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```
function [estimate,difference] = PS08_ln3_noloop_rbehl(n)

%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
% ENGR 132
% Program Description
%The program compute the vale of ln(3) for a given number of terms and
% without using a loop and also checks for invalid inputs
% Function Call
%[estimate,difference] = PS08_ln3_noloop_rbehl(n)
%
% Input Arguments
%n is the number of terms and is a scalar output
%
% Output Arguments
% estimate is the estimated value of ln(3)
% difference is the abs difference betwee nthe estimate and the value
 of
% log(3)

% Assignment Information
%   Assignment:        PS 08, Problem 04
%   Author:             Ranjan Behl, rbehl@purdue.edu
%   Team ID:            ###-##
%   Contributor:   Name, login@purdue [repeat for each]
%   My contributor(s) helped me:
%     [ ] understand the assignment expectations without
%         telling me how they will approach it.
%     [ ] understand different ways to think about a solution
%         without helping me plan my solution.
%     [ ] think through the meaning of a specific error or
%         bug present in my code without looking at my code.
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
```

INITIALIZATION

```
estimate = -99; % the preset value of estimate of ln(3)
```

```
difference = -99; % the preset value of the difference between ln(3)
 and log(3)
```

CALCULATIONS

```
if n <= 0 % checks to see if n is invalid
    fprintf("\n ERROR: invalid n");
    fprintf("\n The apporoximation for ln3 is %f and \n the difference
 between apporoximation and MATLAB log(3) is %f",estimate,difference);
elseif isscalar(n) == 0 % checking to see if n is a valid scalar
    fprintf("\n ERROR: invalid n");
    fprintf("\n The apporoximation for ln3 is %f and \n the difference
 between apporoximation and MATLAB log(3) is %f",estimate,difference);
elseif floor(n) == ~n % checks if n is a integer value
    fprintf("\n ERROR: invalid n");
    fprintf("\n The apporoximation for ln3 is %f and \n the difference
 between apporoximation and MATLAB log(3) is %f",estimate,difference);
else
    k = (0:(n-1)); % vector that holds all the possible n values
    estimate = (1./4.^k).*(1./((2.*k)+1)); % calculates the formula
 through the vector k
    sumestimate = sum(estimate); %summation
    difference = abs(log(3) - sumestimate); % finding the abs
 difference
    fprintf("\n The apporoximation for ln3 is %f and \n
 the difference between apporoximation and MATLAB log(3) is
 %f",sumestimate,difference);
end
```

The apporoximation for ln3 is 1.098612 and
the difference between apporoximation and MATLAB log(3) is 0.000000

COMMAND WINDOW OUTPUT

Test case n = 8

```
%{
[estimate,difference] = PS08_ln3_noloop_rbehl(8)

 The apporoximation for ln3 is 1.098611 and
 the difference between apporoximation and MATLAB log(3) is 0.000001

ans =

    1.0000    0.0833    0.0125    0.0022    0.0004    0.0001    0.0000
    0.0000
```

```
%}
% Test case n = 12
%{
[estimate,difference] = PS08_ln3_noloop_rbehl(12)

 The apporoximation for ln3 is 1.098612 and
 the difference between apporoximation and MATLAB log(3) is 0.000000

estimate =

    1.0000    0.0833    0.0125    0.0022    0.0004    0.0001    0.0000
    0.0000    0.0000    0.0000    0.0000    0.0000


difference =

   3.1038e-09
%}
% Test case n = 24
%{
 [estimate,difference] = PS08_ln3_noloop_rbehl(24)

 The apporoximation for ln3 is 1.098612 and
 the difference between apporoximation and MATLAB log(3) is 0.000000

estimate =

  Columns 1 through 16

    1.0000    0.0833    0.0125    0.0022    0.0004    0.0001    0.0000
    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000
    0.0000    0.0000

  Columns 17 through 24

    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000
    0.0000


difference =

   6.6613e-16
%}
% Test case n = -0.25
%{
[estimate,difference] = PS08_ln3_noloop_rbehl(-0.25)

 ERROR: invalid n
 The apporoximation for ln3 is -99.000000 and
 the difference between apporoximation and MATLAB log(3) is -99.000000

estimate =

   -99
```

```
difference =

   -99
%}
```

ACADEMIC INTEGRITY STATEMENT

```
PS07_integrity_rbehl(["Ranjan Behl"]);


I am submitting code that is my own original work. I have not used
source code, either modified or unmodified, obtained from any
unauthorized source.  Neither have I provided access to
my code to any peer or unauthorized source. Signed,
 <Ranjan Behl>

ans =

  Columns 1 through 7

    1.0000    0.0833    0.0125    0.0022    0.0004    0.0001    0.0000

  Columns 8 through 14

    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000

  Columns 15 through 21

    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000

  Columns 22 through 25

    0.0000    0.0000    0.0000    0.0000
```

Published with MATLAB® R2018b