On predicting a multivariable function (40 Points)

The problem:

Imagine f is a function of some variables: x\_1, x\_2,..., x\_n. We have several observations of this function, each observation is the value of each x\_i and the value of f for those inputs. What we want to do, is to predict f for inputs other than our observations.

Part I:

Do this problem in 1 dimension. You must write a program which reads the observations from an input file (Observations.txt) and reads another file (Queries.txt) which includes a set of numbers as input, for those numbers you must write your prediction of f in a file (Prediction.txt).

To do this, you must use Estimators. Use the following estimators (for each estimator you must write a separate program) :

For each case, plot the observations and also plot the graph of predicted f for a given domain.

Compare your estimators; which method works better for each set of input and queries? What do you learn from this?

Part II:

Now do this problem in 2 dimensions. Notice that this time, your plots are 3D plots of the points and of a 2D surface (which is the predicted f(x\_1,x\_2) ).

Now make a program to do this, for N (N is given in the input) variable, this case does not need you to plot anything.