

li $t1 1 # $t1 = 1

li $t2 2 # $t2 = 2

li $t3 3 # $t3 = 3

li $t4 4 # $t4 = 4

li $t5 5 # $t5 = 5

beq $t0 $t1 kilometer # compares $t0 and $t1

beq $t0 $t2 meter # compares $t0 and $t2

beq $t0 $t3 centimeter # compares $t0 and $t3

beq $t0 $t4 feet # compares $t0 and $t4

beq $t0 $t5 inch # compares $t0 and $t5

la $a0, action\_invalid

li $v0, 4

syscall

j L2

meter: # converts meter to killometer

l.s $f3 d3 # $f3 = 1000.0

div.s $f2 $f2 $f3 # $f2 = $f2 / $f3

j request1 # go to loop request1

centimeter: #converts centimeter to killometer

l.s $f3 d3 # $f3 = 1000.0

l.s $f4 d4 # $f4 = 100.0

div.s $f2 $f2 $f4 # $f2 = $f2 / $f4

div.s $f2 $f2 $f3 # $f2 = $f2 / $f3

j request1 # go to loop request1

feet: # converts feet to killometer

l.s $f3 d1 # $f3 = 30.0

l.s $f4 d3 # $f4 = 1000.0

l.s $f5 d4 # $f5 = 100.0

mul.s $f2 $f2 $f3 # $f2 = $f2 \* $f2

div.s $f2 $f2 $f5 # $f2 = $f2 / $f5

div.s $f2 $f2 $f4 # $f2 = $f2 / $f4

j request1 # go to loop request1

inch: #converts inches to killometer

l.s $f3 d2 # $f3 = 12.0

l.s $f4 d1 # $f4 = 30.0

l.s $f5 d3 # $f5 = 1000.0

l.s $f6 d4 # $f6 = 100.0

div.s $f2 $f2 $f3 # $f2 = $f2 / $f3

mul.s $f2 $f2 $f4 # $f2 = $f2 \* $f4

div.s $f2 $f2 $f6 # $f2 = $f2 / $f6

div.s $f2 $f2 $f5 # $f2 = $f2 / $f5

j request1 # go to loop request1

kilometer:

j request1 # go to loop request1

request1: # asks the user to input the unit they want to convert into

la $a0, msg3 # prompts the user to select the unit ot length (killometer, meter, centimeter, feet, inch)

li $v0, 4

syscall

li $v0, 5 # get the option selected by the user

syscall

move $t6 $v0 # $t6 = option

beq $t6 $t1 kilometerfinal # compares $t6 and $t1

beq $t6 $t2 meterfinal # compares $t6 and $t2

beq $t6 $t3 centimeterfinal # compares $t6 and $t3

beq $t6 $t4 feetfinal # compares $t6 and $t4

beq $t6 $t5 inchfinal # compares $t6 and $t5

kilometerfinal: # converts killometer to killometer

la $a0, msg2 # display "value"

li $v0, 4

syscall

mov.s $f12 $f2

li $v0, 2 # display the converted value

syscall

j exit # go to exit loop for menu

meterfinal: # converts killometer to meter

l.s $f3 d3 # $f3 = 1000.0

la $a0, msg2

li $v0, 4 # display "value"

syscall

mul.s $f2 $f2 $f3 # $f2 = $f2 \* $f3

mov.s $f12 $f2

li $v0 2 # display the converted value

syscall

j exit # go to exit loop for menu

centimeterfinal: # converts killometer to centimeter

l.s $f3 d3 # $f3 = 1000.0

l.s $f4 d4 # $f4 = 100.0

la $a0, msg2

li $v0, 4 # display "value"

syscall

mul.s $f2 $f2 $f3 # $f2 = $f2 \* $f3

mul.s $f2 $f2 $f4 # $f2 = $f2 \* $f4

mov.s $f12 $f2

li $v0 2 # display the converted value

syscall

j exit # go to exit loop for menu

feetfinal: # converts killometer to feet

l.s $f3 d3 # $f3 = 1000.0

l.s $f4 d4 # $f4 = 100.0

l.s $f5 d1 # $f5 = 30.0

la $a0, msg2

li $v0, 4 # display "value"

syscall

mul.s $f2 $f2 $f3 # $f2 = $f2 \* $f3

mul.s $f2 $f2 $f4 # $f2 = $f2 \* $f4

div.s $f2 $f2 $f5 # $f2 = $f2 / $f5

mov.s $f12 $f2

li $v0 2 # display the converted value

syscall

j exit # go to the exit loop for menu

inchfinal: # converts killometer to inches

l.s $f3 d3 # $f3 = 1000.0

l.s $f4 d4 # $f4 = 100.0

l.s $f5 d1 # $f5 = 30.0

l.s $f6 d2 # $f6 = 12.0

la $a0, msg2

li $v0, 4 # display "value: "

syscall

mul.s $f2 $f2 $f3 # $f2 = $f2 \* $f3

mul.s $f2 $f2 $f4 # $f2 = $f2 \* $f4

div.s $f2 $f2 $f5 # $f2 = $f2 / $f5

mul.s $f2 $f2 $f6 # $f2 = $f2 \* $f6

mov.s $f12 $f2

li $v0 2 # display converted value

syscall

j exit # go to exit loop for menu

# if weight is selected

L3:

la $a0, msg5 # prompts the user to select the unit ot weight (gram, killogram, ounces, pounds)

