

Sheet1

| | | | |
|-----|----|------------------------------|-----------------------|
| I=0 | a= | 3 12 44 99 72 33 11 18 65 42 | |
| J=9 | | | 42 65 Swapped = True |
| J=8 | | | 18 42 Swapped = False |
| J=7 | | | 11 18 Swapped = False |
| J=6 | | | 11 33 Swapped = True |
| J=5 | | | 11 72 Swapped = True |
| J=4 | | | 11 99 Swapped = True |
| J=3 | | | 11 44 Swapped = True |
| J=2 | | | 11 12 Swapped = True |
| J=1 | | 3 11 | Swapped = False |

| | | | |
|-----|----|------------------------------|-----------------------|
| I=1 | a= | 3 11 12 44 99 72 33 18 42 65 | |
| J=9 | | | 42 65 Swapped = False |
| J=8 | | | 18 42 Swapped = False |
| J=7 | | | 18 33 Swapped = True |
| J=6 | | | 18 72 Swapped = True |
| J=5 | | | 18 99 Swapped = True |
| J=4 | | | 18 44 Swapped = True |
| J=3 | | | 12 18 Swapped = False |
| J=2 | | 11 12 | Swapped = False |

| | | | |
|-----|----|------------------------------|-----------------------|
| I=2 | a= | 3 11 12 18 44 99 72 33 42 65 | |
| J=9 | | | 42 65 Swapped = False |
| J=8 | | | 33 42 Swapped = False |
| J=7 | | | 33 72 Swapped = True |
| J=6 | | | 33 99 Swapped = True |
| J=5 | | | 33 44 Swapped = True |
| J=4 | | | 18 33 Swapped = False |
| J=3 | | 12 18 | |

| | | | |
|-----|----|------------------------------|-----------------------|
| I=3 | a= | 3 11 12 18 33 44 99 72 42 65 | |
| J=9 | | | 42 65 Swapped = False |
| J=8 | | | 42 72 Swapped = True |
| J=7 | | | 42 99 Swapped = True |
| J=6 | | | 42 44 Swapped = True |
| J=5 | | | 33 44 Swapped = False |
| J=4 | | 18 33 | Swapped = False |

| | | | |
|-----|----|------------------------------|-----------------------|
| I=4 | a= | 3 11 12 18 33 42 44 99 72 65 | |
| J=9 | | | 65 72 Swapped = True |
| J=8 | | | 65 99 Swapped = False |
| J=7 | | | 44 54 Swapped = False |
| J=6 | | | 42 44 Swapped = False |
| J=5 | | 33 42 | Swapped = False |

| | | | |
|-----|----|------------------------------|----------------------|
| I=5 | a= | 3 11 12 18 33 42 44 65 99 72 | |
| J=9 | | | 72 99 Swapped = True |

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J=8 65 72 Swapped = False
J=7 44 65 Swapped = False
J=6 42 44 Swapped = False
Final Array = 3,11,12,18,33,42,44,65,72,99

I=0 a= 8 6 42 11 5 19 88 40 9 3
J=9 3 9 Swapped = True
J=8 3 40 Swapped = True
J=7 3 88 Swapped = True
J=6 3 19 Swapped = True
J=5 3 5 Swapped = True
J=4 3 11 Swapped = True
J=3 3 42 Swapped = True
J=2 3 6 Swapped = True
J=1 3 8 Swapped = True

I=1 a= 3 8 6 42 11 5 19 88 40 9
9 40 Swapped = True
9 88 Swapped = True
9 19
5 9
11 5
42 11
J=3 6 42
J=2 8 6
3

I=2 a= 3 8 6 42 11 5 9 19 88 40
40 88 Swapped = True

I=3 a= 3 8 6 42 11 5 9 19 40 88
J=9 40 88
J=8 10 40
J=7 9 19
J=6 5 9 Swapped = True
J=5 5 11 Swapped = True
J=4 5 42 Swapped = True
5 6 Swapped = True
5 8 Swapped = True
3

