

**CHAPMAN University**  
 Department of Computational and Data Sciences  
 CS501 Introductory Computation for Scientists  
 Fall 2019  
 Class Project#1  
 Male/Female Life Expectancy

Date Given: Sep 18, 2019

Due Date: Oct 15, 2019

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Addendum#1: Annual Growth Rate Math: Sep 23, 2019

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This class project involves writing the Python code to do the following using the dataset.

1. Compute the **annual** population percent growth from 2010 to 2015 for every age group (age code = 0 to 999) and gender (sex code = 0-2).

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Method to compute the annual growth rate is as follows. Suppose you deposit \$100 in a bank that promises 5% growth rate per annum.

Year	Amount	Account Balance
0	\$100.00	
1	\$100.00 * 1.05	\$105.00
2	\$105.00 * 1.05	\$110.25
3	\$110.25 * 1.05	\$115.76
4	\$115.76 * 1.05	\$121.55

$$After = Before * 1.05 * 1.05 * 1.05 * 1.05$$

$$After = \$100 * 1.05 * 1.05 * 1.05 * 1.05 = \$121.55$$

$$After = Before * (1 + growth\ rate)^4 = \$100 * (1 + 0.05)^4 = \$121.55$$

$$\frac{After}{Before} = (1 + growth\ rate)^4$$

$$\left(\frac{After}{Before}\right)^{\frac{1}{4}} = 1 + growth\ rate$$

$$growth\ rate = \left(\frac{After}{Before}\right)^{\frac{1}{4}} - 1$$

- If **after** and **before** are measurements of the same quantity taken **t** time units apart, then the *growth rate* is  

$$(after/before) ** (1/t) - 1$$