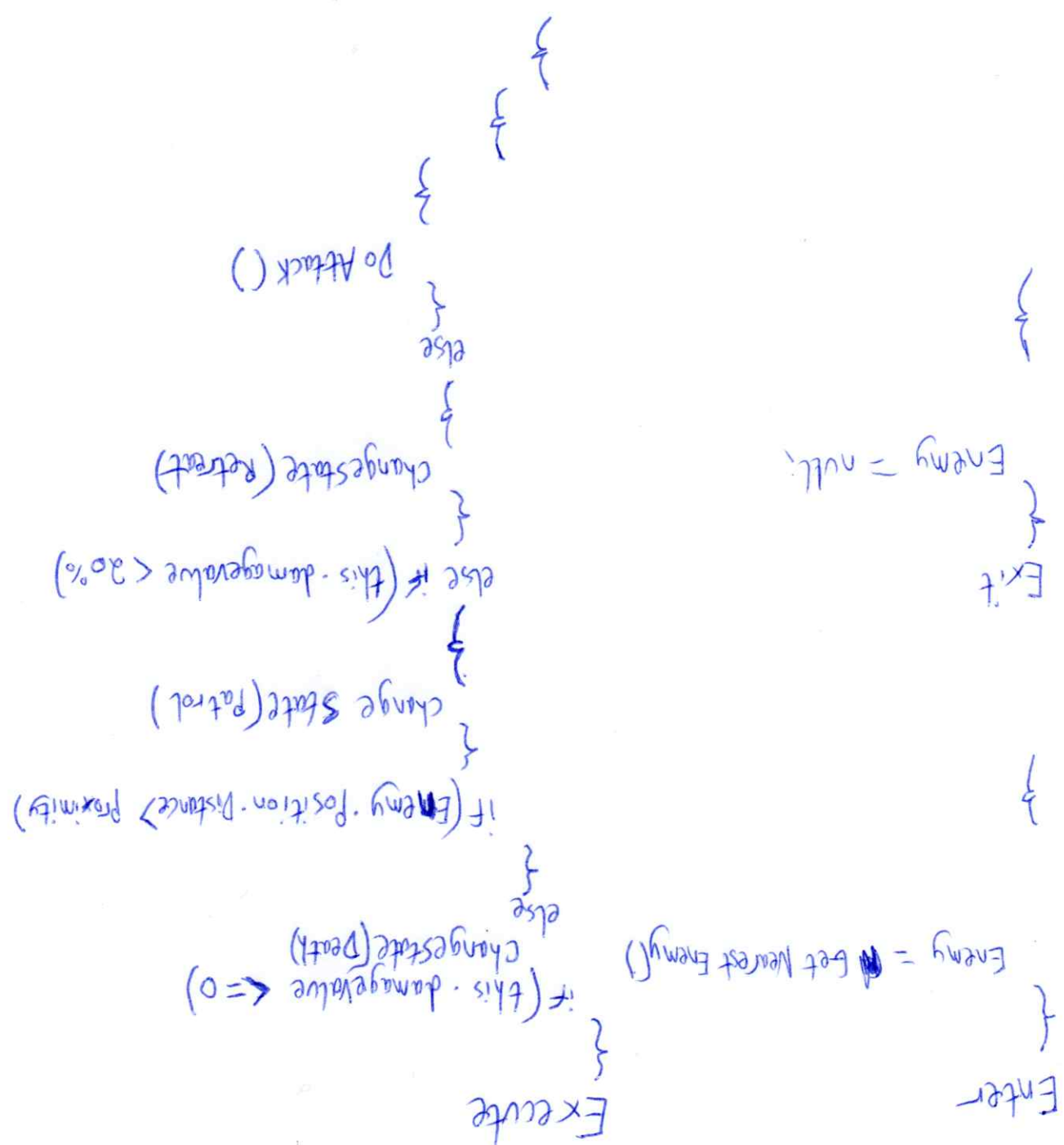


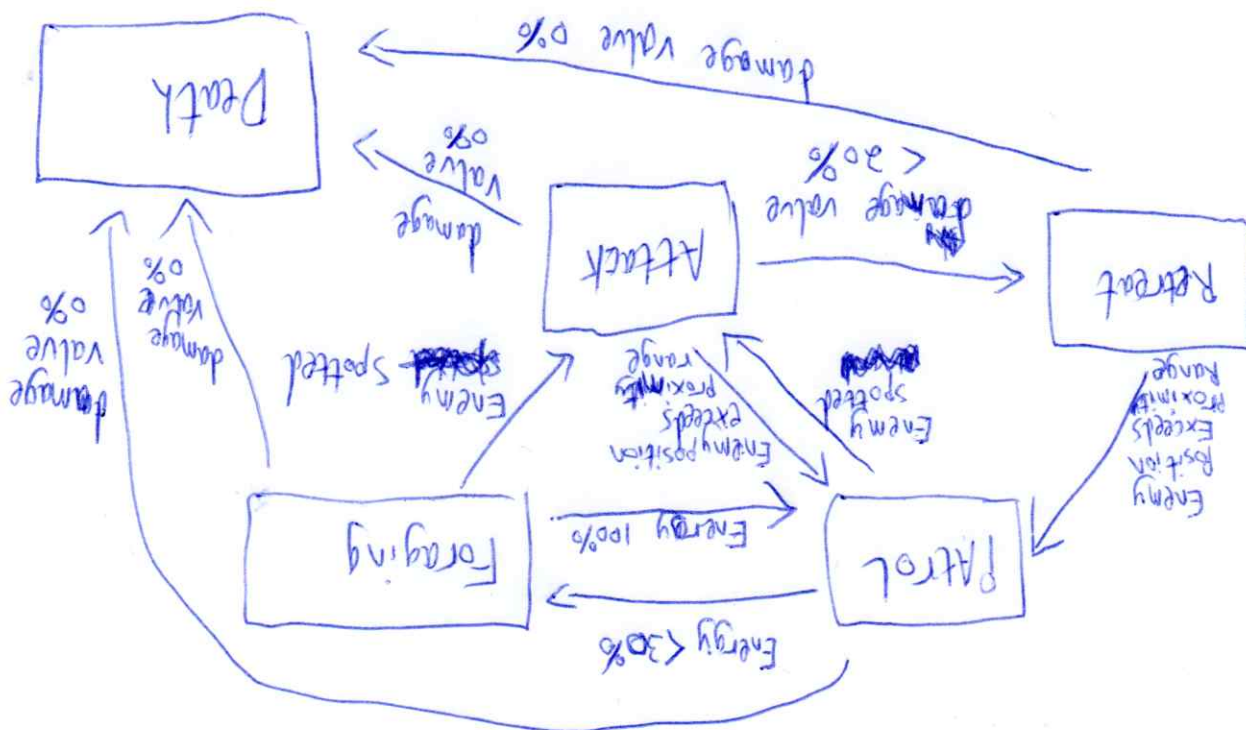
on entering the state, the shark stores which enemy it is attacking. this is cleared on exit

The execute loop checks to ensure shark is not dead before checking if the enemy is too far away or if low on health. If ~~any~~ any of those 3 checks is true, then the shark will transition to a different state in accordance to which check succeeded.





~~if (Enemy > proximity)~~
