What you need to take away from the computer labs

- Short practical 1 day 1:
  - You understand and can implement: the MSE cost function, the univariate linear regression hypothesis (ax+b; theta_0 + theta_1*x), the partial derivatives of the MSE and gradient descent using those.
    You should be able to write these formulae and describe how to implement them.
- Short practical 2 day 1:
  - See how you can add polynomial features, able to normalize data, able to implement regression and gradient descent for any number of variables.
    You should be able to describe how you add polynomial features and how to extend linear regression to any number of variables.
- Afternoon practical day 1:
  - See cross-validation in action, and understand the limits of naïve cross-validation (futher shown in the lecture on metrics), do simple linear algebra

What you need to take away from the computer labs

- Afternoon practical day 1:
  - See cross-validation in action, and understand the limits of naïve cross-validation (futher shown in the lecture on metrics), do simple linear algebra multiplications by hand, implement the linear regression hypothesis, MSE cost, partial derivative calculations and gradient descent with linear algebra.
    You should be able to explain exactly how cross-validation works, do simple linear algebra by hand, and know exactly how to calculate regression predictions using linear algebra, as well as the partial derivatives and performing gradient descent (as shown at the end of slide deck 3, day 1).

What you need to take away from the computer labs

- Short practical 1 day 2:
  - Able to implement the logistic regression prediction function, which is just the linear regression function in a fancy new sigmoid coat. Able to implement the cost function, and able to change gradient descent. Voila: logistic regression.
    You should know exactly how you get logistic regression from linear regression (sigmoid function, change to cost function)
- Short practical 2 day 2:
  - Implementing regularisation in the cost function and gradient descent. Running regularisation with multiple lambda values on a very messy/overtrain-prone dataset, making an ROC curve the hard way.
    You should know exactly how to implement an ROC curve, and exactly how regularisation is implemented in both the cost and (hence) the gradients.

What you need to take away from the computer labs

- Afternoon practical day 2:
  - Implementing multi-class logistic regression (lots of bookkeeping), seeing how simple logistic regression performs on digit classification (baseline for neural nets), watching videos on neural nets and implementing forward pass neural networks.
    We continue at the neural network forward pass today.
    You should know: how multiclass logistic regression is done, how exactly a neural network calculates its predictions from its inputs (using matrix-matrix multiplications and activation functions)

What you need to take away from the computer labs

- So, order today:
  - I step through the answers of short practical 1 and 2 of day 2.
  - I finish the intro lecture on neural networks from yesterday.
  - You continue/start the neural network forward propagation part of the afternoon computer lab of yesterday
  - One hour later I lecture on backpropagation
  - The first ‘computer lab’ of today is just watching more videos on backpropagation to wrap your head around it.
  - *And* there’s only two lectures today (backpropagation and CNNs).