Project: Scrolling Text

Your EE 230L semester project is to design a scrolling text system. The sentence to be displayed is stored in the internal logics or memory (use anything you see fit!). For this particular scrolling text system, each character enters from the right and scrolls (or shift) from right to left. The text scrolling system will continuously re-display the same text (insert space as necessary to increase readability). The system is to scroll at the speed of around 1 Hz, so that the message can be read!

The scrolling text is “I cannot believe I can do this”. The following is the segment decoding for the seven-segment LED.

```
<table>
<thead>
<tr>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>b</td>
<td>c</td>
<td>d</td>
<td>e</td>
<td>h</td>
<td>i</td>
</tr>
<tr>
<td>l</td>
<td>n</td>
<td>o</td>
<td>s</td>
<td>t</td>
<td>v</td>
<td></td>
</tr>
</tbody>
</table>
```

Since hardware prototype system has been built for this project, you have been asked to use the Spartan-3 prototyping kit (the FPGA board you have been using this semester) on board four seven-segment LEDs.

In short, this project is to display the text “I cannot believe I can do this” to the four seven-segment LEDs from the right seven-segment (digit-0) LED to the left seven-segment LED (digit-3). For example, the first character “I” appears on digit-0. After ~1 second, “I” moves to digit-1 and a space appears on digit-0. Then, “I” moves to digit-2, the space moves to digit-1, and “c” appears in digit-0. This process continues until the end of the sentence and it repeats itself.

Requirement:
Design a scrolling text system with the above specifications. You need to demonstrate your project and submit a full report of your design. You need to describe all aspects of your design from blocks to the complete design. You should answer this question in your report: how an engineer will be able to tell that you have a good design from your report? Also in your report, what if someone is to scroll a different text, what he/she has to do?

Tools & Input Types:
You can use anything that you have learned in EE 230 and EE 230L. Project copying will result in 0 for the project grade and F for the overall laboratory grade. You can design using VHDL, Verilog, State Diagram or even (the good old!) schematics capture. All symbols in the Xilinx libraries are allowed. If you have any questions of what can or cannot be used, please send me emails.

What you should and shouldn’t do:
You should start early, design the blocks and test one block at a time. You should have a preliminary block diagram design to seek advice from laboratory instructor at the early stage of the design process. If you waited until the last possible minutes, very little help can be provided.

Availability:
There will be no more normal laboratory experiments after this week (week of 11/13-11/19). After this week, the laboratory assistants will be available in the lab during normal lab hours to answer your questions and help you with your design. Due to my research travel, I will be out of town from 12/5 to 12/8. If you have questions, send me emails. I will arrange someone to help you.