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/*--- conv.c ---*/
//Mike Hanling

#include <stdio.h>
#include <string.h>

typedef char cstring[128];

// lenUnitCF(fromUnit,toUnit) - this function returns
// conversion factors between different units of length
// for units it understands, and returns 0.0 for units
// it does not understand.
// It understands: feet, inches, yards, miles, millimeters,
// centimeters, meters, kilometers, nautical-miles and light-years.
double lenUnitCF(cstring fromUnit, cstring toUnit);

double toFeet(cstring fromUnit); // This just helps with lenUnitCF

int main()
{
    //---- YOUR CODE GOES HERE -----//

    double init = 0.0; //the value inputted by user
    double final = 0.0; //the value in the new unit
    cstring trash; //for useless words
    cstring from; //stores original unit
    cstring to; //stores desired unit

    //scan in the user input
    scanf(" %s %lg %s %s %s", trash, &init, from, trash, to);

    //calculate the new value
    final = init*lenUnitCF(from, to);

    //print out the results
    printf("%g %s\n", final, to);

    return 0;
}

double lenUnitCF(cstring fromUnit, cstring toUnit) {
    return toFeet(fromUnit)/toFeet(toUnit);
}

double toFeet(cstring fromUnit) {
    if (strcmp(fromUnit, "feet") == 0) {
        return 1.0;
    } else if (strcmp(fromUnit, "inches") == 0) {
        return 1.0/12.0;
    } else if (strcmp(fromUnit, "yards") == 0) {
        return 3.0;
    } else if (strcmp(fromUnit, "miles") == 0) {
        return 5280;
    } else if (strcmp(fromUnit, "millimeters") == 0) {
        return 0.00328084;
    } else if (strcmp(fromUnit, "centimeters") == 0) {
        return 0.0328084;
    } else if (strcmp(fromUnit, "meters") == 0) {
        return 3.28084;
    } else if (strcmp(fromUnit, "kilometers") == 0) {
        return 3280.84;
    } else if (strcmp(fromUnit, "nautical-miles") == 0) {
        return 6076.12;
    } else if (strcmp(fromUnit, "light-years") == 0) {
        return 3.1038479e16;
    } else {
        return 0.0;
    }
}

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}
}

/*--- harm.c ---*/
//Mike Hanling

#include <stdio.h>

// I want a function harm(n) that computes the nth harmonic number, which
// is 1/1 + 1/2 + 1/3 + ... + 1/n. Can you make it for me?
// Add the prototype and definition to this file that makes the program work.

double harm(int term);

int main() {
    double target;
    printf("Enter target: ");
    fflush(stdout);
    scanf(" %lg", &target);

    double curharm = 0;
    int i = 0;
    do {
        i++;
        curharm = harm(i); //-- here's where I use harm!
    } while(curharm < target);

    printf("The %ith harmonic number is %g,"
           " which is the first greater than %g.\n",
           i, curharm, target);

    return 0;
}

double harm(int term) {
    double ans = 0.0;
    for (int i = 1; i <= term; i++) {
        ans += 1/(double)i;
    }

    return ans;
}

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