~~Change State (Patrol)~~
~~else if (Enemy > damage)~~
~~Change State (Patrol)~~
~~else if (Enemy > 0)~~
~~Change State (Patrol)~~



4c.

w_{k1} and w_{k3} are both being ~~used~~ used to control the output y . w_{k2} however is acting as an inhibitor to this output.

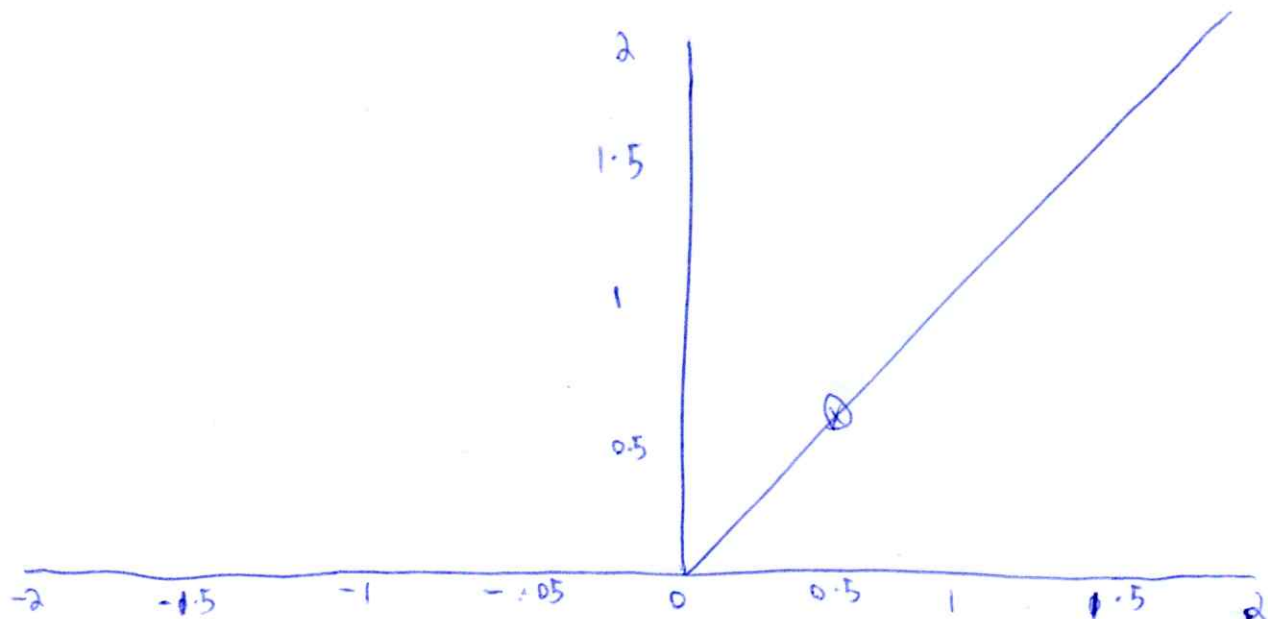
w_{k1} and w_{k3} act as excitatory nodes in this instance, whether these be ~~the~~ the outputs of other neurons or inputs.

