CSC 578 Homework 1
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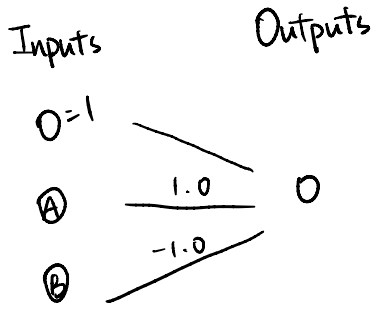
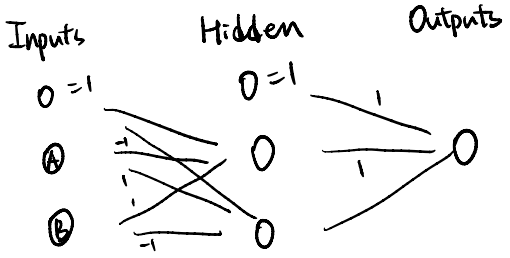
1. A. $A \wedge \neg B$

| A | B | $A \wedge \neg B$ |
|---|---|---|
| 1 | 1 | -1 |
| 1 | -1 | 1 |
| -1 | 1 | -1 |
| -1 | -1 | -1 |




B. $A \oplus B$

| A | B | $A \oplus B$ |
|---|---|---|
| 1 | 1 | -1 |
| 1 | -1 | 1 |
| -1 | 1 | 1 |
| -1 | -1 | -1 |




2. $o = w_0 + w_1 x_1 + w_1 x_1^2 + \cdots + w_n x_n + w_n x_n^2$

$$\frac{\partial E}{\partial w_i} = \frac{\partial}{\partial w_i} \cdot \frac{1}{2} \sum_{d \in D} (t_d - o_d)^2$$
$$= \frac{1}{2} \sum_{d \in D} \frac{\partial}{\partial w_i} (t_d - o_d)^2$$
$$= \frac{1}{2} \sum_{d \in D} 2 \cdot (t_d - o_d) \frac{\partial}{\partial w_i} (t_d - o_d)$$
$$= \sum_{d \in D} (t_d - o_d) \frac{\partial}{\partial w_i} (t_d - (w_0 + w_1 x_{1d} + w_1 x_{1d}^2 + \cdots + w_n x_{nd} + w_n x_{nd}^2))$$
$$= \sum_{d \in D} (t_d - o_d) (-x_{id} - x_{id}^2)$$