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CS 1073 (FR02A)

Assignment 11

3429069

Section A

Source Code:

```java
/**

 * Inverted Stairs

 * @author Isaac Shoebottom (3429069)

 */


public class PatternInverted {


    public static void main(String[] args) {

        for (int i = 1; i < 10; i++) {

            for (int a = 9; a > i; a--) {

                System.out.print(' ');

            }

            for (int j = 1; j <= i; j++) {

                System.out.print('*');

            }

            System.out.println();

        }

    }

}
```

Output:

Section B

Source Code:

```java
import java.util.Scanner;

/**
 * Simple test stats
 * @author Isaac Shoebottom (3429069)
 */

public class ClassGrades {
    public static void main(String[] args) {
        Scanner scan = new Scanner(System.in);
        long testScore;
        long numberOfA = 0;
        long numberOfB = 0;
        long numberOfC = 0;
        long numberOfD = 0;
        long numberOfF = 0;
        do {
            System.out.print("Enter test score: ");
            testScore = scan.nextLong();

            if (testScore > 100) {
                System.out.println("Please enter a test score within the range 0-100");
            }
            else {
                if (testScore >= 85) {
                    numberOfA++;
                }
                else if (testScore >= 70) {
```

```java
                numberOfB++;

            }

            else if (testScore >= 55) {

                numberOfC++;

            }

            else if (testScore >= 45) {

                numberOfD++;

            }

            else if (testScore >= 0) {

                numberOfF++;

            }

        }

    } while (testScore >= 0);


    System.out.println("Number of A's: " + numberOfA);

    System.out.println("Number of B's: " + numberOfB);

    System.out.println("Number of C's: " + numberOfC);

    System.out.println("Number of D's: " + numberOfD);

    System.out.println("Number of F's: " + numberOfF);


    }

}
```

Output:

```
"c:\program files\zulu\zulu-8\bin\java.exe" ...
Enter test score: 12
Enter test score: 23
Enter test score: 34
Enter test score: 45
Enter test score: 56
Enter test score: 67
Enter test score: 78
Enter test score: 89
Enter test score: 90
Enter test score: 01
Enter test score: 32
Enter test score: 54
Enter test score: 65
Enter test score: 76
Enter test score: 87
Enter test score: 09
Enter test score: 1000
Please enter a test score within the range 0-100
Enter test score: 1050
Please enter a test score within the range 0-100
Enter test score: 100
Enter test score: 0
Enter test score: -1
Number of A's: 4
Number of B's: 2
Number of C's: 3
Number of D's: 2
Number of F's: 7

Process finished with exit code 0
```

Source Code:

```java
import java.util.Scanner;


/**

 * Sideways histogram for tests

 * @author Isaac Shoebottom (3429069)

 */


public class ClassGradesHistogram {

    public static void main(String[] args) {

        Scanner scan = new Scanner(System.in);

        long testScore;

        long numberOfA = 0;

        long numberOfB = 0;

        long numberOfC = 0;

        long numberOfD = 0;

        long numberOfF = 0;

        do {

            System.out.print("Enter test score: ");

            testScore = scan.nextLong();


            if (testScore > 100) {

                System.out.println("Please enter a test score within
the range 0-100");

            } else {

                if (testScore >= 85) {

                    numberOfA++;

                } else if (testScore >= 70) {

                    numberOfB++;

                } else if (testScore >= 55) {
```

```java
                numberOfC++;

            } else if (testScore >= 45) {

                numberOfD++;

            } else if (testScore >= 0) {

                numberOfF++;

            }

        }

    } while (testScore >= 0);


    System.out.println("Scores");

    System.out.print("A\t\t|");

    while (numberOfA > 0) {

        System.out.print('*');

        numberOfA--;

    }

    System.out.println();

    System.out.print("B\t\t|");

    while (numberOfB > 0) {

        System.out.print('*');

        numberOfB--;

    }

    System.out.println();

    System.out.print("C\t\t|");

    while (numberOfC > 0) {

        System.out.print('*');

        numberOfC--;

    }

    System.out.println();

    System.out.print("D\t\t|");

    while (numberOfD > 0) {
```

```java
            System.out.print('*');

            numberOfD--;

        }

        System.out.println();

        System.out.print("F\t\t|");

        while (numberOfF > 0) {

            System.out.print('*');

            numberOfF--;

        }

        System.out.println();

        System.out.println("\t\t" +
"=============================");

        System.out.println("\t\t" + "+           +           +
+");

        System.out.println("\t\t" + "0           10          20
30");


    }
}
```