li $v0, 4

syscall

li $v0, 5 # get the option selected by the user

syscall

move $t0, $v0

la $a0, msg2 # gets the value that is to be converted

li $v0, 4

syscall

li $v0, 6

syscall

mov.s $f2, $f0

li $t2, 1 # $t2 = 1

li $t3, 2 # $t3 = 2

li $t4, 3 # $t4 = 3

li $t5, 4 # $t5 = 4

beq $t0, $t2, gram # compares $t0 with $t2

beq $t0, $t3, killogram # compares $t0 with $t3

beq $t0, $t4, ounce # compares $t0 with $t4

beq $t0, $t5, pound # compares $t0 with $t5

la $a0, action\_invalid

li $v0, 4

syscall

j L3

gram:

j request3 # go to loop request3

killogram: # converts killogram to grams

l.s $f3, d9 # $f3 = 1000.0

mul.s $f2, $f2, $f3 # $f2 = $f2 \* $f3

j request3 # go to loop request3

ounce: # converts ounces to grams

l.s $f3, d10 # $f3 = 28.34952

mul.s $f2, $f2, $f3 # $f2 = $f2 \* $f3

j request3 # go to loop request3

pound: # converts pounds to grams

l.s $f3, d11 # $f3 = 453.592

mul.s $f2, $f2, $f3 # $f2 = $f2 \* $f3

j request3 # go to loop request3

request3: # asks the user to input the unit they want to convert into

la $a0, msg6

li $v0, 4 # prompts the user to select the unit ot weight (gram, killogram, ounces, pounds)

syscall

li $v0, 5 # gets the option

syscall

move $t6, $v0 # $t6 = option

beq $t6, $t2, gramfinal # compares $t6 with $t2

beq $t6, $t3, killogramfinal # compares $t6 with $t3

beq $t6, $t4, ouncefinal # compares $t6 with $t4

beq $t6, $t5, poundfinal # compares $t6 with $t5

gramfinal: # converts gram to gram

la $a0, msg2

li $v0, 4 # display "value"

syscall

mov.s $f12, $f2

li $v0, 2 # display converted value

syscall

j exit # goto the exit loop for menu

killogramfinal: # converts gram to killogram

l.s $f3, d9 # $f3 = 1000.0

div.s $f2, $f2, $f3 # $f2 = $f2 / $f3

la $a0, msg2

li $v0, 4 # display "value"

mov.s $f12, $f2

li $v0, 2 # display converted value

syscall

j exit # go to exit loop for menu

ouncefinal: # converts killogram to ounce

l.s $f3, d10 # $f3 = 28.34952

div.s $f2, $f2, $f3 # $f2 = $f2 / $f3

la $a0, msg2

li $v0, 4 # display "value"

mov.s $f12, $f2

li $v0, 2 # display converted value

syscall

j exit # go to exit loop for menu

poundfinal: # converts killogram to to pound

l.s $f3, d11 # $f3 = 453.592

div.s $f2, $f2, $f3 # $f2 = $f2 / $f3

la $a0, msg2

li $v0, 4 # display "value"

mov.s $f12, $f2

li $v0, 2 # display converted value

syscall

j exit # go to exit loop for menu

exit:

la $a0, msg4

li $v0, 4 # print menu

syscall

li $v0, 5 # get the choice

syscall

move $t1, $v0

li $t2, 2 # $t2 = 2

li $t3, 3 # $t3 = 3

li $t4, 1 # $t4 = 1

beq $t1, $t2, main # compares $t1 and $t2

beq $t1, $t3, exitfinal # compares $t1 and $t3

beq $t1, $t4, menu\_choice # compares $t1 and $t4

la $a0, action\_invalid

li $v0, 4

syscall

j exitfinal

menu\_choice:

beq $s4, $s5, L1 # compares $s5 and $s6

beq $s4, $s6, L2 # compares $s5 and $s7

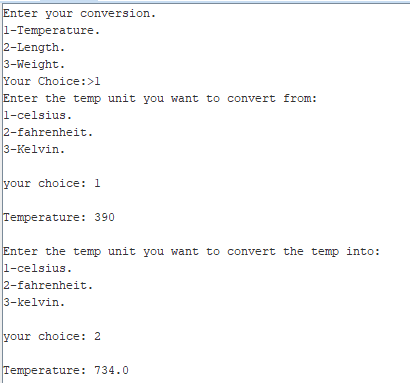
beq $s4, $s7, L3 # compares $s5 and $s8

exitfinal:

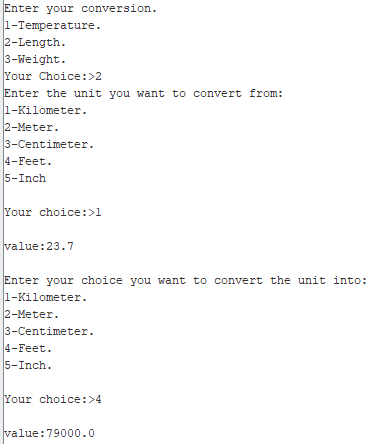
li $v0, 10 # terminates the program

syscall

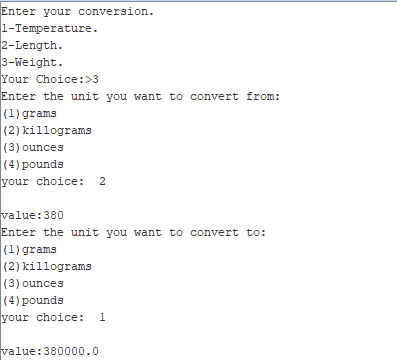
TEMPRATURE CONVERSION



LENGTH CONVERSION



WEIGHT CONVERSION



SUB-MENU

