Assumptions Made:

General:

- Array size can be arbitrary, as long as it is larger than 100. I chose 150.
- No int file is provided, so one called "ints.txt" is generated in main for use in readFileData().

Functions:

- displayArray()
 - The ints are not longer than 4 characters. Change the set width to accommodate if necessary.
 - Trailing zeros that are not explicitly added after array initialization are not meant to be shown in the array.
- indexLocationOfNum()
 - None
- readFileData()
 - The input file is called "ints.txt". Change if that is not the case. Number of ints in the file is less than 150.
- modifyValue()
 - Basic validation and throwing an error if the input index is not a valid location in the array is acceptable.
 - Values in the array but after the last modified value can still be modified.
- addNewInt()
 - o Basic check if the array is full is acceptable for use in the try-catch block.

Sample output:

indexLocationOfNum()

```
Enter a number to where it appears in the array.
51
The index of the number 51 is: 50. (-1 means the number is not in the array)
```

modifyValue Failure

```
Enter an index to modify the int at that location in the array.
200
Out_of_range exception thrown for index 200
Enter an index to modify the int at that location in the array.
50
The current value at index 50 is: 51
Enter a numerical value to add to that value.
49
The current value at index 50 after adding 49 to is: 100
The current array is:
                        5
             3
                  4
                             6
                                        8
                                             9
   1
        2
                                                 10
  11
       12
            13
                 14
                       15
                            16
                                 17
                                       18
                                            19
                                                 20
       22
            23
                       25
                            26
                                       28
                                            29
  21
                  24
                                 27
                                                 30
            33
                  34
                       35
                            36
                                            39
                                                 40
  31
       32
                                 37
                                       38
            43
                 44
  41
       42
                       45
                            46
                                 47
                                       48
                                            49
                                                 50
            53
 100
       52
                 54
                       55
                            56
                                 57
                                       58
                                            59
                                                 60
  61
       62
            63
                 64
                       65
                            66
                                 67
                                       68
                                            69
                                                 70
  71
       72
            73
                 74
                       75
                            76
                                       78
                                            79
                                                 80
                                 77
  81
       82
            83
                 84
                       85
                            86
                                 87
                                       88
                                            89
                                                 90
       92
            93
                 94
                       95
                            96
                                 97
                                       98
                                            99
  91
                                                100
```

modifyValue Success

```
Enter an index to modify the int at that location in the array.
50
The current value at index 50 is: 51
Enter a numerical value to add to that value.
The current value at index 50 after adding 49 to is: 100
The current array is:
        2
              3
                   4
                        5
                             6
                                         8
                                              9
                                                  10
   1
  11
       12
             13
                  14
                       15
                             16
                                  17
                                        18
                                             19
                                                   20
  21
       22
             23
                  24
                       25
                             26
                                  27
                                        28
                                             29
                                                  30
  31
       32
             33
                  34
                       35
                             36
                                  37
                                        38
                                             39
                                                  40
             43
                       45
                             46
  41
       42
                  44
                                  47
                                        48
                                             49
                                                  50
 100
       52
             53
                  54
                       55
                             56
                                  57
                                        58
                                             59
                                                  60
  61
       62
             63
                  64
                       65
                             66
                                  67
                                        68
                                             69
                                                  70
                  74
                       75
                                             79
  71
       72
             73
                             76
                                  77
                                        78
                                                  80
  81
       82
             83
                  84
                       85
                             86
                                  87
                                        88
                                             89
                                                  90
  91
       92
             93
                  94
                       95
                             96
                                  97
                                        98
                                             99
                                                 100
```

addNewInt Fail

Enter a number to add to the end of the array. The array is full. Cannot add int.

addNewInt Success

```
Enter a number to add to the end of the array.
101
The current array is:
             3
                   4
                         5
                                              9
        2
                              6
                                         8
                                                   10
  1
  11
       12
             13
                  14
                        15
                             16
                                   17
                                        18
                                              19
                                                   20
                        25
  21
       22
             23
                  24
                             26
                                   27
                                        28
                                              29
                                                   30
  31
       32
             33
                  34
                        35
                             36
                                              39
                                   37
                                        38
                                                   40
             43
                  44
                       45
                                        48
                                             49
  41
       42
                             46
                                   47
                                                   50
 100
             53
                  54
                        55
                                              59
       52
                             56
                                   57
                                        58
                                                   60
                  64
                        65
  61
       62
             63
                             66
                                   67
                                        68
                                              69
                                                   70
                                              79
  71
       72
             73
                  74
                       75
                             76
                                   77
                                        78
                                                   80
  81
       82
             83
                  84
                        85
                             86
                                   87
                                        88
                                             89
                                                   90
  91
       92
            93
                  94
                        95
                             96
                                   97
                                        98
                                             99 100
 101
```

removeValue

```
Enter an index to remove the int at that location from the array.
50
The current array is:
                 4
                      5
  1
       2
            3
                          6
                                    8
                                          9
                                              10
      12
           13
                14
                     15
                          16
                               17
                                    18
                                         19
                                              20
 11
  21
       22
            23
                24
                     25
                          26
                               27
                                    28
                                         29
                                              30
  31
      32
            33
                34
                     35
                          36
                               37
                                    38
                                         39
                                              40
           43
                44
                     45
 41
      42
                          46
                               47
                                    48
                                         49
                                              50
           54
  52
       53
                55
                     56
                          57
                               58
                                    59
                                         60
                                              61
  62
      63
           64
                65
                     66
                               68
                                    69
                                         70
                                              71
  72
      73
           74
               75
                     76
                               78
                                    79
                                         80
                                              81
                          77
  82
      83
           84 85
                     86
                          87
                               88
                                    89
                                         90 91
  92
           94
                95
                               98
      93
                     96
                          97
                                    99
                                       100 101
```