Output (Too long for picture):

```
Enter test score: 12

Enter test score: 23

Enter test score: 34

Enter test score: 56

Enter test score: 67

Enter test score: 89

Enter test score: 90

Enter test score: 21

Enter test score: 43

Enter test score: 54

Enter test score: 65

Enter test score: 76

Enter test score: 87

Enter test score: 98

Enter test score: 09

Enter test score: 49

Enter test score: 28

Enter test score: 48

Enter test score: 43

Enter test score: 86

Enter test score: 23

Enter test score: 765

Please enter a test score within the range 0-100

Enter test score: 54

Enter test score: 65

Enter test score: 32

Enter test score: 73

Enter test score: 96

Enter test score: 62
```

```
Enter test score: 74

Enter test score: 52

Enter test score: 52

Enter test score: 74

Enter test score: 52

Enter test score: 74

Enter test score: 52

Enter test score: 75

Enter test score: 2

Enter test score: 74

Enter test score: 41

Enter test score: 74

Enter test score: 41

Enter test score: 63

Enter test score: 41

Enter test score: -1
Scores
A          |******
B          |********
C          |******
D          |********
F          |**************

           ==============================
           +          +          +          +
           0          10         20         30
```

Source Code:

```java
import java.util.Scanner;

/**
 * Vertical histogram for tests
 * @author Isaac Shoebottom (3429069)
 */

public class ClassGradesHistogramVertical {
    public static void main(String[] args) {
        Scanner scan = new Scanner(System.in);
        long testScore;
        long numberOfA = 0;
        long numberOfB = 0;
        long numberOfC = 0;
        long numberOfD = 0;
        long numberOfF = 0;
        do {
            System.out.print("Enter test score: ");
            testScore = scan.nextLong();

            if (testScore > 100) {
                System.out.println("Please enter a test score within the range 0-100");
            } else {
                if (testScore >= 85) {
                    numberOfA++;
                } else if (testScore >= 70) {
                    numberOfB++;
                } else if (testScore >= 55) {
```

```java
            numberOfC++;
        } else if (testScore >= 45) {
            numberOfD++;
        } else if (testScore >= 0) {
            numberOfF++;
        }
    }
} while (testScore >= 0);


for (int i = 30; i > 0; i--) {
    if (i == 30 | i == 20 | i == 10)
        System.out.print(i+ "+");
    System.out.print("\t| ");
    if (numberOfA >= i) {
        System.out.print('*');
    }
    else {
        System.out.print(' ');
    }
    System.out.print(' ');
    if (numberOfB >= i) {
        System.out.print('*');
    }
    else {
        System.out.print(' ');
    }
    System.out.print(' ');
    if (numberOfC >= i) {
        System.out.print('*');
    }
```

```java
            else {
                System.out.print(' ');
            }
            System.out.print(' ');
            if (numberOfD >= i) {
                System.out.print('*');
            }
            else {
                System.out.print(' ');
            }
            System.out.print(' ');
            if (numberOfF >= i) {
                System.out.print('*');
            }
            else {
                System.out.print(' ');
            }
            System.out.print(' ');
            System.out.println();
        }
        System.out.println("0+\t==========");
        System.out.println("\t  A B C D F");
    }
}
```

```
Enter test score: 12

Enter test score: 34

Enter test score: 56

Enter test score: 78

Enter test score: 90

Enter test score: 09

Enter test score: 87

Enter test score: 65

Enter test score: 43

Enter test score: 21

Enter test score: 13

Enter test score: 35

Enter test score: 7

Enter test score: 75

Enter test score: 42

Enter test score: 65

Enter test score: 42

Enter test score: 86

Enter test score: 432

Please enter a test score within the range 0-100

Enter test score: 73

Enter test score: 95

Enter test score: 05

Enter test score: 15

Enter test score: 73

Enter test score: 53

Enter test score: 86

Enter test score: 53

Enter test score: 86
```

```
Enter test score: 52
Enter test score: 85
Enter test score: 53
Enter test score: 86
Enter test score: 27
Enter test score: 73
Enter test score: 52
Enter test score: 85
Enter test score: -1
```

```
30+   |

      |

      |

      |

      |

      |

      |

      |

      |

      |

20+   |

      |

      |

      |

      |

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      |              *

      |              *

      |              *

10+   |              *

      | *            *

      | *            *

      | *            *

      | *            *

      | *  *      *  *

      | *  *      *  *

      | *  *  *  *  *

      | *  *  *  *  *

      | *  *  *  *  *

0+    ===========

        A  B  C  D  F
```

