Karatsuba multiplication algorithm:

$$X = X_2 * 10^N + X_1$$
 len(X_2) = len(X_1)

$$Y = Y_2 * 10^N + Y_1$$
 $len(Y_2) = len(Y_1)$

$$A = X_2 * Y_2$$

$$A = X_2 * Y_2$$

 $B = X_1 * Y_1$

$$A = X_2 * Y_2$$

 $B = X_1 * Y_1$

$$B = X_1 * Y_1$$

$$Z = X * Y = A * 10^{2N} + (X_2 * Y_1 + X_1 * Y_2) * 10^N + B$$

 $Z = X * Y = A * 10^{2N} + (C - B - A) * 10^{N} + B$

 $C = (X_2 + X_1) * (Y_2 + Y_1)$

$$A = X_2 * Y_2$$

 $B = X_1 * Y_1$