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Question: Problem HW4P4 (16 points) Early explorers often estimated alt...

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this is a matlab question

Problem HW4P4 (16 points)

Early explorers often estimated altitude by measuring the temperature of boiling water. The relationship between the height, pressure and boiling temperatures is shown by the following two equations.

$$p = 29.921(1 - 6.8753 \times 10^{-6}h), \quad T_b = 49.161 \ln p + 44.932$$

where p is atmospheric pressure in inches of mercury, T_b is the boiling temperature in °F, and h is the altitude in ft.

- a) (8 pts) Write a script file HW4P4a.m that does the following:
- (1 pt) Creates a variable H for the altitude which must go from -500 ft to 10,000 ft at an increment of 500 ft,
 - (3pts) Uses the previous 2 equations to determine P and T_b ,
 - (2 pts) Creates a table of three columns, the first is the altitude in ft, the second is the pressure in inches of mercury and the third is the boiling temperature in °F,
 - (2 pts) Saves the table values in an ascii file format called HW4P4a.txt.

If it is required to convert all the units to SI system where the height will be in meters, the pressure in bar and the temperature in °C. This can be done using the following conversion equations:

$$\begin{aligned}
 h(m) &= h(ft) \times 0.3048 \\
 p(bar) &= b(inch \text{ mercury}) \times 0.03386 \\
 T(^{\circ}C) &= (T(^{\circ}F) - 32) \times 5/9
 \end{aligned}$$

- b) (8 pts) Write another script file HW4P4b.m that does the following:
- (1 pt) Loads the data file HW4P4a.txt and assign it to a variable HPT_En,
 - (2 pts) Assigns the first column to a variable H_ft , the second column to a variable P_inHg and the third column to a variable T_F ,
 - (3 pts) Uses the previous equations to find the corresponding variables in SI, H_m , P_bar and T_C .
 - (2 pts) Creates a Table_SI of the SI variables and displays this table in the Command Window without using neither the **disp** function nor the **fprintf** function.

Use format short g for this problem.

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Expert Answer



Peter Adams answered this
796 answers

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a)

Program code screen shot: HW4P4.m

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```

%% The relationship between the height, pressure
%% and boiling temperature
%% The pressure equation to determine the pressure
p = @(h) 29.921*(1 - 6.8753*10^(-6)*h);

%% The temperature equation to determine the temperature
T = @(p) 49.161*log(p)+ 44.932;

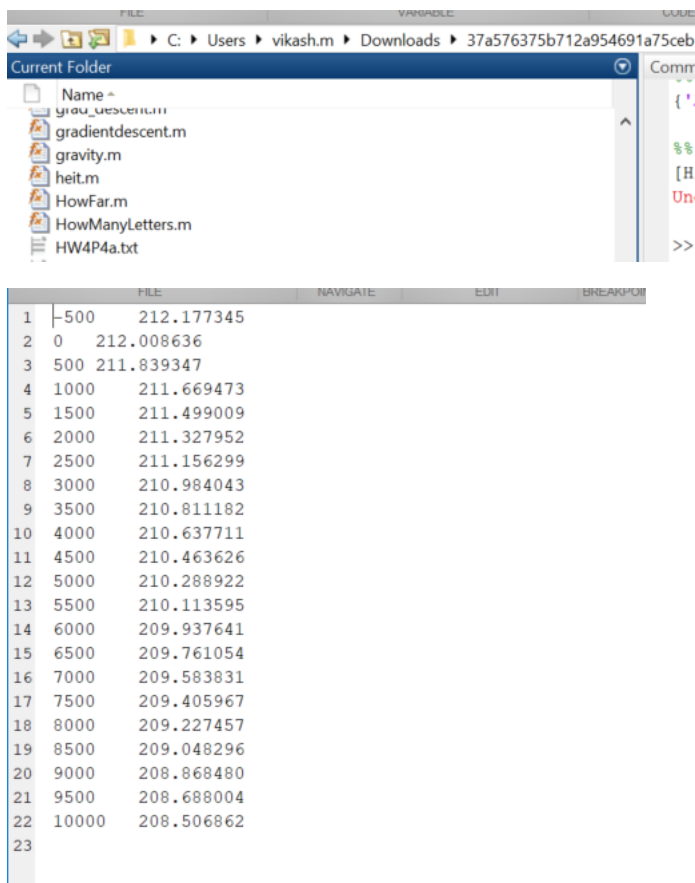
%% save the file HW4Prob4.txt
fid = fopen('HW4P4a.txt','w');

