

# Why 3 Matrices: Example

match = 10, mismatch = -2, gap = -7, gap\_start = -15

CART  
CA-T

$$\text{OPT}(4, 3) = \text{optimal score} = 30 - 15 - 7 = 8$$

CARTS  
CA-T-

$$\text{WRONG}(5, 3) = 30 - 15 - 7 - 15 - 7 = -14$$

CARTS  
CAT--

$$\text{OPT}(5, 3) = 20 - 2 - 15 - 14 = -11$$

↑  
this is why we need to keep the X and Y matrices around.  
they tell us the score of ending with a gap in one of the sequences.