Position from Velocity!?

At this point, you have definitions for Δx, Δt, and v. You've done LAO-1-1-WS1. Let's take one row out of the table you computed.

$$v_{5\to 6} \equiv \frac{x_6 - x_5}{t_6 - t_5} = \frac{63m - 54m}{3744s - 3743s} = 9\frac{m}{s}$$

Let's rearrange the algebra

$$(t_6 - t_5)\, v_{5\to 6} = x_6 - x_5$$

$$x_6 = x_5 + (t_6 - t_5)\, v_{5\to 6}$$

That says we can get x_6 from x_5 and $v_{5\to 6}$!

If of course didn't matter that it was positions 5 and 6 we were considering. We also have

$$x_5 = x_4 + (t_5 - t_4)\, v_{4\to 5}$$

By substituting the circled stuff in for x_5 you can see that we can actually get x_6 from x_4! This just keeps going. You can get x_6 from x_0 if you also know $v_{0\to1}$, $v_{1\to2}$, $v_{2\to3}$, $v_{3\to4}$, $v_{4\to5}$, and $v_{5\to6}$.

It's going to get tiring for me to write out all these examples. So we need some notation. We write

$$x_{i+1} = x_i + (t_{i+1} - t_i)\, v_{i\to i+1}$$

Put $i=5$ into this equation. Do you see that you get the equation for x_6? Put $i=4$ into the equation. Do you see that you get the equation for x_5?

$\Longrightarrow$ Do LA0-1-1-WS2

Maybe it is not a surprise that the addition and multiplication that gets us x_6 from x_5 "undoes" the subtraction and division that got us $v_{5\to6}$ from x_6 and x_5.