given x $\qquad y = w_0 + w_1 x$ $\qquad$ this distribution is our assumption

$$t \sim N(t / y(x, w), \sigma)$$

$(x_1, t_1) \quad (x_2, t_2) \; ----- \; (x_N, t_N)$

$$p\left((x_1, t_1), (x_2, t_2), ---, (x_N, t_N) \mid y(x, w)\right)$$

$$y(x, w) = w_0 + w_1 x$$

maximise p for w_0, w_1

ALSO Lets assume mean is target, variance is same otherwise, the problem is very hard!

$$\prod_{n=1}^{N} p(t_N \mid x_n, w_0, w_1)$$

$$= \max_{w_0, w_1} \prod_{n=1}^{N} \frac{1}{\sqrt{2\pi}\,\sigma} e^{-\frac{1}{2}\left(\frac{(y(x_n, w) - t_n)^2}{\sigma^2}\right)}$$

$$= \max_{w_0, w_1} \left(\frac{1}{(2\pi)^{N/2} \sigma^N} e^{\frac{-1}{2\sigma^2}\left(\sum_{n=1}^{N} ((w_0 + w_1 x_n) - t_n)^2\right)} \right)$$

$$\max_{w_0, w_1} \left(-\frac{N}{2} \log 2\pi - N \log \sigma - \frac{1}{2\sigma^2} \sum_{n=1}^{N} ((w_0 + w_1 x_N) - t_n)^2 \right)$$

$$\max_{w_0, w_1} \left[-\frac{1}{2\sigma^2} \sum_{n=1}^{N} ((w_0 + w_1 x_n) - t_n)^2 \right]$$

$$\left\{ \min_{w_0, w_1} \left[+\frac{1}{2} \sum_{n=1}^{N} ((w_0 + w_1 x_n) - t_n)^2 \right] \right\} = SSE$$

(σ^2 is constant)

How to minimize? You already know, bish.