Section E

Source Code (Utilities):

```java
/**
 * Array utils for ints
 * @author Isaac Shoebottom (3429069)
 */


public class IntArrayUtil {


    /**
     * Appends an array to another array
     * @param arrA First array in append
     * @param arrB Second array in append
     * @return Appended array
     */
    public static int[] append (int[] arrA, int[] arrB) {
        int appendedLength = arrA.length + arrB.length;
        int[] appended = new int[appendedLength];
        for(int i = 0; i < arrA.length; i++) {
            appended[i] = arrA[i];
        }
        for(int i = 0; i < arrB.length; i++) {
            appended[i + arrA.length] = arrB[i];
        }
        return appended;
    }


    /**
     * Reverse the order of elements in a string
     * @param arr The array to be reversed
```

```java
 * @return The reversed array
 */
public static int[] reverse (int[] arr) {

    int[] reversed = new int[arr.length];

    for(int i =0; i<arr.length; i++ ) {

       reversed[i] = arr[i];

    }


    for(int i = 0; i < arr.length/2; i++) {

        int temp = reversed[i];

        reversed[i] = arr[(arr.length-1) - i];

        reversed[(arr.length-1) - i] = temp;

    }


    return reversed;

}


/**
 * Subtracts every odd index from a string from every even index
 * @param arr The array to perform math on
 * @return The alternating sum of the array
 */
public static int alternatingSum (int[] arr) {

    int positives = 0;

    int negatives = 0;

    boolean isPos = true;

    for (int j : arr)

        if (isPos) {

            positives += j;
```

```
                isPos = false;

        } else {

                negatives += j;

                isPos = true;

        }


        return positives-negatives;

    }

}
```

```java
import java.util.Arrays;


public class IntArrayUtilDriver {

    public static void main(String[] args) {
        int[] array1 = {1, 4 ,9, 16};
        int[] array2 = {9, 7, 4, 9 ,11};


        int[] array3 = IntArrayUtil.append(array1, array2);



        System.out.println("These are the original strings");
        System.out.println(Arrays.toString(array1));
        System.out.println(Arrays.toString(array2));
        System.out.println(Arrays.toString(array3));


        System.out.println("These are the modified strings");
        System.out.println(Arrays.toString(IntArrayUtil.append(array1,
array2)));

System.out.println(Arrays.toString(IntArrayUtil.reverse(array3)));
        System.out.println(IntArrayUtil.alternatingSum(array3));
    }
}
```

These are the original strings

[1, 4, 9, 16]

[9, 7, 4, 9, 11]

[1, 4, 9, 16, 9, 7, 4, 9, 11]

These are the modified strings

[1, 4, 9, 16, 9, 7, 4, 9, 11]

[11, 9, 4, 7, 9, 16, 9, 4, 1]

-2

```
These are the original strings
[1, 4, 9, 16]
[9, 7, 4, 9, 11]
[1, 4, 9, 16, 9, 7, 4, 9, 11]
These are the modified strings
[1, 4, 9, 16, 9, 7, 4, 9, 11]
[11, 9, 4, 7, 9, 16, 9, 4, 1]
-2
```