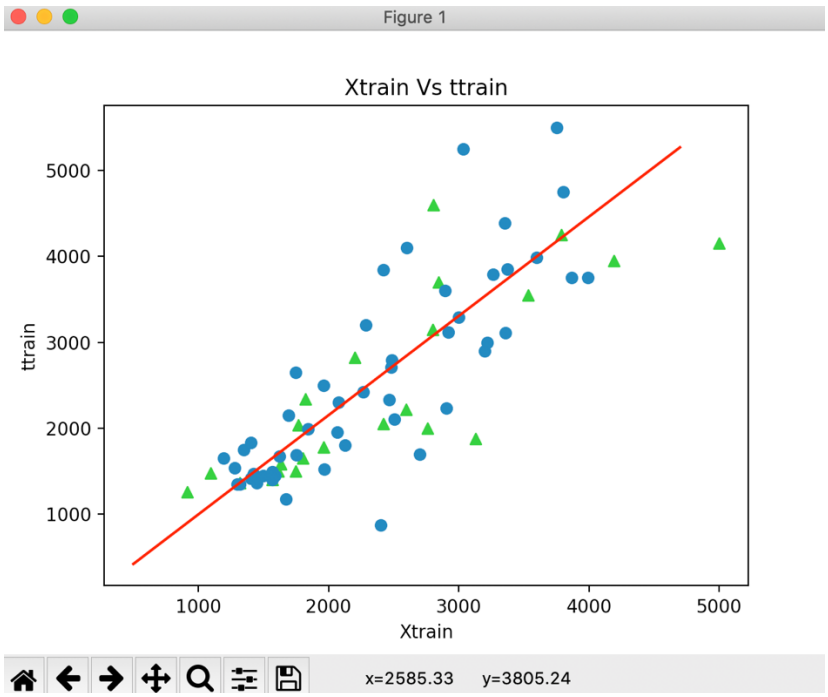
Hw1 Implementation Report

Simple Regression (Part 1) Answer done in simple.py:

- **Code Output from console:**
    - Params: [-156.82270216   1.15418452]
    - Training RMSE: 640.84.
    - Training cost: 205334.84.
    - Test RMSE: 657.73.
    - Test cost: 216305.64.

```
Params:  [-156.82270216    1.15418452]
Training RMSE: 640.84.
Training cost: 205334.84.
Test RMSE: 657.73.
Test cost: 216305.64.
```

- **Screenshot of the Plot from the code output up above:**



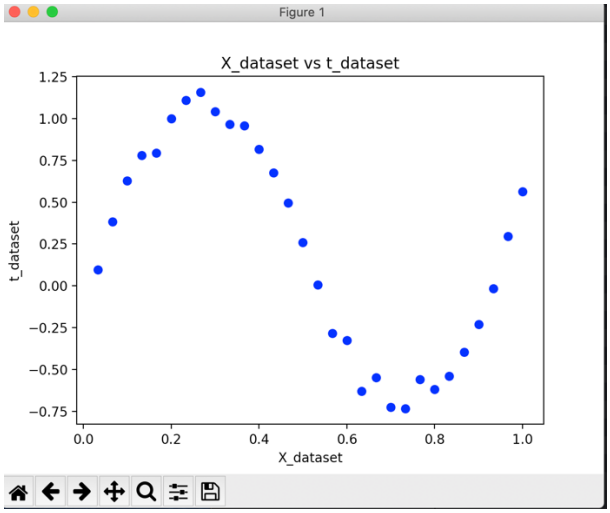
Multiple Regression (Part 2) Answer done in multiple.py:

- **Code Output from console:**
    - Params: [-667.13841504 0.96602209 253.32577975 3.84475147]
    - Training RMSE: 610.71.
    - Training cost: 186481.02.
    - Test RMSE: 584.81.
    - Test cost: 171003.24.