I=4 a= 3 5 8 6 42 11 9 19 40 88
J=9 40 88 Swapped = False
J=8 19 40 Swapped = False
J=7 9 19 Swapped = False
J=6 9 11 Swapped = True
J=5 9 42 Swapped = False

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I=5      a=      3  5  8  6  9 42 11 19 40 88
J=9                                40 88 Swapped = False
J=8                                19 40  Swapped = False
J=7                                11 19  Swapped = False
J=6                                11 42  Swapped = True

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I=6      a=      3  5  8  6  9 11 42 19 40 88
J=9                                40 88 Swapped = False
J=8                                19 40  Swapped = False
J=7                                19 42  Swapped = True
                                11 19  Swapped = False

```

```

I=7      a=      3  5  8  6  9 11 19 42 40 88
J=9                                40 88 Swapped = False
J=8                                40 42  Swapped = True

```

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I=8      a=      3  5  8  6  9 11 19 40 42 88
J=9                                6  8  Swapped = True

```

Final Array = 3,5,6,8,11,19,40,42,88

```

                                0  1  2  3  4  5  6  7  8  9
I=0
exch(a,0,0) a=      3 12 44 99 72 33 11 18 65 42
I=1
exch(a,1,6) a=      3 11 44 99 72 33 12 18 65 42
I=2
exch(a,2,6) a=      3 11 12 99 72 33 44 18 65 42
I=3
exch(a,3,7) a=      3 11 12 18 72 33 44 99 65 42
I=4
exch(a,4,5) a=      3 11 12 18 33 72 44 99 65 42
I=5
exch(a,5,9) a=      3 11 12 18 33 42 44 99 65 72
I=6
exch(a,6,6) a=      3 11 12 18 33 42 44 99 65 72
I=7
exch(a,7,8) a=      3 11 12 18 33 42 44 65 99 72
I=8
exch(a,8,9) a=      3 11 12 18 33 42 44 65 72 99

```

Final Array = 3,11,12,18,33,42,44,65,72,99

Sheet1

```

      8 6 42 11 5 19 88 40 9 3
      0 1 2 3 4 5 6 7 8 9

l=0
exch(a,0,9) a=      3 6 42 11 5 19 88 40 9 8
l=1
exch(a,1,4) a=      3 5 42 11 6 19 88 40 9 8
l=2
exch(a,2,4) a=      3 5 6 11 42 19 88 40 9 8
l=3
exch(a,3,9) a=      3 5 6 8 42 19 88 40 9 11
l=4
exch(a,4,8) a=      3 5 6 8 9 19 88 40 42 11
l=5
exch(a,5,9) a=      3 5 6 8 9 11 88 40 42 19
l=6
exch(a,6,7) a=      3 5 6 8 9 11 19 40 42 88
l=7
exch(a,7,7) a=      3 5 6 8 9 11 19 40 42 88
l=8
exch(a,8,8) a=      3 5 6 8 9 11 19 40 42 88
Final Array = 3,5,6,8,11,19,40,42,88

```

| | | Bold indicates swap | Underline indicates front of subarray |
|-----|----|-------------------------------------|---------------------------------------|
| l=1 | a= | 3 12 44 99 72 33 11 18 65 42 | |
| J=1 | | 3 <u>12</u> | Exchange = False |
| l=2 | a= | 3 <u>12</u> 44 99 72 33 11 18 65 42 | |
| J=2 | | 3 12 <u>44</u> | Exchange = False |
| l=3 | a= | 3 12 <u>44</u> 99 72 33 11 18 65 42 | |
| J=3 | | 3 12 44 <u>99</u> | Exchange = False |
| l=4 | a= | 3 12 44 <u>99</u> 72 33 11 18 65 42 | |
| J=4 | | 3 12 44 72 99 | Exchange = True |
| l=5 | a= | 3 12 44 72 <u>99</u> 33 11 18 65 42 | |
| J=5 | | 33 99 | Exchange = True |
| J=4 | | 33 72 | Exchange = True |
| J=3 | | 33 44 | Exchange = True |
| l=6 | a= | 3 12 33 44 72 <u>99</u> 11 18 65 42 | |
| J=6 | | 11 99 | Exchange = True |
| J=5 | | 11 72 | Exchange = True |
| J=4 | | 11 44 | Exchange = True |
| J=3 | | 11 33 | Exchange = True |
| J=2 | | 11 12 | Exchange = True |
| | | 3 | |
| l=7 | a= | 3 11 12 33 44 72 <u>99</u> 18 65 42 | |

