Assignment 4

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# Exercise 1

## Program ArraysExercise

**File name:** ArraysExercise.java

**Purpose:** This program can create arrays based on the number of elements and values specified by the user. It also has methods for displaying it, finding its maximum and minimum values, the indexes for those values, checking if the arrays are sorted in ascending or descending order, and more.

**Packages:** javax.swing.JOptionPane

**Input:** The program asks for integer values multiple times depending on the method being used.

**Output:** Depending on the method, the program will display messages containing responses with strings.

**Pseudocode:**

Algorithm ArraysExercise

START

(**main**)

Set array of integers arr1 = **getArray**()

**printArray**(arr1)

Print **findMax**(arr1)

Print **findMin**(arr1)

Print **findMaxIndex**(arr1)

Print **findMinIndex**(arr1)

Print **isSortedAscend**(arr1)

Print is **SortedDescend**(arr1)

**swapNeighbor**(arr1)

**printArray**(arr1)

Set array of integers arr2 = **getArray**()

**printArray**(arr2)

**printArray**(**merge**(arr1, arr2))

(**getArray**)

Set integer n

Set boolean error = false

Do {

If ( error = true ) {

Print error message

}

Read n

error = true

} While ( n <= 0 )

Set array of integers array of size n

Set integer i = 0

While ( i < n ) {

Read array[ i ]

i++

}

Return array

(**printArray**, parameter: array of integers array)

Set integer n = array.length

Set string elements = “”,

Set integer i = 0

While ( i < n ) {

elements += array[ i ] + new line

i++

}

Print elements

(**findMax**, parameter: array of integers array)

Set integer max = array[0]

Set integer i = 0

While ( i < array.length ) {

If ( array[ i ] > max ) {

max = array[ i ]

}

i++

}

Return max

(**findMin**, parameter: array of integers array)

Set integer min = array[0]

Set integer i = 0

While ( i < array.length ) {

If ( array[ i ] < min ) {

min = array[ i ]

}

i++

}

Return min

(**findMaxIndex**, parameter: array of integers array)

Set integer n = array.length

Set integer max = **findMax**(array)

Set integer i = 0

While ( i < n ) {

If ( array[ i ] = max ) {

Return i

}

i++

}

Return array[ n - 1 ]

(**findMinIndex**, parameter: array of integers array)

Set integer n = array.length

Set integer min = **findMin**(array)

Set integer index = 0

Set integer i = 0

While ( i < n ) {

If ( array[ i ] = min ) {

index = i

}

i++

}

Return index

(**isSortedAscend**, parameter: array of integers array)

Set integer n = array.length

Set integer pivot = array[0]

Set integer i = 0

While ( i < n ) {

If ( array[ i ] < pivot ) {

Return false

}

pivot = array[ i ]

i++

}

Return true

(**isSortedDescend**, parameter: array of integers array)

Set integer n = array.length

Set integer pivot = array[0]

Set integer i = 0

While ( i < n ) {

If ( array[ i ] > pivot ) {

Return false

}

pivot = array[ i ]

i++

}

Return true

(**swapNeighbor**, parameter: array of integers array)

Set integer n = array.length

Set integer i = 0

While ( i < n - 1 ) {

if ( array[ i ] > array[ i + 1 ] ) {  
 array[ i + 1 ] += array[ i ]

array[ i ] = array[ i + 1 ] – array[ i ]

array[ i + 1 ] -= array[ i ]

}

}

(**merge**, parameters: array of integers array1 and array2)

If ( **isSortedAscend**(array1) = false or **isSortedAscend**(array2) = false) {

Print error message

Return empty array

}

Set integer n = array1.length

Set integer m = array2.length

Set integer l = n + m

Set array of integers merged of size l

Set integer i = 0

While ( i < l ) {

If ( j < n and k < m) {

If ( array1[ j ] < array2[ k ] ) {

merged[ i ] = array1[ j ]

j++

} Else {

merged[ i ] = array2[ k ]

k++

}

} Else {

if ( j = n and k < m ) {

merged[ i ] = array2[ k ]

k++

}

if ( k = m and j < n ) {

merged[ i ] = array1[ j ]

j++

}

}

i++

}

Return merged

END ArraysExercise

**Test run(s):**

Testing getArray():

A screenshot of a computer screen

Description automatically generated A screenshot of a computer

Description automatically generated

A screenshot of a computer error

Description automatically generated A screenshot of a computer error

Description automatically generated

Testing printArray():

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Description automatically generated

Testing findMax(), findMin(), findMaxIndex(), and findMinIndex():

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A screenshot of a computer

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Testing isSortedAscend():

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Testing isSortedDescend():

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Testing swapNeighbor():

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Testing merge():

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Description automatically generated

# Part A

## Program (program name)

**File name:** (file’s relative path)

**Purpose:** To have a sample from which to create external documentation.

**Packages:** (list of imported packages)

**Limitations:** (input it can’t handle, list of possible error messages, round-off error)

**Bugs:** (list of unfixed bugs)

**Input:** …

**Output:** …

**Pseudocode:**

Algorithm (program name)

START

1. Step 1
2. .
3. .
4. .

END (program name)

**Test run(s):**