CPE462 - VHDL: Simulation and Synthesis - Fall'11
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Homework Assignment #13
Due Date: Wednesday, November 2nd 2011

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Homework policy: If I see something unusual about your work, you can be sure I will ask you about it. If you are unable to explain it to me why you chose some implementation method I will have to consider your entire solution wrong. Now, what is my definition of "unusual work"? Well, things like suspicious parts of code that may have been copied from a website or chunks of your implementation that are very close to one of your colleagues. I really encourage communication amongst yourselves, and I want you guys to have a good time learning while doing these exercises... but please don't blindly copy code. If you really must, at least acknowledge your sources.

1. You professor's favorite TV-show is unquestionably Battlestar Galactica. In the TV-show the last remains of human civilization tries to escape a cybernetic race known as the Cylons (Figure 1). One of the Cylon models has a group of pulsating LEDs instead of regular eyes. I would like you to replicate this behavior in our FPGA boards. If you never seen the TV show, you can see how their eyes glow by taking a peak at the following video : http://www.youtube.com/watch?v=HxSs6crjP4A . Use all available LEDs and implement the moving LED motion. Also implement three VERY different moving speeds. For example, if switch 1 is high, the motion is very slow, but if switch 3 is high, then the motion is very fast. Turn in a copy of your code and demonstrate its behavior (in a Spartan3 FPGA board) to the instructor for full credit.

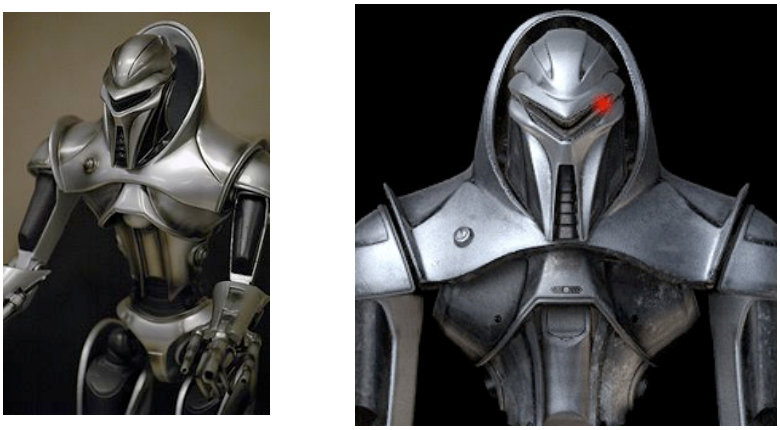

Figure 1 - A Cylon centurion.

2. Implement a binary counter in a spartan 3 FPGA board with a two second delay between each number. That is, start counting at 0 and every two seconds increase the counter by one. Represent the current binary number using the LEDs.