Assignment 1: Numbers in Words

(Review of basic concepts)

Due Date: June, 16 at the beginning of the class

Late assignments will not be accepted.

Write a program that reads a sequence of non-negative integer number (4 digits maximum) and writes the number in words. The numbers in words should be displayed in descending order of their lengths. The end of input is indicated by a negative number.

Your program must contain two classes: Numbers and Test.

**Class Numbers**

<table>
<thead>
<tr>
<th>Private Instance Variables:</th>
<th>int value;</th>
<th>The value of the integer number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constructor</td>
<td>Numbers(int n)</td>
<td>Initializes the value of number to n</td>
</tr>
<tr>
<td>Public Methods:</td>
<td>String toString()</td>
<td>Returns the spelling of the value</td>
</tr>
<tr>
<td>Private Methods:</td>
<td>int getOnes()</td>
<td>Returns number of ones in value</td>
</tr>
<tr>
<td></td>
<td>int getTens()</td>
<td>Returns number of tens in value</td>
</tr>
<tr>
<td></td>
<td>int getHundreds()</td>
<td>Returns number of hundreds in value</td>
</tr>
<tr>
<td></td>
<td>int getThousands()</td>
<td>Returns number of thousands in value</td>
</tr>
<tr>
<td></td>
<td>String digitToString(int d)</td>
<td>Returns the spelling of d (one digit)(i.e. zero, one, two, …)</td>
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<tr>
<td></td>
<td>String hundredsToString(int d)</td>
<td>Returns the spelling of “d” hundreds</td>
</tr>
<tr>
<td></td>
<td>String thousandsToString(int d)</td>
<td>Returns the spelling of “d” thousands</td>
</tr>
<tr>
<td></td>
<td>String tensAndOnesToString(int d1, int d2)</td>
<td>Returns the spelling of d1d2, where d1d2 is a 2 digit number (i.e. ten, eleven, …, twenty, twenty one, … ninety nine)</td>
</tr>
</tbody>
</table>

The above methods should not duplicate the work of other methods of the class and should call them if necessary.
The Test class contains the main method shown below:

```java
public static void main(String[] args) {
    do {
        Scanner input = new Scanner(System.in);
        System.out.print("Enter the an integer (4 digits max) -->");
        int value = input.nextInt();
        if (value > 0) {
            Numbers n = new Numbers(value); // Store n.toString in an array, s
        } else break;
    } while (true);
    // display contents of s in descending order of their lengths
}
```

Add other methods as needed (particularly a method to sort the array s);

**Sample input/output**

The following table shows a sample input/output for the program.

Input: 5, 11, 154, 1001, 504, 7376, 8001, 5101, 0

Output:

- Seven thousands and three hundreds and seventy six
- Five thousands and one hundred and one
- One hundred and fifty four
- Five hundreds and four
- One thousand and one
- Eight thousands
- Eleven
- Five
- Zero

Note that the first letter of the output is capitalized, singular and plural words for “thousand” and “hundred” are used and the different parts of the number are connected with “and”.

**Turn in:** Printed listings of all your java source code and a sample output.