UNIVERSITY, SCHOOL OR DEPARTMENT NAME

# 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 the batch gradient is: (Don't know if this is correct)
Preprocessing: $\mathcal{O}(n)$
Descent: $\mathcal{O}(epochs * logcost)$
Logcost: $\mathcal{O}(nd)$ (assuming naive matrix multiplication)
In total: $\mathcal{O}(epochs * nd)$

$$\log softmax(z)_j = \log\left(\frac{e^{zj}}{\sum i = 1^d e^{z_i}}\right) = -(zj - \log\sum i = 1^d e^{z_i}) \tag{1.1}$$