**Algorithm Workbench**

2. This is an algorithm for a descending bubble sort.

4. A descending selection sort

**Debugging Exercise**

1. The program does not work because the result of the name being found will return “Name not found” while the name not being found will return “name found”

**Pseudocode**

**Part 1:**

//Declarations

Constant Integer Rows = 3

Constant Integer Columns = 7

Declare String Array[Rows][Columns]

Declare Integer row = 2

Declare Integer col = 6

Declare Integer index

//Last name initializations

Set Array[0][0] = “Harris”

Set Array[0][1] = “Jefferson”

Set Array[0][2] = “Adams”

Set Array[0][3] = “Watkins”

Set Array[0][4] = “Smith”

Set Array[0][5] = “Banks”

Set Array[0][6] = “Garcia”

//First name initializations

Set Array[1][0] = “Jamie”

Set Array[1][1] = “Daniel”

Set Array[1][2] = “Kim”

Set Array[1][3] = “Stacey”

Set Array[1][4] = “Pauline”

Set Array[1][5] = “Paul”

Set Array[1][6] = “Thomas”

//Birth year initializations

Set Array[2][0] = “1942”

Set Array[2][1] = “1966”

Set Array[2][2] = “1995”

Set Array[2][3] = “1938”

Set Array[2][4] = “1999”

Set Array[2][5] = “1992”

Set Array[2][6] = “1994”

//Calls the sorting module

Call selectionSort(Array[2], col)

Display “Sorted Order:”

For index = 0 To col

Display Array[0, index]

EndFor

For index = 0 To col

Display Array[1, index]

EndFor

For index = 0 To col

Display Array[2, index]

EndFor

//---------------------------------------------------------------------------

Module selectionSort(String Ref array[], Integer col, Integer row)

Declare String startScan

Declare String maxIndex

Declare String maxValue

Declare String index

For startScan = col - 1 To 0

Set maxIndex = startScan

Set maxValue = Array[2, startScan]

For index = 0 To col

If Array[2, index] > maxValue Then

Set maxValue = Array[2, index]

Set maxIndex = index

End If

End For

For index = 0 To row

Call swap(Array[index, maxIndex], Array[index, startScan])

End For

End For

End Module

//----------------------------------------------------------------------------

Module swap(Integer Ref A, Integer Ref B)

Declare Integer temp

Set temp = A

Set A = B

Set B = temp

End Module

**Part 2:**

//Declarations

Constant Integer Rows = 3

Constant Integer Columns = 7

Declare String Array[Rows][Columns]

Declare Integer row = 2

Declare Integer col = 6

Declare Integer index

//Last name initializations

Set Array[0][0] = “Harris”

Set Array[0][1] = “Jefferson”

Set Array[0][2] = “Adams”

Set Array[0][3] = “Watkins”

Set Array[0][4] = “Smith”

Set Array[0][5] = “Banks”

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//First name initializations

Set Array[1][0] = “Jamie”

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//Birth year initializations

Set Array[2][0] = “1942”

Set Array[2][1] = “1966”

Set Array[2][2] = “1995”

Set Array[2][3] = “1938”

Set Array[2][4] = “1999”

Set Array[2][5] = “1992”

Set Array[2][6] = “1994”

//Calls the sorting module

Call selectionSort(Array[0], col)

Display “Sorted Order:”

For index = 0 To col

Display Array[0, index]

EndFor

For index = 0 To col

Display Array[1, index]

EndFor

For index = 0 To col

Display Array[2, index]

EndFor

//---------------------------------------------------------------------------

Module selectionSort(String Ref array[], Integer col, Integer row)

Declare String startScan

Declare String maxIndex

Declare String maxValue

Declare String index

For startScan = col - 1 To 0

Set maxIndex = startScan

Set maxValue = Array[0, startScan]

For index = 0 To col

If Array[0, index] > maxValue Then

Set maxValue = Array[0, index]

Set maxIndex = index

End If

End For

For index = 0 To row

Call swap(Array[index, minIndex], Array[index, startScan])

End For

End For

End Module

//----------------------------------------------------------------------------

Module swap(Integer Ref A, Integer Ref B)

Declare Integer temp

Set temp = A

Set A = B

Set B = temp

End Module