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| | | | |
|-----|--|--------------|-----------------|
| J=7 | | 18 99 | Exchange = True |
| J=6 | | 18 72 | Exchange = True |
| J=5 | | 18 44 | Exchange = True |
| J=4 | | 18 33 | Exchange = True |

| | | | |
|-----|----|-------------------------------------|-----------------|
| I=8 | a= | 3 11 12 18 33 44 72 <u>99</u> 65 42 | |
| J=8 | | 65 99 | Exchange = True |
| J=7 | | 65 72 | Exchange = True |

| | | | |
|-----|----|-------------------------------------|-----------------|
| I=9 | a= | 3 11 12 18 33 44 65 72 <u>99</u> 42 | |
| J=9 | | 42 99 | Exchange = True |
| J=8 | | 42 72 | Exchange = True |
| J=7 | | 42 65 | Exchange = True |
| J=6 | | 42 44 | Exchange = True |

Final Array = 3,11,12,18,33,42,44,65,72,99

Sheet1

| | | | Bold indicates swap | Underline indicates front | |
|-----|----|----------|---------------------|---------------------------|-------------------------------------|
| I=1 | a= | 8 | 6 | <u>42</u> | 11 5 19 88 40 9 3 |
| J=1 | | 6 | 8 | | Exchange = True |
| I=2 | a= | 6 | <u>8</u> | <u>42</u> | 11 5 19 88 40 9 3 |
| J=2 | | 6 | 8 | <u>42</u> | Exchange = False |
| I=3 | a= | 6 | 8 | <u>42</u> | 11 5 19 88 40 9 3 |
| J=3 | | | 11 | 42 | Exchange = True |
| I=4 | a= | 6 | 8 | 11 | <u>42</u> 5 19 88 40 9 3 |
| J=4 | | | | 5 | 42 Exchange = True |
| J=3 | | | 5 | 11 | Exchange = True |
| J=2 | | | 5 | 8 | Exchange = True |
| J=1 | | 5 | 6 | | Exchange = True |
| I=5 | a= | 5 | 6 | 8 | 11 <u>42</u> 19 88 40 9 3 |
| J=5 | | | | 19 | 42 Exchange = True |
| I=6 | a= | 5 | 6 | 8 | 11 19 <u>42</u> 88 40 9 3 |
| J=6 | | | | | 42 <u>88</u> Exchange = False |
| I=7 | a= | 5 | 6 | 8 | 11 19 42 <u>88</u> 40 9 3 |
| J=7 | | | | | 40 88 Exchange = True |
| J=6 | | | | 40 | 42 Exchange = True |
| I=8 | a= | 5 | 6 | 8 | 11 19 40 42 <u>88</u> 9 3 |
| J=8 | | | | | 9 88 Exchange = True |
| J=7 | | | | 9 | 42 Exchange = True |
| J=6 | | | | 9 | 40 Exchange = True |
| J=5 | | | 9 | 19 | Exchange = True |
| J=4 | | | 9 | 11 | Exchange = True |
| I=9 | | 5 | 6 | 8 | 9 11 19 40 42 88 3 |
| J=9 | | | | | 3 88 Exchange = True |
| J=8 | | | | 3 | 42 Exchange = True |
| J=7 | | | | 3 | 40 Exchange = True |
| J=6 | | | | 3 | 19 Exchange = True |
| J=5 | | | 3 | 11 | Exchange = True |
| J=4 | | | 3 | 9 | Exchange = True |
| J=3 | | 3 | 8 | | Exchange = True |
| J=2 | | 3 | 6 | | Exchange = True |

Swapped = Tr