**Design Name :** Modify Knight-Rider design so that left and right light movements are triggered by West and East buttons

## **Objective :**

Learn some signal attributes and clock-division..

## **Assignment :**

- 1. Repeat the Knight-Rider design given in the lecture notes (the one with an up-down counter and decoder) and try to understand it by experimenting.
- 2. Modify the design so that LED blink motions are button controlled. That is, pressing the West button moves blinking LED from the rightmost position to the leftmost only once. Similarly East button does the same action but to the right.

West button pressed and released East button pressed and released



3. Modify the design so that pressing a button and releasing it quickly causes the motion to be done once but keeping it pressed causes the motion to repeat until the button released and the last started motion completed.

## Follow Up Work :

Redesign the assignment using two 4-bit counters for left and right motions independently. Use a single combinatorial 4 to 8 decoder to feed the LEDs (since all LEDs must be off at the end of the motion, 4 to 8 decoder should be more practical). Think of a way to combine counter outputs and prevent multi-sourced signals.

## **Homework :**

Modify your design so that keeping the button pressed increases the motion speed each time the motion is restarted.

