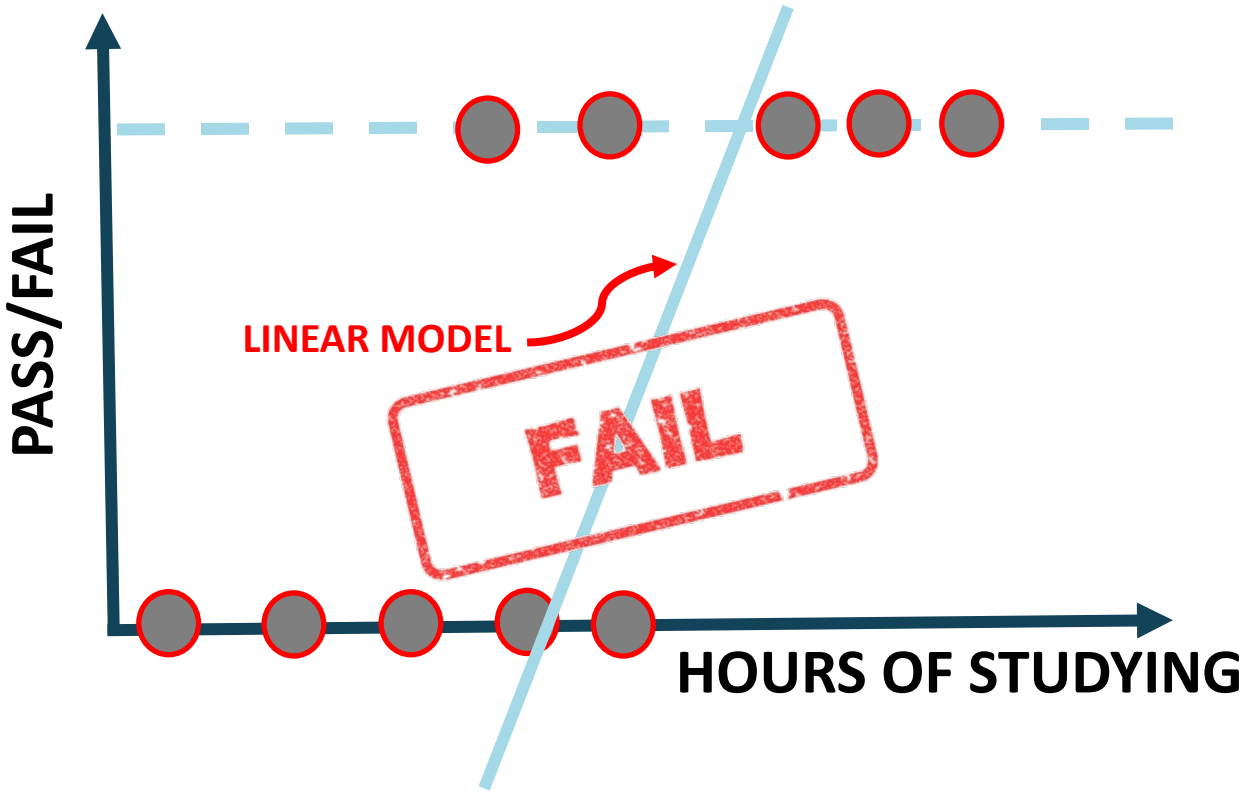
LOGISTIC REGRESSION: INTUITION

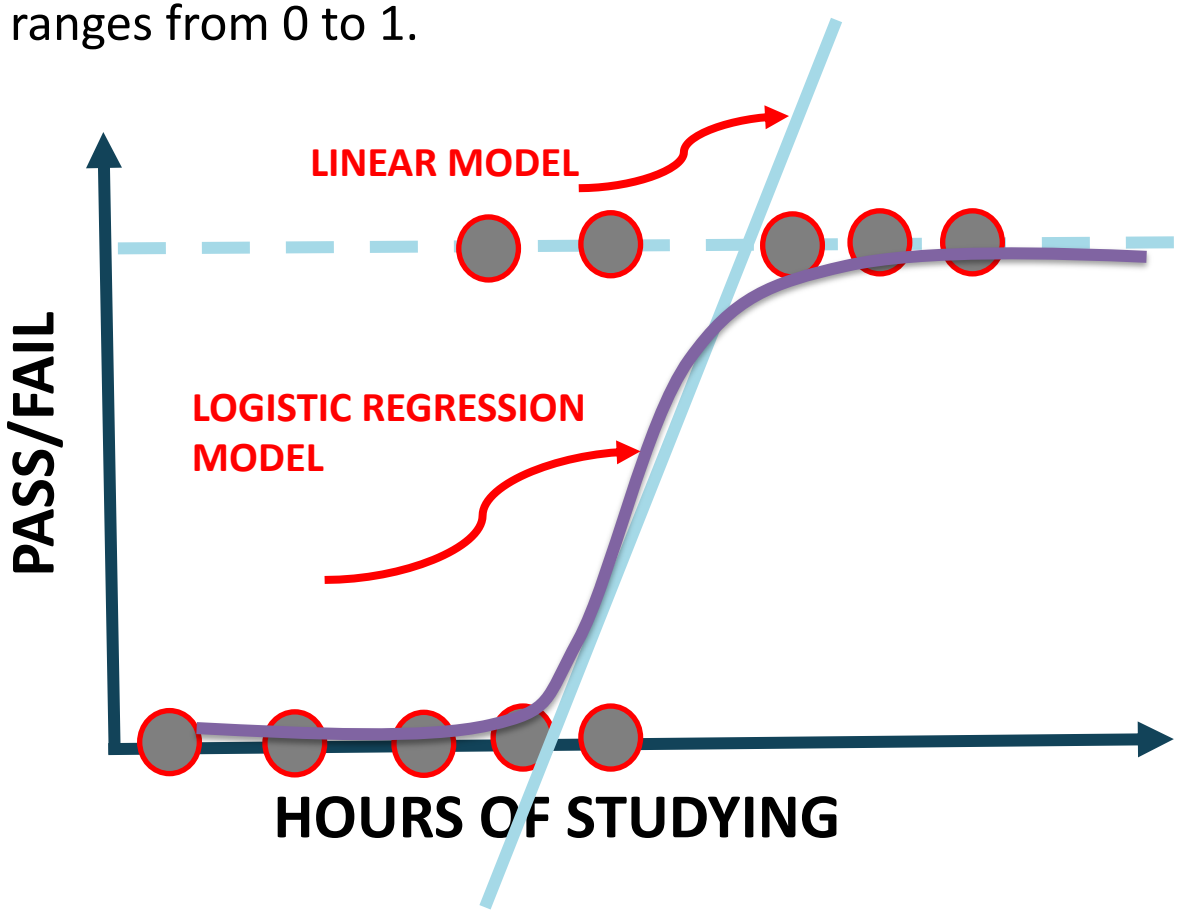
- **Linear regression** is used to predict outputs on a continuous spectrum.
  - Example: predicting revenue based on the outside air temperature.
- **Logistic regression is used to predict binary outputs** with two possible values labeled "0" or "1"
  - Logistic model output can be one of two classes: pass/fail, win/lose, healthy/sick



