

Programming Assignment 04

Group Assignment

Assigned: Wednesday 17 September

Due: By start of class, Wednesday 24 September

New engineering designs or processes frequently result in potential investment opportunities for companies. Because companies have a need to make a return on an investment in order to remain in business and, hopefully, to pass on some gains to stockholders, the practicality of any new engineering design or process needs to be measured in economic as well as technical terms. If several different designs for a process have been proposed, all of which are judged equally technically feasible, the relative desirability of one design (investment) over another can be judged based upon economic criteria. Engineering economics is used to help make decision investments based upon relevant economic considerations.

One of the simplest concepts in engineering economics is that of an interest-earning savings account. The amount of money in such an account is given by

$$B = P \left(1 + \frac{i}{100} \right)^n$$

where

- B : Balance at the end of year n , \$
- P : Principal (initial deposit), \$
- i : Simple annual interest rate, %
- n : Number of compounding periods (years in this case), dimensionless

You have been asked to design, code, and make operational a MATLAB script that will compute any of the four parameters in the above equation given values for the other three parameters. Your script is to then display annotated results showing the values of all four parameters, with the newly calculated parameter being displayed first.

For this assignment, your script must

1. Use a menu command to get the choice of which parameter to calculate.
2. Use only one function to obtain the other three parameters needed to calculate the desired value. This function must use a **if-elseif-else** decision structure. Note: You are required to use only one function to get three values, but four possible different values could result from the function. How can you handle this?
3. Use only one function to calculate the desired value (regardless of which one is desired). This function must use a **switch-case** decision structure.
4. Use one function to display the results. You may use your choice of decision structure for this function.
5. BONUS: use a while loop to have your script ask whether to repeat calculations and, if the answer is yes, cycle back to the menu command.

Turn in

1. A 3.5in floppy with your script (saved as **pa04xxx.m** where **xxx** is one of your initials).

your floppy should be labeled w/ your name(s) and
programming assignment number

2. A copy of the evaluation criteria sheet on the following page (with your name(s) filled in!).
3. A printout of your script and functions
4. A copy of a screen display that tests your script with the following values

$P = \$10,000$, $i = 2.5\%$, $n = 10$ years

$B = \$25,000$, $i = 3.3\%$, $n = 10$ years

$P = \$10,000$, $B = \$25,000$, $n = 10$ years

$P = \$10,000$, $B = \$25,000$, $i = 5.0\%$

5. Please staple (do not dog-ear) items 2, 3, and 4 together.

You will be evaluated on programming style as well as correctness of results. Your script (and functions) must each contain

1. The full header section (w/ needs and results)
2. A variable dictionary
3. Appropriate comments/whitespace
4. MATLAB statements to achieve the purpose of the script/function

Your user interface (screen display when the program is run) must

Display your header when first run

Ask for input values in appropriate units

Report results with appropriate units

Have appropriate whitespace and be easy to read

The evaluation algorithm is provided on the following page.

Programming Assignment 04 - Evaluation Criteria

Name(s) _____

Criteria	Points Available	Points Awarded
Script Requirements		
Used menu to get option	10	
One function to get input	10	
used if-elseif	10	
One function to compute	10	
used switch-case	10	
One function to display	10	
Output		
Script ran	10	
Results agree with printout	20	
Results correct	20	
Desired value first in display	10	
BONUS	20	
Points to lose total		
	Total Pts:	/120

Points to Lose Criteria	Max Points	Points Lost
Header does not display	10	
Header missing from any function	10	
Variable dictionary missing from any function	10	
Names not meaningful	10	
Poor whitespace/readability	10	
Poor commenting	10	
Poor user interface	10	
	Total Pts:	