Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_

AP CS Period: \_\_\_\_\_\_\_\_\_\_

Selection Sort Worksheet

1. Given the following method that sorts the private field a which is an integer array using selection sort:

 public void selectionSort()

 {

 int smallestIndex = 0;

 // loop from 0 to one before last item

 for (int i = 0; i < a.length-1; i++)

 {

 // set smallest index to the one at i

 smallestIndex = i;

 // loop from i+1 to the end looking for a smaller value

 for (int j = i + 1; j < a.length; j++)

 {

 if (a[j] < a[smallestIndex])

 {

 smallestIndex = j;

 }

 }

 // swap the one at i with the one at smallest index

 int temp = a[i];

 a[i] = a[smallestIndex];

 a[smallestIndex] = temp;

 }

If the value of a is {-3, 8, 25, 6, 15, 2} when selectionSort is called what are the values in the array after each time the outer loop finishes?

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Initial state | -3 | 8 | 25 | 6 | 15 | 2 |
| i=0 |  |  |  |  |  |  |
| i=1 |  |  |  |  |  |  |
| i=2 |  |  |  |  |  |  |
| i=3 |  |  |  |  |  |  |
| i=4 |  |  |  |  |  |  |

What are the values in the array a after each loop when a contains {90, 80, 70, 60, 50, 40}?

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Initial state | 90 | 80 | 70 | 60 | 50 | 40 |
| i=0 |  |  |  |  |  |  |
| i=1 |  |  |  |  |  |  |
| i=2 |  |  |  |  |  |  |
| i=3 |  |  |  |  |  |  |
| i=4 |  |  |  |  |  |  |

 What are the values in the array a after each loop when a contains {72, -30, 5, 17, 23, 36}?

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Initial state | 72 | -30 | 5 | 17 | 23 | 36 |
| i=0 |  |  |  |  |  |  |
| i=1 |  |  |  |  |  |  |
| i=2 |  |  |  |  |  |  |
| i=3 |  |  |  |  |  |  |
| i=4 |  |  |  |  |  |  |

What are the values in the array a after each loop when a contains {-50, 10, 20, 30, 40, 50}?

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Initial state | -50 | 10 | 20 | 30 | 40 | 50 |
| i=0 |  |  |  |  |  |  |
| i=1 |  |  |  |  |  |  |
| i=2 |  |  |  |  |  |  |
| i=3 |  |  |  |  |  |  |
| i=4 |  |  |  |  |  |  |

 What are the values in the array a after each loop when a contains {5, -3, 4, -2, 3, -1}?

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Initial state | 5 | -3 | 4 | -2 | 3 | -1 |
| i=0 |  |  |  |  |  |  |
| i=1 |  |  |  |  |  |  |
| i=2 |  |  |  |  |  |  |
| i=3 |  |  |  |  |  |  |
| i=4 |  |  |  |  |  |  |

 What are the values in the array after each loop when a contains {68, 54, 45, 36, 23, 17}?

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Initial state | 68 | 54 | 45 | 36 | 23 | 17 |
| i=0 |  |  |  |  |  |  |
| i=1 |  |  |  |  |  |  |
| i=2 |  |  |  |  |  |  |
| i=3 |  |  |  |  |  |  |
| i=4 |  |  |  |  |  |  |

 What are the values in the array after each loop when a contains {17, 23, 36, 45, 54, 68}?

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Initial state | 17 | 23 | 36 | 45 | 54 | 68 |
| i=0 |  |  |  |  |  |  |
| i=1 |  |  |  |  |  |  |
| i=2 |  |  |  |  |  |  |
| i=3 |  |  |  |  |  |  |
| i=4 |  |  |  |  |  |  |

1. Given the following method that does a selection sort:

public void selectionSort2 ()

 {

 int largestIndex = 0;

 // loop from last to before first

 for (int i = a.length-1; i > 0; i--)

 {

 // set largest index to the one at i

 largestIndex = i;

 // loop from i-1 to the front looking for a larger

 for (int j = i - 1; j >= 0; j--)

 {

 if (a[j] > a[largestIndex])

 {

 largestIndex = j;

 }

 }

 // swap the one at i with the one at largest index

 int temp = a[i];

 a[i] = a[largestIndex];

 a[largestIndex] = temp;

 }

 }

If the value of a is {-3, 8, 25, 6, 15, 2} when selectionSort2 is called what are the values in the array after each time the outer loop finishes?

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Initial state | -3 | 8 | 25 | 6 | 15 | 2 |
| i=5 |  |  |  |  |  |  |
| i=4 |  |  |  |  |  |  |
| i=3 |  |  |  |  |  |  |
| i=2 |  |  |  |  |  |  |
| i=1 |  |  |  |  |  |  |

What are the values in the array a after each loop when a contains {90, 80, 70, 60, 50, 40}?

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Initial state | 90 | 80 | 70 | 60 | 50 | 40 |
| i=5 |  |  |  |  |  |  |
| i=4 |  |  |  |  |  |  |
| i=3 |  |  |  |  |  |  |
| i=2 |  |  |  |  |  |  |
| i=1 |  |  |  |  |  |  |

 What are the values in the array a after each loop when a contains {72, -30, 5, 17, 23, 36}?

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Initial state | 72 | -30 | 5 | 17 | 23 | 36 |
| i=5 |  |  |  |  |  |  |
| i=4 |  |  |  |  |  |  |
| i=3 |  |  |  |  |  |  |
| i=2 |  |  |  |  |  |  |
| i=1 |  |  |  |  |  |  |

What are the values in the array a after each loop when a contains {-50, 10, 20, 30, 40, 50}?

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Initial state | -50 | 10 | 20 | 30 | 40 | 50 |
| i=5 |  |  |  |  |  |  |
| i=4 |  |  |  |  |  |  |
| i=3 |  |  |  |  |  |  |
| i=2 |  |  |  |  |  |  |
| i=1 |  |  |  |  |  |  |

 What are the values in the array a after each loop when a contains {5, -3, 4, -2, 3, -1}?

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Initial state | 5 | -3 | 4 | -2 | 3 | -1 |
| i=5 |  |  |  |  |  |  |
| i=4 |  |  |  |  |  |  |
| i=3 |  |  |  |  |  |  |
| i=2 |  |  |  |  |  |  |
| i=1 |  |  |  |  |  |  |

 What are the values in the array after each loop when a contains {68, 54, 45, 36, 23, 17}?

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Initial state | 68 | 54 | 45 | 36 | 23 | 17 |
| i=5 |  |  |  |  |  |  |
| i=4 |  |  |  |  |  |  |
| i=3 |  |  |  |  |  |  |
| i=2 |  |  |  |  |  |  |
| i=1 |  |  |  |  |  |  |

 What are the values in the array after each loop when a contains {17, 23, 36, 45, 54, 68}?

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Initial state | 17 | 23 | 36 | 45 | 54 | 68 |
| i=5 |  |  |  |  |  |  |
| i=4 |  |  |  |  |  |  |
| i=3 |  |  |  |  |  |  |
| i=2 |  |  |  |  |  |  |
| i=1 |  |  |  |  |  |  |