Hours Studying	Pass/Fail
1	0
1.5	0
2	0
3	1
3.25	0
4	1
5	1
6	1

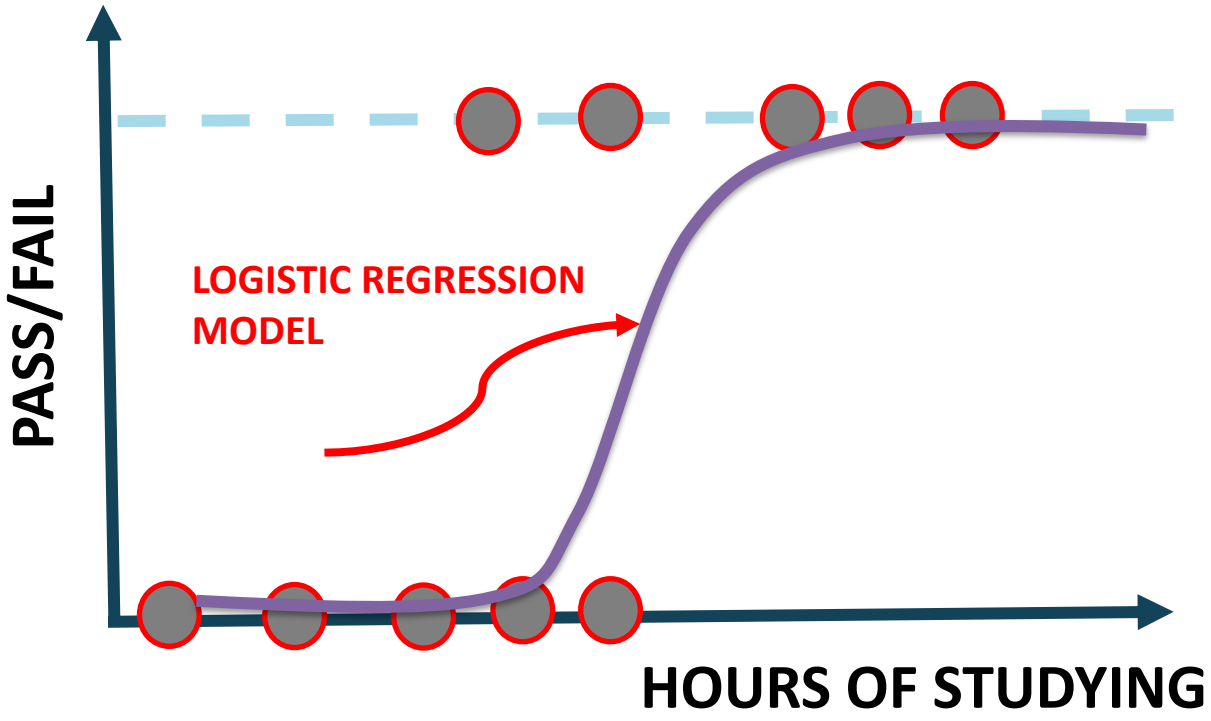
LOGISTIC REGRESSION: INTUITION

- Linear regression is not suitable for classification problem.
- Linear regression is unbounded, so logistic regression will be better candidate in which the output value ranges from 0 to 1.



LOGISTIC REGRESSION: SOME MATH

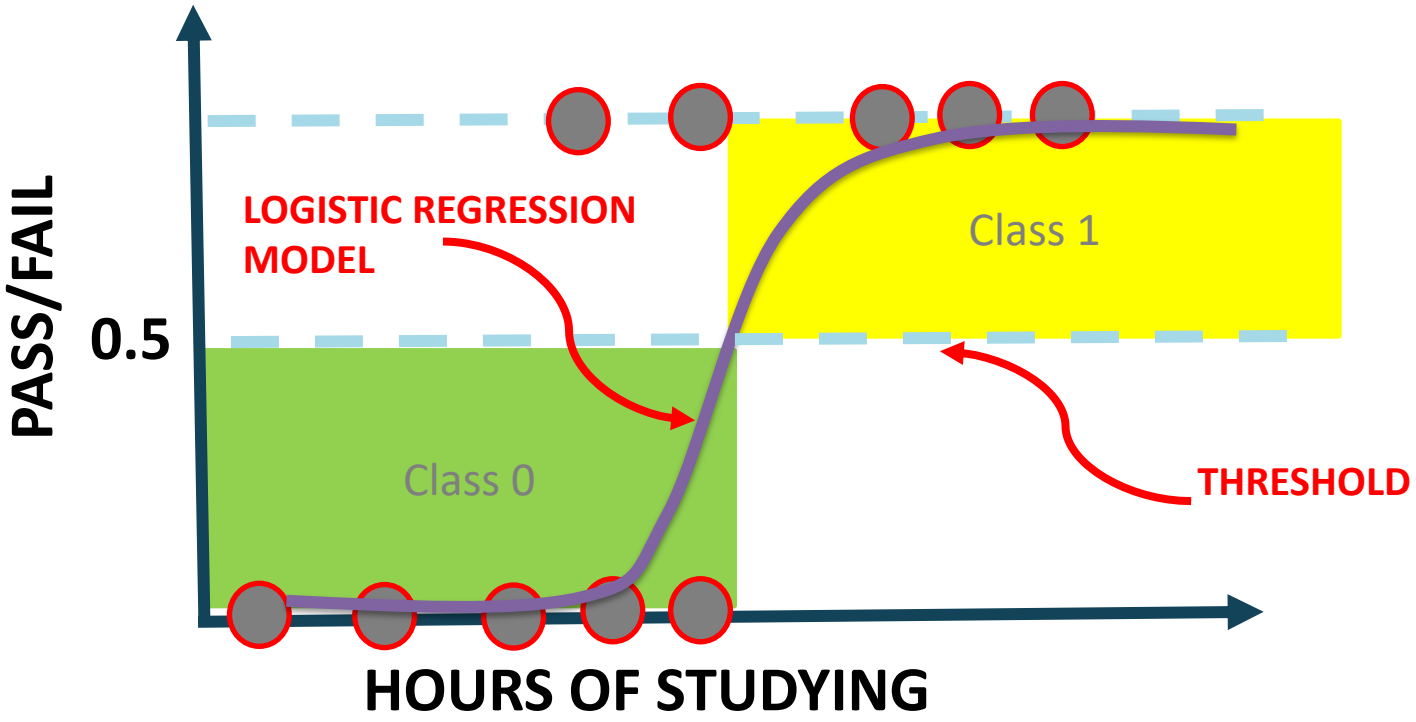
- Logistic regression algorithm works by implementing a linear equation first with independent predictors to predict a value.
- We then need to convert this value into a probability that could range from 0 to 1.



- Linear equation:
  - $y = b_0 + b_1 * x$
- Apply Sigmoid function:
  - $P(x) = sigmoid\ (y)$
  - $P(x) = \frac{1}{1+e^{-y}}$
  - $P(x) = \frac{1}{1+e^{-(b_0+b_1*x)}}$

LOGISTIC REGRESSION: FROM PROBABILITY TO CLASS

- Now we need to convert from a probability to a class value which is “0” or “1”.



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