

SERIES EXAMPLES and Proof by Trace Table

SWAP is the process of interchanging the values within two boxes. An algorithm to do this follows in figure 1; it uses a temporary box t. A trace is shown to the right, consisting of a series of "snap shots" showing the change of values in the boxes from the Before state to the After state. This trace could be more general by using any values, say x and y instead of constant values. 5 and 7

EXCHANGE, of figure 2, shows another way to do the interchange without using a temporary box, and the trace proves this, in general for any values x, and y.

1 SWAP Algorithm using temporary box t (not general)

Before	r =	<input type="text" value="5"/>	s =	<input type="text" value="7"/>	t =	<input "="" type="text" value="?"/>
1. Set t = s		<input type="text" value="5"/>		<input type="text" value="7"/>		<input type="text" value="7"/>
2. Set s = r		<input type="text" value="5"/>		<input type="text" value="5"/>		<input type="text" value="7"/>
3. Set r = t		<input type="text" value="5"/>		<input type="text" value="5"/>		<input type="text" value="7"/>
After	r =	<input type="text" value="7"/>	s =	<input type="text" value="5"/>	t =	<input type="text" value="7"/>

2 EXCHANGE: SWAP without Temporary box (general proof)

Before	r =	<input type="text" value="X"/>	s =	<input type="text" value="Y"/>
Set r = r + s		<input type="text" value="X+Y"/>		<input type="text" value="Y"/>
Set s = r - s		<input type="text" value="X+Y"/>		<input type="text" value="X"/>
Set r = s - r		<input type="text" value="X+Y"/>		<input type="text" value="X"/>
After	r =	<input type="text" value="Y"/>	s =	<input type="text" value="X"/>