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```
function [estimate,difference] = PS08_ln3_approx_rbehl_jchapla(n)

%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
% ENGR 132
% Program Description
% The program compute the vale of ln(3) for a given number of terms
% and
% also checks for invalid inputs
%
% Function Call
%[estimate,difference] = PS08_ln3_approx_rbehl_jchapla(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 between nthe estimate and the value
% of
% log(3)
%
% Assignment Information
% Assignment:      PS 08, Problem 3
% Team ID:        008-14
% Paired Partner:  Ranjan Behl, rbehl@purdue.edu
% Paired Partner:  John Chapla, jchapla@purdue.edu
% Contributor:     Name, login@purdue [repeat for each]
% Our contributor(s) helped us:
%   [ ] understand the assignment expectations without
%       telling us how they will approach it.
%   [ ] understand different ways to think about a solution
%       without helping us plan our solution.
%   [ ] think through the meaning of a specific error or
%       bug present in our code without looking at our 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)
i = 0; % the index counter
```

---

## CALCULATIONS

```
if isscalar(n) % checking to see if n is valid
    if floor(n) == n % checks if n is a integer
        if n > 0 % sees if in is greater than zero and this postive
            estimate = 0;
            while i <= n-1 % runs until the index is greater than n
-1
                estimate = estimate + ((1 / 4^i) * (1 / (2 * i
+1))))); % calculating ln(3)
                i = i + 1;
            end
            difference = abs(log(3) - estimate); % finding the
abs difference between ln(3) and log(3)
        else n < 0
            fprintf("\n invalid n, n must be a postive integer");
        end
    else
        fprintf("\n invalid n, n must be a integer");
    end
end
else
    fprintf("\n invalid n, n must be a scalar value");
end
fprintf("\n The apporoximation for ln3 is %f and \n the difference
between apporoximation and MATLAB log(3) is %f",estimate,difference);
```

```
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 = 6
%{
[estimate,difference] = PS08_ln3_approx_rbehl_jchapla(6)

The apporoximation for ln3 is 1.098588 and
```

---

```

    the difference between apporoximation and MATLAB log(3) is 0.000024
    estimate =

        1.0986

difference =

    2.4006e-05
%}
% Test case n = -1
%{
    invalid n, n must be a postive integer
    The apporoximation for ln3 is -99.000000 and
    the difference between apporoximation and MATLAB log(3) is -99.000000
    estimate =

        -99

difference =

        -99
%}
% Test case n = 0
%{

    invalid n, n must be a postive integer
    The apporoximation for ln3 is -99.000000 and
    the difference between apporoximation and MATLAB log(3) is -99.000000
    estimate =

        -99

difference =

        -99
%}
% Test case n = [1;2]
%{

>[estimate,difference] = PS08_ln3_approx_rbehl_jchapla([1;2])

    invalid n, n must be a scalar value
    The apporoximation for ln3 is -99.000000 and
    the difference between apporoximation and MATLAB log(3) is -99.000000
    estimate =

        -99

difference =

```

---

---

-99

```
%}  
% Test case n = 5  
%{  
[estimate,difference] = PS08_ln3_approx_rbehl_jchapla(5)  
  
The apporoximation for ln3 is 1.098500 and  
the difference between apporoximation and MATLAB log(3) is 0.000113  
estimate =  
  
1.0985  
  
difference =  
  
1.1278e-04  
%}  
% Test case n = 10  
%{  
[estimate,difference] = PS08_ln3_approx_rbehl_jchapla(10)  
  
The apporoximation for ln3 is 1.098612 and  
the difference between apporoximation and MATLAB log(3) is 0.000000  
estimate =  
  
1.0986  
  
difference =  
  
5.8883e-08  
%}  
% Test case n = 20  
%{  
[estimate,difference] = PS08_ln3_approx_rbehl_jchapla(20)  
  
The apporoximation for ln3 is 1.098612 and  
the difference between apporoximation and MATLAB log(3) is 0.000000  
estimate =  
  
1.0986  
  
difference =  
  
2.9754e-14  
%}
```

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# ACADEMIC INTEGRITY STATEMENT

```
PS07_integrity_rbehl(["Ranjan Behl","John Chapla"]);
```

*We are submitting code that is our own original work. We have not used source code, either modified or unmodified, obtained from any unauthorized source. Neither have we provided access to our code to any peer or unauthorized source. Signed,*  
*<Ranjan Behl>*  
*<John Chapla>*

*ans =*

*1.0986*

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