GIT Department of Computer Engineering

CSE 331- 2021

Homework 2 #Report

Okan Torun

1801042662

Test Cases And Results :

```
addi $s0,$zero ,3
addi $s1,$zero ,10
addi $s2,$zero ,7
addi $s3,$zero ,9
addi $s4,$zero ,4
addi $s5,$zero ,11

#index = $t0
addi $t0,$zero,0

sw $s0, myArray($t0)
    addi $t0,$t0,4
sw $s1, myArray($t0)
    addi $t0,$t0,4
sw $s2, myArray($t0)
    addi $t0,$t0,4
sw $s3, myArray($t0)
    addi $t0,$t0,4
sw $s4, myArray($t0)
    addi $t0,$t0,4
sw $s5, myArray($t0)


li $s0,6    #arrLength
li $t2 ,0   #index1
li $t3 ,1   #index2
li $t4 ,0   #index1Counter
li $t5 ,1   #index2Counter
li $t6 ,0   #sequenceLength
li $t7 ,0   #maxSequenceLength
```

```
Demo 1:

Length of Sequance:3
3,10,11,
Length of Sequance:3
3,7,9,
Length of Sequance:4
3,7,9,11,
Length of Sequance:3
3,9,11,
Length of Sequance:3
3,4,11,
Length of Sequance:3
7,9,11,
Max Length of Sequance:4
3,7,9,11,
```

```
addi $s0,$zero ,22
addi $s1,$zero ,10
addi $s2,$zero ,9
addi $s3,$zero ,33
addi $s4,$zero ,21
addi $s5,$zero ,50

#index = $t0
addi $t0,$zero,0

sw $s0, myArray($t0)
    addi $t0,$t0,4
sw $s1, myArray($t0)
    addi $t0,$t0,4
sw $s2, myArray($t0)
    addi $t0,$t0,4
sw $s3, myArray($t0)
    addi $t0,$t0,4
sw $s4, myArray($t0)
    addi $t0,$t0,4
sw $s5, myArray($t0)


li $s0,6    #arrLength
li $t2 ,0   #index1
li $t3 ,1   #index2
li $t4 ,0   #index1Counter
li $t5 ,1   #index2Counter
li $t6 ,0   #sequenceLength
li $t7 ,0   #maxSequenceLength
```

```
Demo 2:

Length of Sequance:3
22,33,50,
Length of Sequance:3
22,33,50,
Length of Sequance:3
22,33,50,
Length of Sequance:3
10,33,50,
Length of Sequance:3
10,33,50,
Length of Sequance:3
10,21,50,
Length of Sequance:3
9,33,50,
Length of Sequance:3
9,21,50,
Max Length of Sequance:3
22,33,50,
```

```
addi $s0,$zero ,6
addi $s1,$zero ,9
addi $s2,$zero ,2
addi $s3,$zero ,3
addi $s4,$zero ,5
addi $s5,$zero ,7

#index = $t0
addi $t0,$zero,0

sw $s0, myArray($t0)
    addi $t0,$t0,4
sw $s1, myArray($t0)
    addi $t0,$t0,4
sw $s2, myArray($t0)
    addi $t0,$t0,4
sw $s3, myArray($t0)
    addi $t0,$t0,4
sw $s4, myArray($t0)
    addi $t0,$t0,4
sw $s5, myArray($t0)


li $s0,6    #arrLength
li $t2 ,0   #index1
li $t3 ,1   #index2
li $t4 ,0   #index1Counter
li $t5 ,1   #index2Counter
li $t6 ,0   #sequenceLength
li $t7 ,0   #maxSequenceLength
```

```
Demo 3:

Length of Sequance:3
2,3,5,
Length of Sequance:4
2,3,5,7,
Length of Sequance:3
2,5,7,
Length of Sequance:3
3,5,7,
Max Length of Sequance:4
2,3,5,7,
```

```
addi $s0,$zero ,35
addi $s1,$zero ,7
addi $s2,$zero ,47
addi $s3,$zero ,60
addi $s4,$zero ,18
addi $s5,$zero ,95

#index = $t0
addi $t0,$zero,0

sw $s0, myArray($t0)
    addi $t0,$t0,4
sw $s1, myArray($t0)
    addi $t0,$t0,4
sw $s2, myArray($t0)
    addi $t0,$t0,4
sw $s3, myArray($t0)
    addi $t0,$t0,4
sw $s4, myArray($t0)
    addi $t0,$t0,4
sw $s5, myArray($t0)


li $s0,6    #arrLength
li $t2 ,0   #index1
li $t3 ,1   #index2
li $t4 ,0   #index1Counter
li $t5 ,1   #index2Counter
li $t6 ,0   #sequenceLength
li $t7 ,0   #maxSequenceLength
```

```
Length of Sequance:3
35,47,60,
Length of Sequance:4
35,47,60,95,
Length of Sequance:3
35,47,60,
Length of Sequance:4
35,47,60,95,
Length of Sequance:3
35,60,95,
Length of Sequance:3
7,47,60,
Length of Sequance:4
7,47,60,95,
Length of Sequance:3
7,60,95,
Length of Sequance:3
7,18,95,
Length of Sequance:3
47,60,95,
Max Length of Sequance:4
35,47,60,95,
```

```
addi $s0,$zero ,90
addi $s1,$zero ,60
addi $s2,$zero ,85
addi $s3,$zero ,55
addi $s4,$zero ,75
addi $s5,$zero ,80

#index = $t0
addi $t0,$zero,0

sw $s0, myArray($t0)
    addi $t0,$t0,4
sw $s1, myArray($t0)
    addi $t0,$t0,4
sw $s2, myArray($t0)
    addi $t0,$t0,4
sw $s3, myArray($t0)
    addi $t0,$t0,4
sw $s4, myArray($t0)
    addi $t0,$t0,4
sw $s5, myArray($t0)


li $s0,6    #arrLength
li $t2 ,0   #index1
li $t3 ,1   #index2
li $t4 ,0   #index1Counter
li $t5 ,1   #index2Counter
li $t6 ,0   #sequenceLength
li $t7 ,0   #maxSequenceLength
```

```
Demo 5:

Length of Sequance:3
60,75,80,
Length of Sequance:3
60,75,80,
Length of Sequance:3
55,75,80,
Max Length of Sequance:3
60,75,80,
```

```
addi $s0,$zero ,30
addi $s1,$zero ,10
addi $s2,$zero ,7
addi $s3,$zero ,9
addi $s4,$zero ,4
addi $s5,$zero ,55

#index = $t0
addi $t0,$zero,0

sw $s0, myArray($t0)
    addi $t0,$t0,4
sw $s1, myArray($t0)
    addi $t0,$t0,4
sw $s2, myArray($t0)
    addi $t0,$t0,4
sw $s3, myArray($t0)
    addi $t0,$t0,4
sw $s4, myArray($t0)
    addi $t0,$t0,4
sw $s5, myArray($t0)


li $s0,6    #arrLength
li $t2 ,0   #index1
li $t3 ,1   #index2
li $t4 ,0   #index1Counter
li $t5 ,1   #index2Counter
li $t6 ,0   #sequenceLength
li $t7 ,0   #maxSequenceLength
```

```
Demo 6:

Length of Sequance:3
7,9,55,
Max Length of Sequance:3
7,9,55,
```

