

Based the code in which I have written for the selection sort, the following derivation of  $T(n)$  shows that the formula ends with the quadratic formula, and both the best/worse case scenarios.

$$T(n) = c_1N + c_2(N^2/2 + N/2) + C_3(N^2/2 - N/2) + C_4((N^2/2 - N/2) - 1) + C_5((N^2/2 - N/2) - 1) + C_6((N^2/2 - N/2) - 1)$$

$$T(n) = (C_2/2 + C_3/2 + C_4/2 + C_5/2 + C_6/2)N^2 + (C_1 - C_2/2 - C_3/2 - C_4/2 - C_5/2 - C_6/2)N + (C_4 - C_5 - C_6)$$

$$T(n) = An^2 + Bn + C$$

In the worst case, the value of  $N \rightarrow 1$ , where the entire array is in descending order; the best case being the array is already sorted in Ascending order  $N \rightarrow 0$ .