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# Assignment Title

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## 1 PART I: LOGISTIC REGRESSION

### 1.1 CODE

### 1.2 THEORY

#### 1.2.1 QUESTION 1

The running time of batch gradient is:

Preprocessing:  $\mathcal{O}(n)$

Descent:  $\mathcal{O}(\text{epochs} * \log \text{cost})$

Logcost:  $\mathcal{O}(nd)$  (assuming naive matrix multiplication)

Gradient:  $\mathcal{O}(nd)$  (assuming naive matrix multiplication)

In total:  $\mathcal{O}(\text{epochs} * nd)$

The running time of mini gradient descent is: Toal:  $\mathcal{O}(\text{epochs} * n / \text{batchsize} * \text{batchsize} * d) = \mathcal{O}(\text{epochs} * nd)$