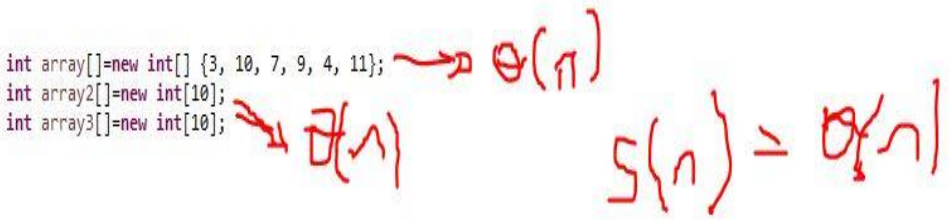
Time Complexity:

```
while(index1Counter<array.length-1) {

    if(index2<array.length  && array[index1]<array[index2]) {

        if(sequenceLength==0) {
            array2[sequenceLength]=array[index1];
            sequenceLength++;
            array2[sequenceLength]=array[index2];
            sequenceLength++;
            index1=index2;
            index2++;
        }
        else {
            array2[sequenceLength]=array[index2];
            sequenceLength++;
            index1=index2;
            index2++;
            for(int i=0;i<sequenceLength;i++) {
                System.out.println(array2[i]);
            }
            System.out.println("------------");
        }

    }
    else if(index2<array.length) {
        index2++;


    }

    if(index2==array.length) {

        if(sequenceLength>maxSequenceLength) {
            maxSequenceLength=sequenceLength;
            for(int i=0;i<maxSequenceLength;i++) {
                array3[i]=array2[i];
            }
        }
        sequenceLength=0;
        index2Counter++;
        index2=index2Counter;
        index1=index1Counter;
        if(index2Counter==array.length) {
            index1Counter++;
            index2Counter=index1Counter+1;
            index1=index1Counter;
            index2=index2Counter;


        }

    }
}
```

Explain Code :

```
while(index1Counter<array.length-1) {

    if(index2<array.length  && array[index1]<array[index2]) {

        if(sequenceLength==0) {
            array2[sequenceLength]=array[index1];
            sequenceLength++;              //  In the first comparison of the order, I insert the first two elements of the array.
            array2[sequenceLength]=array[index2];
            sequenceLength++;//I increment the sequence counter and use index2 as iterator.
            index1=index2;
            index2++;
        }
        else {
            array2[sequenceLength]=array[index2];
            sequenceLength++;           //I continue to load elements one by one after the first positive comparison.
            index1=index2;
            index2++;
            for(int i=0;i<sequenceLength;i++) {
                System.out.println(array2[i]);  //I suppress when the sequential element occurs.
            }
            System.out.println("------------");
        }

    }
    else if(index2<array.length) {
        index2++;   //If the comparison is negative, I continue the iterator.


    }

    if(index2==array.length) {

        if(sequenceLength>maxSequenceLength) {//When the iterator reaches the end of the array, I check if there is a maximum queue.
            maxSequenceLength=sequenceLength;
            for(int i=0;i<maxSequenceLength;i++) {
                array3[i]=array2[i];               //then I optimize the max array.
            }
        }
        sequenceLength=0;   //I reset the sequence length.
        index2Counter++;
        index2=index2Counter;
        index1=index1Counter;
        if(index2Counter==array.length) {
            index1Counter++;        //I also use an iterator for the element I am comparing in the array,
            index2Counter=index1Counter+1;//and I improve it when it is equal to the length of the array.
            index1=index1Counter;
            index2=index2Counter;


        }

    }
}


for(int i=0;i<maxSequenceLength;i++) {
    System.out.println(array3[i]);  //I'm suppressing the elements of the maximum length sub
}
```

Space Complexity:



Bonus Part :

I printed all the sub-sequences.