# Table of Contents



```
function [layer, aTemp] = PS09_atm_temp_hkolagan(height)

%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
% ENGR 132
% Program Description
%   Uses information from the US Standard Atmosphere 1976 to calculate
 the
%   idealized temperature at any altitude below 51 kilometers and
 states
%   where in the atmosphere the altitude is located.
%
% Function Call
%   [layer, aTemp] = PS09_atm_temp_hkolagan(height)
%
% Input Arguments
%   1. height
%
% Output Arguments
%   1. layer
%   2. aTemp
%
% Assigment Information
%   Assignment:       PS 09, Problem 2
%   Author:             Harith Kolaganti, hkolagan@purdue.edu
%   Team ID:            005-12
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
```

# INITIALIZATION

Strings

```
layerTrps = 'Troposphere';
```

```
layerTrp = 'Tropopause';
layerStr = 'Stratosphere';
layerStrp = 'Stratopause';

% Base Temp, Base Height, Temp Lapse Arrays
Trps = [288.15 0 -6.5];
Trp = [216.65 11 0];
Str3 = [216.65 20 1];
Str4 = [228.65 32 2.8];
Strp = [270.65 47 0];
```

# CALCULATIONS

```
if (height >= 0 && height < 11)
    aTemp = Trps(1) + Trps(3)*(height - Trps(2));
    layer = layerTrps;
elseif (height >= 11 && height < 20)
    aTemp = Trp(1) + Trp(3)*(height - Trp(2));
    layer = layerTrp;
elseif (height >= 20 && height < 32)
    aTemp = Str3(1) + Str3(3)*(height - Str3(2));
    layer = layerStr;
elseif (height >= 32 && height < 47)
    aTemp = Str4(1) + Str4(3)*(height - Str4(2));
    layer = layerStr;
elseif (height >= 47 && height < 51)
    aTemp = Strp(1) + Strp(3)*(height - Strp(2));
    layer = layerStrp;
else
    fprintf('Error. Height Outside Boundaries');
end
```

# FORMATTED TEXT DISPLAYS

```
fprintf('Atmospheric Temperature = %.2f K\n', aTemp)
fprintf('Atmospheric Layer = %s\n', layer)
```

```
Atmospheric Temperature = 239.85 K
Atmospheric Layer = Stratosphere

ans =

Stratosphere
```

# COMMAND WINDOW OUTPUTS

For each test case, paste the function call and results displayed in the Command Window as comments under the COMMAND WINDOW OUTPUTS section of your function file.

```
% PS09_atm_temp_hkolagan(10)
% Atmospheric Temperature = 223.15 K
% Atmospheric Layer = Troposphere

% PS09_atm_temp_hkolagan(19)
% Atmospheric Temperature = 216.65 K
% Atmospheric Layer = Tropopause

% PS09_atm_temp_hkolagan(30)
% Atmospheric Temperature = 226.65 K
% Atmospheric Layer = Stratosphere

% PS09_atm_temp_hkolagan(34)
% Atmospheric Temperature = 234.25 K
% Atmospheric Layer = Stratosphere

% PS09_atm_temp_hkolagan(50)
% Atmospheric Temperature = 270.65 K
% Atmospheric Layer = Stratopause

% PS09_atm_temp_hkolagan(-1)
% Error. Height Outside Boundaries

% PS09_atm_temp_hkolagan(52)
% Error. Height Outside Boundaries
```

# 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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