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% Taylor Stark
% Section 04
% Exam3 - Main code. Trajectory analysis.

clc;
clear;
delete(allchild(0));

% intro to the user
waitfor(msgbox('Hi! Select 3 trajectories to check landing on star!'));

% allows user to pick the excel file
filename = uigetfile('.xlsx');

% calls function UploadandFiltersData 3 seperate times
[vecXs,vecYs,TrajPicked,powertype] = UploadandFiltersData(filename);
[vecXs_2,vecYs_2,TrajPicked_2,powertype_2] = UploadandFiltersData(filename);
[vecXs_3,vecYs_3,TrajPicked_3,powertype_3] = UploadandFiltersData(filename);

% calls function Graphingplots
GraphingTrajectories(vecXs,vecYs,TrajPicked,powertype,vecXs_2,vecYs_2,TrajPicked_2,
powertype_2,vecXs_3,vecYs_3,TrajPicked_3,powertype_3,filename);
```

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function [vecXs,vecYs,TrajPicked,powertype] = UploadandFiltersData(filename)
% Use as: [vecXs,vecYs,TrajPicked,powertype] = UploadandFiltersData(filename)
%
% This uploads data from an excel sheet that was picked by the user and
% then filters the data
%
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% Section 04

% ****filename for running/checking if it works****
% filename = 'AllMyTrajectoriesData1.xlsx'; %*****

% upload the excel file that was picked
[nums,txt] = xlsread(filename);

% get the trajectory numbers
numTraject = nums(:,1);

% make sure no duplicates of the trajectory numbers
NODUPnumTraject = unique(numTraject);

% convert from number array to cell array
NODUPcellTrajet = num2cell(NODUPnumTraject);

% ask the user what trajectory they want
TrajPicked = NODUPcellTrajet(menu('What trajectory do you want?',NODUPcellTrajet)); %this
is the trajectory picked in a cell array
TrajPicked = cell2mat(TrajPicked); %this converts the trajectory picked from cell array
to number array

% filter out x and y coordinates from the trajectory that was picked
truefalse = (nums(:,1)==TrajPicked);
vecXs = nums(truefalse,2);
vecYs = nums(truefalse,3);

% take out the first 2 lines in the txt, not needed
txt(1:2,:) = []; % first 2 lines in txt are only for labeling and not needed

% filter out the powertype
powertype = txt(truefalse,5);

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function GraphingTrajectories(vecXs,vecYs,TrajPicked,powertype,vecXs_2,vecYs_2,
TrajPicked_2,powertype_2,vecXs_3,vecYs_3,TrajPicked_3,powertype_3,filename)
% Use as: GraphingTrajectories(vecXs,vecYs,TrajPicked,powertype,vecXs_2,vecYs_2,
TrajPicked_2,powertype_2,vecXs_3,vecYs_3,TrajPicked_3,powertype_3,filename)
%
% This function loads a matrix file and plots all of the vectors given
%
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% Section 04

% loads matrix file
load('planets.mat');

% take out the .xlsx from the filename
filenameONLY = filename(1,1:end-5);

% message for the title
TheTitleGraph = sprintf('Trajectories to Star from: %s',filenameONLY);

% strings for the legend
Traject1msg = sprintf('Traj#%d (%s)',TrajPicked,powertype);
Traject2msg = sprintf('Traj#%d (%s)',TrajPicked_2,powertype_2);
Traject3msg = sprintf('Traj#%d (%s)',TrajPicked_3,powertype_3);

% plots the star
plot(xstar,ystar,'p',vecXs,vecYs,'--',vecXs_2,vecYs_2,'-',vecXs_3,vecYs_3,'-.',xearth,
yearth,'-');
title(TheTitleGraph,'FontWeight','bold');
legend('Star',Traject1msg,Traject2msg,Traject3msg,'Location','Best');
text(0,0,'Earth'); % displays 'Earth' at (0,0)
axis equal;

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