**HUBERT BALOS**

Text

Description automatically generated**Programming Coursework November 2020**

All the necessary libraries imported at the start of the code.

Line 13 reads the planet names and detection method from the excel sheet and writes them into separate arrays as strings.

Line 14 reads the orbital period, semi major axis, and star mass from the excel sheet and writes them into separate arrays as floats.

Text

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Loop used to split orbital periods into two arrays based on which detection method was used to find them.

A new array called nothing is created.

Then this piece of code iterates through the arrays: period, semimajor and starmass looking for empty cells, and if they find any their index is appended to the nothing array.

Finally, the items with indexes found in the nothing array are removed from all 5 lists. Hence removing whole rows if any data is missing from any cell in the row.

Chart, histogram

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This code plots a histogram of Orbital period against Number of planets, of orbital periods from 0 to 2500.

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This code plots a histogram of Star mass against Number of planets, for planets with star masses from 1 to 5.

Loop used to split star masses into two arrays based on which detection method was used to find them.

Chart, histogram

Description automatically generated

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Description automatically generated

This code plots a histogram of Star mass against Number of planets, for planets with star masses from 1 to 5.

Chart, bar chart

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A line of best fit is added to the graph using this code.

All the point for the necessary graph are plotted using the following code, with labelled axes.

This code looks for star masses less than 0.7 and orbital periods greater than 10,000 and saves their indexes in the array badvalue, then creates 3 new arrays for period, star mass, and semi major axis, without the items found under the indexes in the array badvalue.

A picture containing text

Description automatically generatedChart, scatter chart

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My results seem to confirm Keplar’s 3rd law as the trend line shows a positive linear correlation so the gradient is constant, therefore T^2 is proportional to a^3.

Gradient = 8x10^7 / 600 = 133,333 days^2 x M☉ / AU^3

4π^2 / G = 133,333 days^2 x M☉ / AU^3

G = 6.64 X 10^-11 m / s^2 x kg^2

Which is rather close to the actual value of G which is 6.67 X 10^-11 m / s^2 x kg^2.