Lab 1 : Arrays

Objective(s)

- Apply programming skills to implement array data structures.
- Develop an appropriate algorithm to perform different operations on array data structures.

Tool(s)/Software

Java programming language with NetBeans IDE.

Description

To implement 1D array in Java:	To implement 2D array in Java:
Syntax: **datatype** [] **arrayname;** **arrayname** = new **datatype** [N]	Syntax: **datatype [] [] arrayname;** **arrayname=new datatype[N][M];**

Algorithms for 1D arrays:

A. Traversing:

1. Repeat **for** K = LB to UB
   Apply PROCESS to **A**[K].
   [**End loop**].
2. End.

B. Find:

1- Find the location of the value to be deleted

- Repeat **for** K = LB to UB
  - **If** (Value = Array[K]) **Then**
    Display("Location of the Values is: ", K)
    [End If]
  [End of Loop]

2- End

C. Delete:

1- Find the location of the value to be deleted
   i. Repeat **for** K = LB to UB
   ii. If (Value = Array[K]) **Then** break **[End If]**
   [**End Loop**]
2- **If** (K > UB) **Then display**("Can't find value")
   Else moves the value to overwrite the delete value
      a. Repeat **for** j = K to UB-1
         i. Array[j] = Array[j+1]
      [**End Loop**]
      b. UB = UB - 1
   [**End If**]
3- End

Algorithms for 2D arrays:

A. Traversing:

1. Repeat **for** K = LBr to UBr
   1.1. Repeat for J = LBc to UBc
      Apply PROCESS to **A[K][J]**
   [End of loop]c
[**End loop**]r
2.End.

B. Find:

1- Find the location of the value to be deleted
   i. Repeat **for** K = LBr to UBr
      - Repeat for J = LBc to UBc
        - **If** (Value = Array[K][J]) **Then**
          - **Display**("Location of the Values is: ", K,J)

        [End If]

      [End of Loop]c

   [End of Loop]r
2- End

Note: *Please refer to lecture slides for more algorithms.*

Tasks/Assignments(s)

1- Create 2 arrays: arr1 and arr2. arr1 is a 1D array of the size 6. arr2 is 2D array of the size 3 * 4.
2- Fill the arrays with elements.

The student should solve <u>at least 3</u> of the following tasks:

1. To find the MAXIMUM value in arr1 and arr2.
2. To find the MINIMUM value in arr1 and arr2.
3. To find the AVERAGE of array values for each array: arr1 and arr2
4. To find SUM of the array values for each array: arr1 and arr2
5. Print all EVEN numbers available in arr1 and in arr2
6. Print all ODD numbers available in arr1 and in arr2
7. Print SQUARE of the numbers for each array: arr1 and arr2.
8. Create array (arr3={10,10,20,5,100,2}). Then, find the ADDITION of arr1, arr3. Store the result in a new array:arr4.
9. Create array (arr5={{1,1,2},{2,5,2}, {4,4,4},{3,0,0}}). Then, find the MULTIPLICATION of arr2 and arr5. Store the result in a new array: arr6.

Deliverables(s)

You are required to implement and deliver a Java program as described in the previous section.