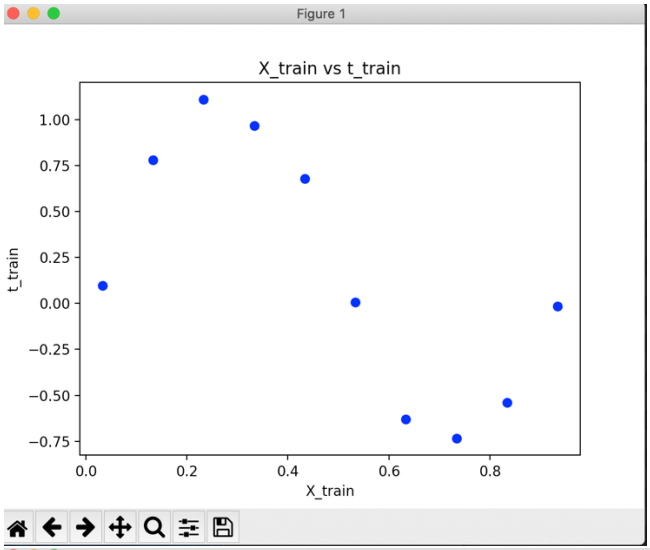
```
Params:  [-667.13841504    0.96602209  253.32577975    3.84475147]

Training RMSE: 610.71.
Training cost: 186481.02.
Test RMSE: 584.81.
Test cost: 171003.24.
```

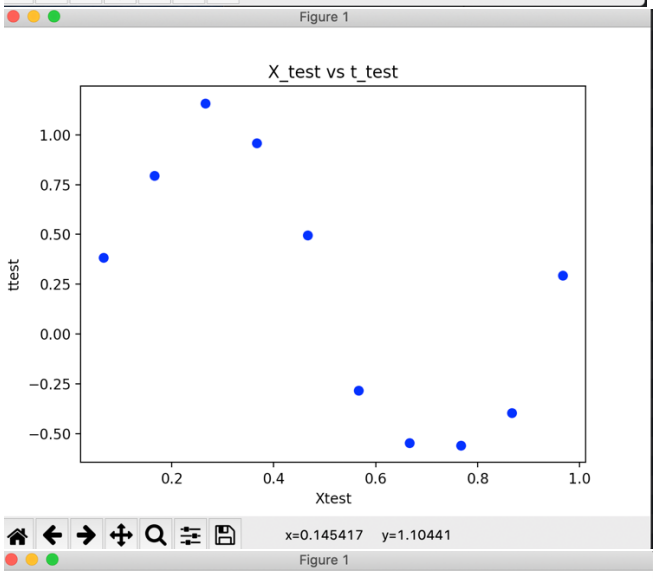
Polynomial Curve fitting (Part 3) :

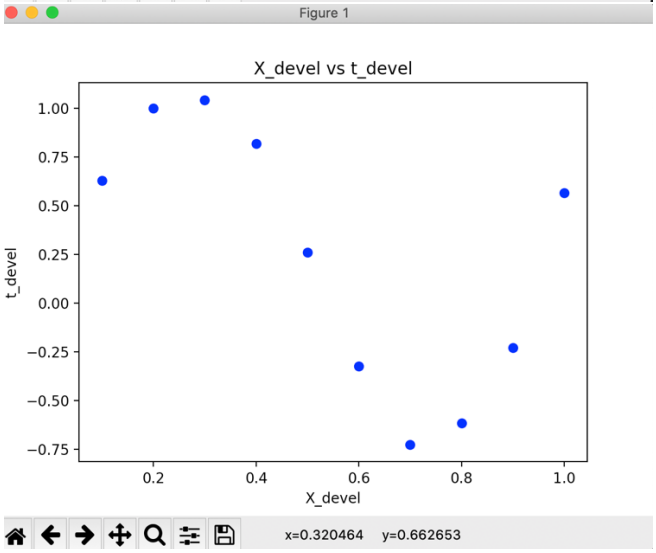
A. **Screenshot of the plotted dataset.txt shown below**



B. Screenshots of all the other plots train, test, and devel.txt in the same order:







C. Normal equation:

$$\mathbf{w} = \left(\mathrm{X}^{\mathrm{T}}\mathrm{X}\right)^{-1}\mathrm{X}^{\mathrm{T}}\mathbf{t}$$

D. (Part 1 without Regularization):