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// file: area.cpp
//
// This program calculates the area of a circle, given the radius.
//
// Programmer: Dick Furnstahl  furnstahl.1@osu.edu
//
// Revision history:
// 02-Jan-2004  original version, for 780.20 Computational Physics
// 01-Jan-2010  updates to "To do" wishlist
//
// Notes:
// * compile with:  "g++ -o area area.cpp"
//
// To do:
// 1. output the answer with higher precision (more digits)
// 2. use the "predefined" value of pi or atan
// 3. define an inline square function
// 4. split the calculation off into a function (subroutine)
// 5. output to a file (and/or input from a file)
// 6. rewrite using a Circle class
//
//*****//
// include files
#include <iostream>    // this has the cout, cin definitions
using namespace std; // if omitted, then need std::cout, std::cin
//*****//

const double pi = 3.1415926535897932385; // define pi as a constant

int
main ()
{
    double radius; // every variable is declared as int or double or ...

    cout << "Enter the radius of a circle: "; // ask for radius
    cin >> radius;

    double area = pi * radius * radius; // area formula

    cout << "radius=" << radius << ", area=" << area;

    return 0; // "0" for successful completion
}
//*****//

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SHELL=/bin/sh
# Brief notes on makefiles: Comments start with #. $(COMMAND) means
# replace with the value of COMMAND assigned with an "=".

# This file contains a set of rules used by the "make" command.
# This makefile $(MAKEFILE) tells "make" how the executable $(COMMAND)
# should be generated from the source files $(SRCS) and the header files
# $(HDRS) via the object files $(OBJS); type the command:
# "make -f make_program"
# where make_program should be replaced by the name of the makefile.
#
# To remove the OBJS files; type the command:
# "make -f make_program clean"
#
# To create a zip archive with name $(COMMAND).zip containing this
# makefile and the SRCS and HDRS files, type the command:
# "make -f make_program zip"

# The name of this makefile goes here
MAKEFILE= make_area

# The command you type to run the program (executable name)
COMMAND= area

# Here are the C++ (or whatever) source files to be compiled, with \s as
# continuation lines. If you get a "missing separator" error pointing
# to a line here, make sure that each \ has NO spaces following it.
SRCS= \
area.cpp

# Header files (if any) here
HDRS= \

#####
# Commands and options for compiling
#####
OBJS= $(addsuffix .o, $(basename $(SRCS)))

CC= g++
CFLAGS= -g -O3
WARNFLAGS= -Werror -Wall -W -Wshadow -fno-common
MOREFLAGS= -ansi -pedantic -Wpointer-arith -Wcast-qual -Wcast-align \
-Wwrite-strings -fshort-enums
LDLFLAGS= -lgsl -lgslcblas

#####
# Instructions to compile and link -- allow for different dependencies
#####

$(COMMAND): $(OBJS) $(HDRS) $(MAKEFILE)
    $(CC) -o $(COMMAND) $(OBJS) $(LDLFLAGS) $(LIBS)

area.o : area.cpp $(MAKEFILE)
    $(CC) $(CFLAGS) $(WARNFLAGS) -c area.cpp -o area.o

#####
# Additional tasks
#####

clean:
    rm -f $(OBJS)

zip:
    zip -r $(COMMAND).zip $(MAKEFILE) $(SRCS) $(HDRS)

#####
# End of makefile
#####

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# file: area0.py
#
# This program calculates the area of a circle, given the radius.
#
# Programmer: Dick Furnstahl  furnstahl.1@osu.edu
#
# Revision history:
#   26-Dec-2008  original version, translated from area.cpp
#
# Notes:
#   * run program using "python area.py"
#   * conversion from .cpp to .py:
#     * // --> # for comments on a single line
#     * drop the semicolons
#     * no variable declarations like int or double
#     * radius**2 instead of radius*radius
#     * different functions for input and output
#
# To do:
#   * output the answer with higher precision (more digits)
#   * split the calculation into a function (def)
#   * output to a file (and/or input from a file)
#
#*****#

pi = 3.141592653589793    # put in \pi by hand

answer = raw_input('Enter the radius of a circle: ') # answer is a string
radius = float(answer)  # convert to floating point number

area = pi * radius**2   # area formula; x**n is x to the n'th power

# simple printing (illustrates that either type of quotes can be used)
print 'radius=', radius, '.area=', area
print "radius=", radius, ".area=", area

# That's all, folks!

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"""
file: area1.py

This program calculates the area of a circle, given the radius.

Programmer: Dick Furnstahl  furnstahl.1@osu.edu

Revision history:
  26-Dec-2008  original version, modified from area0.py

Notes:
* run program using "python area.py"
* conversion from area0.py:
  * use three quotes for multiline comments instead of #
  * use the value of pi defined in the math module
  * do conversion from raw_input to float in one line

To do:
* output the answer with higher precision (more digits)
* split the calculation into a function (def)
* output to a file (and/or input from a file)
"""

import math    # read in the definitions from the math module

# Just do it!

# convert the input to a float right away
radius = float(raw_input('Enter the radius of a circle: '))

area = math.pi * radius**2    # area formula A = pi R^2

# partially formatted print: compare %f to %e
print 'radius = %f, area = %f' % (radius, area)
print 'radius = %e, area = %e' % (radius, area)

# now some additional digits (%.nf means n digits after decimal)
print 'radius = %.4f, area = %.8f' % (radius, area)

# That's all, folks!

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