CSE 102 Spring 2021 Quiz Reflection 2

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1 **Quiz 2**

1. Base step
$$n>0$$

$$T(-)=0\leq 0^{2}=0$$
10. Induction step.

It Assume $T(n)\leq n'$, we need to prove $T(n+1)\leq (n+1)'$

$$T(n+1)=T(n)+n$$

$$= n^{2}+2n$$

$$\leq n^{2}+2n$$

$$\leq n'+2n+1$$

$$= (n+1)'$$
Thus we get $T(n+1)\leq (n+1)'$, by the induction we prove $\overline{I}(n)\leq n^{2}$ the $T(n+1)\leq n'$

Solution. I changed the relation between T(n) + n and $n^2 + n$ from < to = in the last minute. I don't know what I was thinking about at that time. Also, T(n+1) should be equal to T(n) + n + 1. Thus, the whole solution should be like this:

Base case: n=0 $T(0) = 0 < 0^2$ Induction step:

$$T(n+1) = T(n) + n + 1$$

$$\leq n^2 + n + 1$$

$$\leq n^2 + 2n + 1$$

$$= (n+1)^2$$

Thus, we get $T(n+1) \le (n+1)^2$. By the induction, we prove that $T(n) \le n^2$.

References

[1]