CS 150 – 01
Programming Assignment #2
Population Projector

Date Assigned: Friday, September 21, 2007   Name: _____
Date Due: Friday, September 28, 2007
Total Points: 30 pts

You are employed by the US Census bureau to write software to project the total US population for two years. The user will input the current year, a starting population, a birth rate, and a death rate.

For both years, you need to display to the user the starting population, the number of births for that year, the number of deaths for that year, and the ending population for that year. The number of births and number of deaths each year are based on the birth and death rate, respectively, and the starting population for that year.

Finally, you must calculate the total change in population over these two years. Break down this total change into millions and thousands as shown below.

Sample input and output

```
****************************************
|         POPULATION PREDICTOR         |
****************************************
Enter the year: 2007
Enter the starting population for 2007: 301139947
Enter birth rate: 0.01416
Enter death rate: 0.00826

Year 2007
Starting Population: 301139947
Total Births: 4264142
Total Deaths: 2487416
Ending Population: 302916673

Year 2008
Starting Population: 302916673
Total Births: 4289300
Total Deaths: 2502091
Ending Population: 304703882

Total Change in population: 3563935
3563935 is
    3 million
    563 thousand
    935
```

Before you start, answer the following questions. Before you ask the instructor or TA for help you need to attempt to answer these questions.

What data will you need to store for this program?

_____

_____

_____

_____

What data types will you need to use to store each of the above data items?

_____

_____

_____

_____

What formulas will you need to use in this program?

_____

_____

_____

_____

To complete this assignment you must
1. Create a new C++ project in Visual Studio. Name your project **02Popxxxxxxxx**, where xxxxxxxx should be replaced by your PU Net Id. As an example, my project would be called "02Popkhoj0332". It is vital that you name your project correctly!
2. Type the solution (**fully documented/commented**) to the problem into your project.
3. Remember to enter in your name as the author of the program.
4. Make sure that your program compiles and runs correctly. If you get any errors, double check that you typed everything correctly. Be aware that C++ is case-sensitive.
5. Once you are sure that the program works correctly it is time to submit your program. You do this by logging on to Turing and placing your complete project folder in the **CS150-01 Drop** folder. Make sure that you copy your program folder and don't move it. If you move it, then you will not have your own copy!

Notes

1. The birth rate and death rate are always positive numbers.
2. The starting population is always a positive, whole number.
3. You must use a static cast.
4. You must use the mod (%) operator.
5. You will need to test this program thoroughly to make sure that you catch all the possible errors.
    ►For example, what happens if you swap the birth and death rates in the example input?
6. Your output must look exactly like the sample given.
7. You must comment your code appropriately.
8. Refer to the syllabus for what constitutes plagiarism, and the consequences for plagiarizing.

Submitting this project:

To receive full credit for this assignment, your project must be in the drop box by 1pm on the day that it is due. Anything later will be considered late. Further, you must bring a hard copy of **your program** and **this handout**, with the above questions answered, to class and place them **both** on the instructor's desk by 1pm. You must print out the program in color.

Do not wait until the last minute to print your program!

Good luck! And remember, if you have any problems, come and see me straight away.

Don't forget about the CS Messageboards!

Also, refer to the syllabus for assignment policies.

START EARLY!!

Good Luck!