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/*
File: bodes_law_template.cpp
Created by: Tan Qi Hao
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Synopsis:
    Computes the distances of planets Earth, Saturn, and Neptune from
the sun in
    astronomical units, miles, and meters
*/

#include <iostream>
#include <cmath>
#include <iomanip>
using namespace std;

int main()
{
    const double au_to_miles(93000000);
    const double miles_to_meters(1609.344);

    double dist_au_earth(0.0), dist_au_saturn(0.0),
dist_au_neptune(0.0);
    double dist_miles_earth(0.0), dist_miles_saturn(0.0),
dist_miles_neptune(0.0);
    double dist_meters_earth(0.0), dist_meters_saturn(0.0),
dist_meters_neptune(0.0);

    dist_au_earth = ((4 + 3 * pow( 2, 3-2)) / 10);
    dist_au_saturn = ((4 + 3 * pow( 2, 6-2)) / 10);
    dist_au_neptune = ((4 + 3 * pow( 2, 8-2)) / 10);

    dist_miles_earth = dist_au_earth * au_to_miles ;
    dist_miles_saturn = dist_au_saturn * au_to_miles;
    dist_miles_neptune = dist_au_neptune * au_to_miles;

    dist_meters_earth = dist_miles_earth * miles_to_meters;
    dist_meters_saturn = dist_miles_saturn * miles_to_meters;
    dist_meters_neptune = dist_miles_neptune * miles_to_meters;

    cout << endl << "Planet  Astro Units (est.)  Miles (est.)
Meters(est.)" << endl ;
    cout << "-----" << endl;
    cout << left << "Earth" << setw(8) << fixed << setprecision(3) <<
dist_au_earth
        << scientific << dist_miles_earth << dist_meters_earth <<
endl ;
    cout << left << "Saturn" << setw(8) << fixed << setprecision(3) <<
dist_au_saturn
        << scientific << dist_miles_saturn << dist_meters_saturn
<< endl;
    cout << left << "Neptune" << setw(8) << fixed << setprecision(3) <<
dist_au_neptune
        << scientific << dist_miles_neptune <<
dist_meters_neptune << endl ;

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        return 0;  
    }
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