

INTRODUCTION TO COMPUTER PROGRAMMING

BERKELEY CITY COLLEGE

Assignment 5

Use good programming practices. Display messages so that the results are easily understandable.

1. Vowels and consonants

Write a program that reads a word and prints the number of vowels and consonants in the word. For this exercise assume that 'a', 'e', 'i', 'o', 'u', and 'y' are vowels. For example, if the user enters the input "Harry", the program should print "The word contains 2 vowels and 3 consonants".

2. Finonacci numbers

Write a program to compute the n^{th} Fibonacci number. Fibonacci numbers are recursively defined as follows:

$$\begin{aligned}f_0 &= 0 \\f_1 &= 1 \\f_k &= f_{k-1} + f_{k-2}\end{aligned}$$

where f_i is the i^{th} Fibonacci number.

(The zeroth and first Fibonacci numbers are defined as 0 and 1, respectively. Knowing the first two Fibonacci numbers we can calculate the second using the formula $f_2 = f_1 + f_0 = 1$, and so on.)

3. Interest and Mortgage Payment

Write a program that calculates the cost of a mortgage. The program should prompt for the initial values for the principal amount, the terms in years, and the interest rate. The program should output the mortgage amount per month, and show the amounts paid towards the principal amount and the monthly interest for the first three years. Determine the principal amount after the end of the first three years.

Use the following formula to calculate the mortgage payment:

$$\text{Monthly Payment} = \frac{\text{Principal} \times \text{MonthlyInterestRate}}{(1 - (1 / (1 + \text{MonthlyInterestRate})^{\text{Years} \times 12}))}$$

Use the following input:

| | | |
|--------------------------------|-------------------|---------------------|
| a) Principal Amount: \$250,000 | Yearly Rate: 6% | Number of Years: 30 |
| b) Principal Amount: \$250,000 | Yearly Rate: 7.5% | Number of Years: 30 |
| c) Principal Amount: \$250,000 | Yearly Rate: 6% | Number of Years: 15 |
| d) Principal Amount: \$500,000 | Yearly Rate: 6% | Number of Years: 30 |