

Read all instructions
before beginning your work.

COMP1200- MATLAB - Assign 04
Due 11:59 pm – Friday – July 10th
Submit assign04.m via Canvas

NOTE: Your submitted file(s) MUST
be spelled and cased as instructed.

Program: Assign04.m

The distance to the horizon increases as you climb a mountain (or a hill). The expression

$$d = \sqrt{2rh + h^2}$$

where

d = distance to the horizon,
 r = radius of the earth, and
 h = height of the hill.

can be used to calculate that distance. The distance depends on how high the hill is and the radius of the earth (or another planetary body). Read the heights and print a table with columns: the planet number, mountain height (miles), and distance from the horizon (miles). Print the highest mountain on each planet at the end of the report.

The information about some of the mountains on Mars and Earth is stored in the text data file,

`mountainHeights.txt`,

where

11 is the number of mountains for loop control when reading,
4 and 3 are planet ID numbers to determine where the mountain is,
and the second column is the height of the mountains.

Note that

Earth's diameter is 7926 miles.
Mars' diameter is 4217 miles.

Mars, 4th planet from the sun Mons (mountain)	Height* (km)
Arsia Mons	16.0
Ascraeus Mons	18.0
Elysium Mons	12.5
Olympus Mons	27.0
Pavonis Mons	8.7
Earth, 3rd planet from the sun Mountains	Height* (ft)
Mount Everest	29029
Aconcagua	22841
Lookout	2392
McKinley	20320
Rainier	14410
Mitchell	6684

* <http://en.wikipedia.org>

Problem Constants:

filename
earth_diameter is 7926 miles
mars_diameter is 4217 miles

Problem Inputs:

Problem Outputs:

Other variables:

Equations:

Algorithm:

```
% prepare file to read  
  
% check if the file has been opened  
  
% CONSTANT VALUES
```

New commands
fopen
end program if not good open
fscanf
fprintf
CONSTANT variables

```
% print table title and column headers

% read first value in file; number of mountains
numMtn = fscanf(fileID, '%d', 1);
% read the values from data file using fscanf.

% compute distance from horizon

% print table with planet number and

% mountain height and distance from horizon in miles

% table footer
fprintf('* Units = miles\n\n')
% print highest mountain height for each planet
```

Sample Input/Output:

Distance from Mountain Peak and Horizon

Planet Number	Mountain Height*	Horizon Distance*
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4	9.9	205.0
4	11.2	217.5
4	7.8	181.2
4	16.8	266.5
4	5.4	151.1
3	5.5	208.8
3	4.3	185.2
3	0.5	59.9
3	3.8	174.7
3	2.7	147.1
3	1.3	100.2

* Units = miles

mountainHeights.txt

```
11
4 16.0
4 18.0
4 12.5
4 27.0
4 8.7
3 29029.0
3 22841.0
3 2392.0
3 20320.0
3 14410.0
3 6684.0
```

The highest mountain on Mars: 16.8 miles

The highest mountain on Earth: 5.5 miles

General Instructions:

- ☐ Insert comments at the top and throughout each file
 - o Include the follow comments at the beginning of this (and ALL) files.
 - % your name
 - % assignment number
 - % date you completed the assignment
 - % a short narrative about what the file does
 - o Use the algorithm as comments throughout each file
- ☐ Use descriptive variable names.
- ☐ Use Sample Input/Output as a guide.
 - o Use fscanf to read one number at a time from the text file
 - o Save the name of the data file as a CONSTANT.
 - o Use fprintf for printing with one decimal place for height and distance.
 - o Use title and column headers
 - o Print column numbers right-aligned.
- ☐ Indent all blocks.

NOTE: Your submitted file(s) MUST be spelled and cased as instructed.

Submit via Blackboard:

Assign04.m

mountainHeights.txt

.m script program file

The data file that you downloaded needs to be submitted so that there is a copy in your submission folder for your program to read.