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Problem Set 2

1. See computeCost.py for the computeCost function and ps2.py for other code

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2. See gradientDescent.py for the gradientDescent function and ps2.py for other code

A screenshot of a computer program

Description automatically generated

3. See normalEqn.py for the normalEqn function and ps2.py for other code

A screenshot of a computer

Description automatically generated

There is a noticeable difference between the two estimates for theta because the estimate obtained from gradient descent changes gradually over iterations whereas the estimate obtained from using the normal equation approach does not use a learning rate and is more of an analytical approach. To achieve similar results, more iterations of gradient descent should be used.

4. a) See ps2.py for code

b) See ps2-4-b.png

c) See ps2.py for code

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*(row, col)*

d) See ps2.py for code

e) See ps2-4-e.png

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Description automatically generated

*theta = [theta\_0; theta\_1]*

f) See ps2-4-f.png

g) See ps2.py for code



h) See ps2.py for code



i)

**ps2-4-i-1.png**

A graph with a blue line

Description automatically generated

Gradually decreases cost (not very fast, learning rate too low), will take very long to converge.

**ps2-4-i-2.png**

**A graph with a blue line

Description automatically generated**

Cost decreases faster with a slightly higher alpha (good).

**ps2-4-i-3.png**

**A graph of a function

Description automatically generated**

Cost decreases even faster with a higher alpha, runs the risk of overshooting the minima

**ps2-4-i-4.png**

**A graph with numbers and lines

Description automatically generated**

Cost increases, gradient descent diverges with very high alpha, learning rate too high.

5. a) See ps2.py for code

A screen shot of a computer

Description automatically generated

b) See ps2.py for code and also ps2-5-b.png

A screenshot of a computer screen

Description automatically generated

c) See ps2.py for code

