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```
function [Sqrt_2Value, Abs_difference] =
 PS10_sqrt2_asartor_hkolagan(n)

%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
% ENGR 132
% Program Description
%   ... Accepts the number of terms to sum the in the taylor series to
%   compute square root 2, returns the square root two approximation
 as
%   well as the absolute differene
%
% Function Call
%  ...PS10_sqrt2_asartor_hkolagan(n)
%
% Input Arguments
%   1. ..."n"- number of terms to summate
%
% Output Arguments
%   1. ...[Sqrt_2Value, Abs_difference]
%
% Assigment Information
%   Assignment:       PS10 Problem 2
%   Author:             Andrew Sartorio, asartor@purdue.edu
%   Team ID:            125-12
%   Paired Programmer:  Harith Kolaganti, hkolagan@purdue.edu
%   Contributor:        Name, login@purdue [repeat for each]
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
```

INITIALIZATION

```
%Initializes acceptable "n" inputs, cannot be a negative number
y=0;
if n < 0
```

```
    disp('Error: Invalid "n" value')
    y=1;
end

%Initializes the estimate at 0
Sqrt_2value = 0;
```

CALCULATIONS

```
%For acceptable inputs, the for loop will run, and calculate an
%approxomation of root 2 according to a taylor series, summating "n"
 number
%of terms
if y == 0

    for index = 0:1:(n-1)
        numerator = factorial(2*index+1);
        denomonator = (2^(3*index+1))*(factorial(index))^2;
        Next_term = numerator/denomonator;
        Sqrt_2value = Sqrt_2value + Next_term;
    end

    Abs_difference = abs(sqrt(2) - Sqrt_2value);
```

FORMATTED TEXT DISPLAYS

```
fprintf('Our Square Root 2 value is %.10f\n and our Absolute
 Difference is %.10f\n', Sqrt_2value, Abs_difference)
```

```
Our Square Root 2 value is 1.3652954102
 and our Absolute Difference is 0.0489181522
```

```
end
```

COMMAND WINDOW OUTPUTS

```
%Input positive integer n=6
%PS10_sqrt2_asartor_hkolagan(6)
%Our Square Root 2 value is 1.3652954102
%and our Absolute Difference is 0.0489181522

%Input negative integer n=-1
%PS10_sqrt2_asartor_hkolagan(-1)
%Error: Invalid "n" value
```

```
%PS10_sqrt2_asartor_hkolagan(10)
%Our Square Root 2 value is 1.4104420692
%and our Absolute Difference is 0.0037714932

%PS10_sqrt2_asartor_hkolagan(25)
%Our Square Root 2 value is 1.4142133885
%and our Absolute Difference is 0.0000001739

%PS10_sqrt2_asartor_hkolagan(50)
%Our Square Root 2 value is 1.4142135624
%and our Absolute Difference is 0.0000000000
```

ACADEMIC INTEGRITY STATEMENT

I/We have not used source code obtained from any other unauthorized source, either modified or unmodified. Neither have I/we provided access to my/our code to another. The project I/we am/are submitting is my/our own original work.

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