

Question: Give a design for an artificial nerve cell whose output has the function:

- $y = f(W_1X_1 + W_2X_2 + W_3X_3 + W_4 - W_5X_5 - W_6X_6 - W_7X_7)$
- Where W_1 through W_7 are the last seven digits of your student ID number.
- W_4 is a bias input weight.

You may use any resistors above 500 ohms and below 1 megohm.

Solution:

- Student ID: 930616252.
- Last seven digits = 0616252.
- Train the network for $y = f(0 + 6x_2 + x_3 + 6 - 2x_5 - 5x_6 - 2x_7)$.
 - $R_F = 24k$
 - $\pm 12V$ supply.
 - $W_1 = 0$, hence $R_1 = 0$
 - $W_2 = 6$, $\frac{R_F}{R_2} = +6$, $\therefore R_2 = 4k$
 - $W_3 = 1$, $\frac{R_F}{R_3} = +1$, $\therefore R_3 = 24k$
 - $W_4 = +6$ is bias connected to $+12V$ $\frac{R_F * 12}{R_4} = +6$, $\therefore R_4 = 48k$
 - $W_5 = -2$, $\frac{R_F}{R_5} = -2$, $\therefore R_5 = 12k$
 - $W_6 = -5$, $\frac{R_F}{R_6} = -5$, $\therefore R_6 = 4.8k$
 - $W_7 = -2$, $\frac{R_F}{R_7} = -2$, $\therefore R_7 = 12k$