%% Create the variable H for the altitude which
%% must go from -500ft
%% to 10,000 ft with increment of 500 ft
for H = -500:500:10000

    %% write the values into the file
    fprintf(fid, '%d\t%f\n', H, T(p(H)));
end

```

Sample output:



The screenshot shows the MATLAB IDE interface. The top part displays a file explorer window for the 'Current Folder' (C:\Users\vikash.m\Downloads\37a576375b712a954691a75ceb). It lists several files: 'grad_descent.m', 'gradientdescent.m', 'gravity.m', 'heit.m', 'HowFar.m', 'HowManyLetters.m', and 'HW4P4a.txt'. The bottom part shows the output of the script, displaying a table of altitude (H) and temperature (T) values for every 500 feet from -500 to 10000.

Line	H	T
1	-500	212.177345
2	0	212.008636
3	500	211.839347
4	1000	211.669473
5	1500	211.499009
6	2000	211.327952
7	2500	211.156299
8	3000	210.984043
9	3500	210.811182
10	4000	210.637711
11	4500	210.463626
12	5000	210.288922
13	5500	210.113595
14	6000	209.937641
15	6500	209.761054
16	7000	209.583831
17	7500	209.405967
18	8000	209.227457
19	8500	209.048296
20	9000	208.868480
21	9500	208.688004
22	10000	208.506862
23		

Program code to copy:

```

%% The relationship between the height, pressure
%% and boiling temperature
%% The pressure equation to determine the pressure
p = @(h) 29.921*(1 - 6.8753*10^(-6)*h);

%% The temperature equation to determine the temperature
T = @(p) 49.161*log(p)+ 44.932;

%% save the file HW4Prob4.txt
fid = fopen('HW4P4a.txt','w');

%% Create the variable H for the altitude which

```

```
%% must go from -500ft
%% to 10,000 ft with increment of 500 ft
for H = -500:500:10000
```

```
    %% write the values into the file
    fprintf(fid,'%d %f',H,T(p(H)));
end
```

b)

Program code screen shot:

```
%% Load the HW4P4a.txt data file
load('HW4P4a.txt');

%% Change the display the style format to short g
format short g;

%% by the help of HLoaded to copy the 1st column
Hloaded = HW4P4a(:,1);

%% by the help of TLoaded to copy the 1st column
Tloaded = HW4P4a(:,2);

%% Display the result from this message
{'Altitude','Boiling Temperature';'(ft)','(degF)'}

%% Display the result without using disp or fprintf
[Hloaded Tloaded]
```

Sample output:

```
ans =

2x2 cell array

    'Altitude'    'Boiling Temperature'
    '(ft)'        '(degF)'
```

```
ans =

    -500    212.18
         0    212.01
        500    211.84
       1000    211.67
       1500    211.5
       2000    211.33
       2500    211.16
       3000    210.98
       3500    210.81
       4000    210.64
       4500    210.46
       5000    210.29
       5500    210.11
       6000    209.94
       6500    209.76
       7000    209.58
       7500    209.41
       8000    209.23
       8500    209.05
       9000    208.87
       9500    208.69
      10000    208.51
```

```
>> |
```

Program code to copy:

```
%% Load the HW4P4a.txt data file
load('HW4P4a.txt');

%% Change the display the style format to short g
```

```
format short g;

%% by the help of HLoaded to copy the 1st column
Hloaded = HW4P4a(:,1);

%% by the help of TLoaded to copy the 1st column
Tloaded = HW4P4a(:,2);

%% Display the result from this message
('Altitude','Boiling Temperature','(ft)','(degF)')

%% Display the result without using disp or fprintf
[Hloaded Tloaded]

Comment >
```

Questions viewed by other students

Q: MATLAB problem. Would like a detailed answer line by line.

A: [See answer](#) 100% (1 rating)

Q: NAME: LAB SECTION: Problem HW5P3 (20 points) Early explorers often estimated altitude by measuring the temperature of boiling water. The relationship between the altitude, pressure and boiling temperatures is shown by the following two equations. $p=29.921(1 - 6.8753 \times 10^{-6}h)$ (1). $T_o = 49.161 \ln p + 44.932$ (2) where p is atmospheric pressure in inches of mercury, T) is the boiling...

A: [See answer](#) 100% (3 ratings)

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