main.cpp

// CSC240

//

// Created by Austin Spencer on 1/29/20.

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//

#include <iostream>

#include <math.h>

**using** **namespace** std;

**void** calculationOfMonths(**int** initialPop, **double** growthRate, **int** carryingCap, **int** goalPop, **int** table)

{

**double** bunniesOld, oldPop, bunniesNew, newPop;

**int** totalMonths;

oldPop = initialPop;

totalMonths = 0;

**if** (table == 0)

{

cout << " Month Population" << endl;

**do**

{

cout << "\t" << totalMonths << "\t" << oldPop << endl;

bunniesOld = oldPop/carryingCap;

bunniesNew = bunniesOld + (growthRate \* bunniesOld \* (1 - bunniesOld));

newPop = round(bunniesNew \* carryingCap);

oldPop = newPop;

totalMonths++;

}**while**(oldPop < goalPop);

}

**else**

{

**do**

{

bunniesOld = oldPop/carryingCap;

bunniesNew = bunniesOld + (growthRate \* bunniesOld \* (1 - bunniesOld));

newPop = round(bunniesNew \* carryingCap);

oldPop = newPop;

totalMonths++;

}**while**(oldPop <= goalPop);

cout << endl << "The population reaches " << goalPop << " after " << totalMonths << " months" << endl << endl;

}

}

**void** calculationOfBunnies(**int** initialPop, **double** growthRate, **int** carryingCap, **int** timeframe, **int** table)

{

**double** bunniesOld, oldPop, bunniesNew, newPop, i;

oldPop = initialPop;

**if** (table == 0)

{

cout << " Month Population" << endl;

**for**(i = 0; i <= timeframe; i++)

{

cout << "\t" << i << "\t" << oldPop << endl;

bunniesOld = oldPop/carryingCap;

bunniesNew = bunniesOld + (growthRate \* bunniesOld \* (1 - bunniesOld));

newPop = round(bunniesNew \* carryingCap);

oldPop = newPop;

}

}

**else**

{

**for**(i = 1; i <= timeframe; i++)

{

bunniesOld = oldPop/carryingCap;

bunniesNew = bunniesOld + (growthRate \* bunniesOld \* (1 - bunniesOld));

newPop = round(bunniesNew \* carryingCap);

oldPop = newPop;

}

cout << endl << round(oldPop) << " bunnies after " << timeframe << " months" << endl << endl;

}

}

**void** numberOfBunnies(**int** initialPop, **double** growthRate, **int** carryingCap, **int** table)

{

**int** timeframe;

**do**

{

cout << endl << "How many months from now would you like to see the bunny population? : " ;

cin >> timeframe;

cout << endl << endl;

} **while** (timeframe <= 0);

calculationOfBunnies(initialPop, growthRate, carryingCap, timeframe, table);

}

**void** numberOfMonths(**int** initialPop, **double** growthRate, **int** carryingCap, **int** table)

{

**int** goalPop;

**do**

{

cout << endl << "Please enter the number of bunnies you want to have in the population and I will tell you how many months until you can expect that many bunnies : " ;

cin >> goalPop;

cout << endl << endl;

} **while** (goalPop < initialPop && goalPop >= carryingCap);//I dont understand why this is not working properly

calculationOfMonths(initialPop, growthRate, carryingCap, goalPop, table);

}

**int** questionChoice(**int** initialPop, **double** growthRate, **int** carryingCap)

{

**int** question, keepGoing, table;

**do**

{

**do**

{

cout << endl << "Enter 0 if you like to know how many bunnies are in the population after X amount of months.. "<< endl << "Enter 1 if you would like to know how many months to get to X amount of bunnies : ";

cin >> question;

cout << endl << endl;

} **while** (question < 0 || question > 1);

**do**

{

cout << endl << "Would you like to see a table when you get your results? Enter 0 for yes or 1 for no! : ";

cin >> table;

} **while** (table < 0 || table > 1);

**if** (question == 0)

{

numberOfBunnies(initialPop, growthRate, carryingCap, table);

}

**else**

{

numberOfMonths(initialPop, growthRate, carryingCap, table);

}

cout << endl << "If you want to stop asking questions about this farm enter 0, if you want to keep asking enter a different number :";

cin >> keepGoing;

}**while**(keepGoing !=0);

cout << endl << endl << "Enter 0 if you dont want to ask about another farm, if you do want to, enter any other number? ";

cin >> keepGoing;

**if** (keepGoing == 0){

**return** 0;

}

**else** {

**do**

{

cout << endl << "Please enter the carrying capacity of bunnies on the new farm! : " ;

cin >> carryingCap;

} **while** (carryingCap <= 0);

questionChoice(initialPop, growthRate, carryingCap);

}

cout << endl << "Thanks for using my bunny growth population program! Hope you learned a lot! Good-bye!" << endl;

**return** 0;

}

**int** main()

{

**int** initialPop, carryingCap;

**double** growthRate, birthRate, deathRate;

cout << "This program will calculate the population growth of bunnies on any farm!" << endl << "I just need some quick information first and then you can ask questions!" << endl;

**do**

{

cout << endl << "Please enter the carrying capacity of bunnies on the farm! : " ;

cin >> carryingCap;

} **while** (carryingCap <= 0);

**do**

{

cout << endl << "Please enter the inital population of bunnies! : " ;

cin >> initialPop;

} **while** (initialPop < 0);

**do**

{

cout << endl << "Please enter the birth rate of bunnies as a percentage, but please leave the % sign out! : " ;

cin >> birthRate;

} **while** (initialPop < 0);

**do**

{

cout << endl << "Please enter the death rate of bunnies! : " ;

cin >> deathRate;

} **while** (deathRate < 0 && deathRate > 1);

growthRate = (birthRate - deathRate)/100;

questionChoice(initialPop, growthRate, carryingCap);

**return** 0; // End my program

}