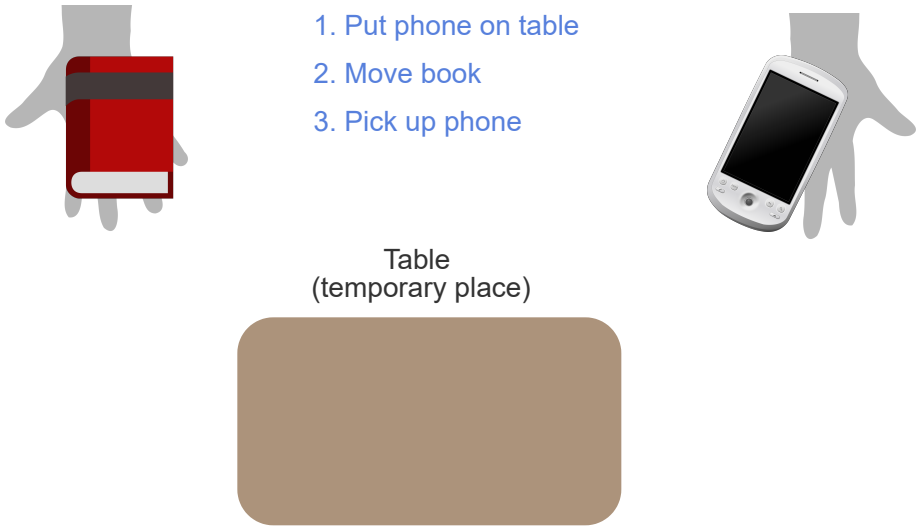
5.9 Swapping two variables (General)

Sometimes a program must swap values among two variables. ***Swapping*** two variables x and y means to assign y's value to x, and x's value to y. If x is 33 and y is 55, then after swapping x is 55 and y is 33.

A common method for swapping uses a temporary variable. A ***temporary variable*** is a variable used briefly to store a value. To understand the intuition of such temporary storage, consider a person holding a book in one hand and a phone in the other, wishing to swap the items. The person can temporarily place the phone on a table, move the book to the other hand, then pick up the phone.

PARTICIPATION ACTIVITY 5.9.1: Swap idea: Use a temporary location.

2x speed



A swap between two hands requires a third, temporary place

Feedback?

Similarly, swapping two variables can use a third variable to temporarily hold one value while the other value is copied over.

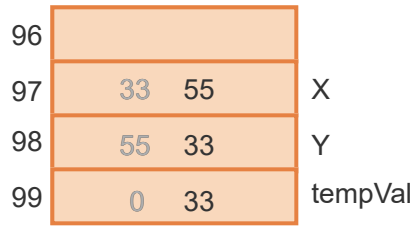
PARTICIPATION ACTIVITY 5.9.2: Swapping two variables using a third temporary variable.

Start 2x speed

```
int X = 33;
int Y = 55;
int tempVal = 0;

tempVal = X;
X = Y;
Y = tempVal;

// Print X and Y
```



X: 55, Y: 33

Feedback?

PARTICIPATION ACTIVITY 5.9.3: Swap.

To begin, x is 22 and y is 99. What are x and y after the given code?

1)
```
x = y;
y = x;
```

- x is 99 and y is 22.
- x is 22 and y is 99.
- x is 99 and y is 99.

2)
```
x = y;
y = x;
x = y;
```

- x is 99 and y is 22.
- x is 99 and y is 99.
- x is 22 and y is 22.

3)
```
tempVal = x;
x = y;
y = x;
```

- x is 99 and y is 22.
- x is 99 and y is 99.

4)

```
tempVal = x;
x = y;
y = tempVal;
```

- ○ x is 99 and y is 22.
- ○ x is 99 and y is 99.

Feedback?

If you have studied arrays or vectors (or other kinds of lists), know that most swaps are actually performed between two list elements. For example, reversing a list with N elements can be achieved by swapping element 1 and N, element 2 and N-1, element 3 and N-2, etc. (stopping at the middle of the list).

PARTICIPATION ACTIVITY 5.9.4: Reversing a list using swaps.

Start ☐ 2x speed

Feedback?

PARTICIPATION ACTIVITY 5.9.5: Reversing a list using swaps.

1) Using the above approach, how many swaps are needed to reverse this list:
999 888 777 666 555 444 333 222

Check Show answer

Feedback?