

COMMON PITFALLS: HW 1, PART 7

1. ABOUT THIS DOCUMENT

As part of an ongoing research project to provide high quality autonomous feedback in online courses, we are making this list of common errors from Homework 1 available to all current students. This list was generated by automatically mining “exemplar submissions” from hundreds of thousands of submissions in the previous iteration of this course. If you have any questions, complaints or general feedback, please email codewebresearch@gmail.com. And stay tuned for the release of our interactive feedback tool in a future homework!

2. COMMON ERRORS

Error 1. (Augmenting the X matrix by a column of ones)

Many students forgot that the columns of 1's is already added to X and did not need to be explicitly added in this function.

```
function theta = normalEqn (X, y)
    theta = zeros (size (X, 2), 1);
    X = [ones(size (X, 1), 1), X]
    theta = pinv (X' * X) * X' * y
```

Error 2. (Forgetting the inverse)

```
function theta = normalEqn (X, y)
    theta = zeros (size (X, 2), 1);
    theta = X' * X * X' * y
```

Error 3. (Trying to use gradient descent)

While giving approximately correct answers, gradient descent is *not* equivalent to using the normal equations!

```
function theta = normalEqn (X, y)
    theta = zeros (size (X, 2), 1);
    mu = mean (X);
    sigma = std (X, 0);
    for i = 1:length (X)
        for j = 2:size (X, 2)
            X (i, j) = X (i, j) - mu (1, j);
            X (i, j) = (X (i, j) / sigma (1, j));
```

```
        endfor;  
    endfor;  
    alpha = 0.01;  
    num_iters = 100;  
    theta = gradientDescentMulti (X, y, theta, alpha, num_iters);
```