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| ***Name:*** First Name MI. Surname | ***Post-Assessment Module 4*** |
| ***Division/Dept****:* | ***Date:*** June 20, 2025 |

**Exercise Name:** Build your own single neural network for the AND and OR:

**Objectives:**

* to perform ANN of basic binary operations using MSExcel/Google Sheets
* to understand the ANN behavior by changing some of its parameters
* to determine the ANN accuracy by solving the error or delta

Please refer to the *ANN\_Excel* file. Take note that the 1st run is counted as epoch 0.

1. Using AND operation, determine the epoch where the error is already/almost 0.
   1. initial bias, w1, w2, learn. coeff. = 0.5, act.fcn = step
   2. initial bias, w1, w2 = 1.0, learn. coeff. = 0.25, act.fcn = step
   3. initial bias, w1, w2, learn. coeff. = 1.0, act.fcn = step
   4. initial bias, w1, w2, learn. coeff. = 0.5, act.fcn = ReLU
   5. initial bias, w1, w2 = 1.0, learn. coeff. = 0.25, act.fcn = ReLU
   6. initial bias, w1, w2, learn. coeff. = 1.0, act.fcn = ReLU
2. Using OR operation, determine the epoch where the error is already/almost 0.
   1. initial bias, w1, w2, learn. coeff. = 0.5, act.fcn = step
   2. initial bias, w1, w2 = 1.0, learn. coeff. = 0.25, act.fcn = step
   3. initial bias, w1, w2, learn. coeff. = 1.0, act.fcn = step
   4. initial bias, w1, w2, learn. coeff. = 0.5, act.fcn = ReLU
   5. initial bias, w1, w2 = 1.0, learn. coeff. = 0.25, act.fcn = ReLU
   6. initial bias, w1, w2, learn. coeff. = 1.0, act.fcn = ReLU
3. Perform XOR using sigmoid and hyperbolic tan activation functions.
   1. Which of the two activation functions performs better at epoch 25? Use initial bias, w1, w2 = 0.5, learn. coeff. = 1.0.
   2. How about at epoch 50?