The purpose of having these 3 inputs contribute towards ~~the~~ ^{being} the excitatory signal for the neuron is so that there are more factors that control this total input and ~~so~~ so that in learning systems, it is possible to use back propagation in order to train neurons acting as these inputs.

4d.

$$y = 0.4 - 0.2 + 0.2 + 0.3 = 0.62$$

$$\Phi_{\max}(0, x)$$



4a

Supervised learning differs from unsupervised learning as supervised learning requires its data sets be labelled and classified.

In a supervised learning model the model is trained by showing appropriately labelled data so that it can learn patterns from the training data to inform later decision making.
In an unsupervised learning model, no labelled training data is provided; instead, the model will attempt to make decisions based on groupings and associations that can be observed in the data.

4b

Classification algorithms aim to identify variables based on the learnt patterns from its training data. For example being able to ~~class~~ identify and classify letters on a page.
Regression algorithms aim to predict values based on learnt patterns from its training data. Regression algorithms models train against data to form an appropriate line of best fit against its training data. Provided enough training data, this line will be very appropriate ~~data~~ for predicting the value of the variable being measured.

More likely to win

$$0.0164 > 0.0031$$

$$P(\text{losing} | \text{mskill} = \text{med} \& \text{oskill} = \text{low} \& \text{orank} = \text{normal} \& \text{mrnk} = \text{normal})$$

$$P(\text{winning} | \text{mskill} = \text{med} \& \text{oskill} = \text{low} \& \text{orank} = \text{normal} \& \text{mrnk} = \text{normal})$$

$$\frac{1}{6} \times \frac{1}{6} \times \frac{2}{6} \times \frac{2}{6} = 0.0031$$

$$P(\text{mrnk} = \text{normal} | \text{win} = \text{no}) = \frac{2}{6}$$

$$P(\text{orank} = \text{normal} | \text{win} = \text{no}) = \frac{2}{6}$$

$$P(\text{oskill} = \text{low} | \text{win} = \text{no}) = \frac{1}{6}$$

$$P(\text{mskill} = \text{medium} | \text{win} = \text{no}) = \frac{1}{6}$$

3a

The denominator in this formula can typically be ignored when comparing conditional probabilities which tends to be the primary usage for using the formula

$$\textcircled{3b} \quad \frac{p(y|x)}{p(x|y)p(y)} = \frac{\sum_i p(x|y_i)p(y_i)}{p(y)}$$

$$\begin{aligned} p(\text{mSkill} = \text{medium} | \text{win} = \text{yes}) &= 4/9 \\ p(\text{oSkill} = \text{low} | \text{win} = \text{yes}) &= 3/9 \\ p(\text{oRank} = \text{normal} | \text{win} = \text{yes}) &= 6/9 \\ p(\text{mRank} = \text{normal} | \text{win} = \text{yes}) &= 2/9 \end{aligned}$$

~~$p(\text{mSkill} = \text{medium} | \text{win} = \text{yes}) = 4/9$~~

$$0.0167 \quad \text{[scribbles]} = \frac{1}{9} \times \frac{1}{6} \times \frac{1}{3} \times \frac{1}{4}$$

~~$p(\text{mSkill} = \text{medium} | \text{win} = \text{yes}) = 4/9$~~