



**CLASS: S.E. E &TC**

**SUBJECT: DC**

**EXPT. NO.: 7**

**DATE:05/12/2020**

**Roll No: 22119**

**TITLE : Study of Counter ICs (74HC191)**

**PRE-REQUISITITES  
FOR EXPT. :**

Definition of Synchronous Counter

Implementation and operation of Synchronous Counter  
Using IC74HC191

(Refer Data-Sheet)

**OBJECTIVE :**

1. Design & Implement 4-bit Up-Counter using IC-74HC191
2. Design & Implement 4-bit Down Counter using IC-74HC191
3. Design & Implement 4-bit UP/Down Counter using IC-74HC191
4. MOD-N Up Counter and MOD N down counter using IC-74HC191. Draw the Timing Diagram.

**APPARATUS :**

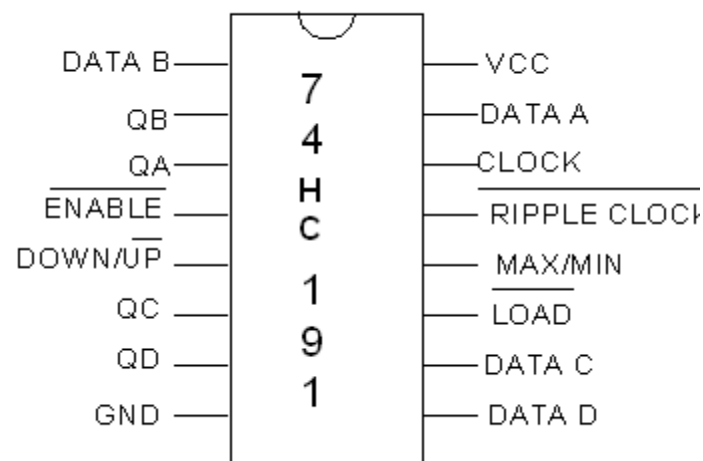
Digital-Board, GP-4Patch-Cords, IC-74LS32,IC-74LS00 / IC-74LS04/IC-74LS08, 74HC191.

**THEORY :**

IC-74HC191 is a 4-bit Synchronous Up/Down Counter. It is called as reversible counter because IC can be used as UP and Down counter by proper mode selection.

IC-74HC191 is also called resettable Counter because counting can start from any desired state as an initial state. IC-74HC191 has an active low enable pin to activate or disable counting, also it has Max/Min pin to indicate terminal count of counter.

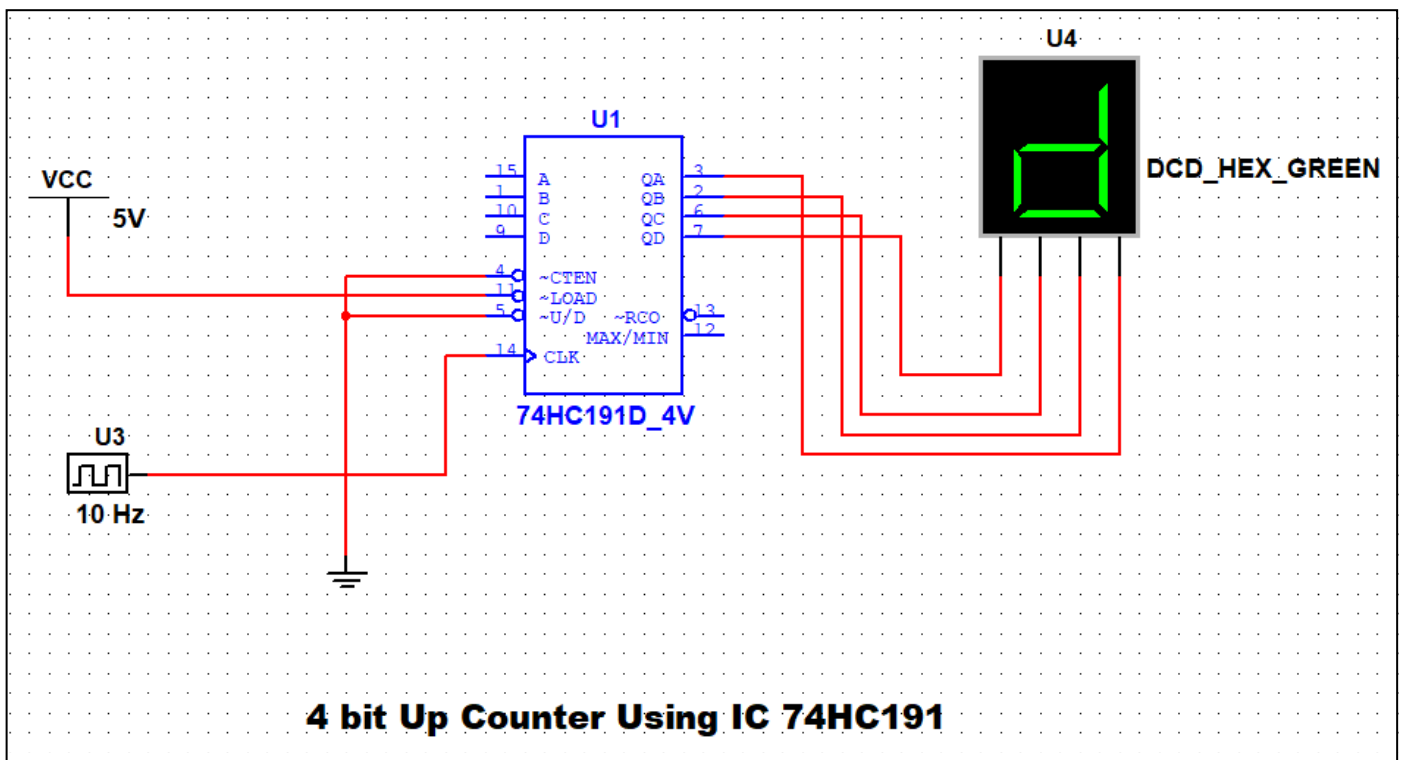
### PIN Diagram:



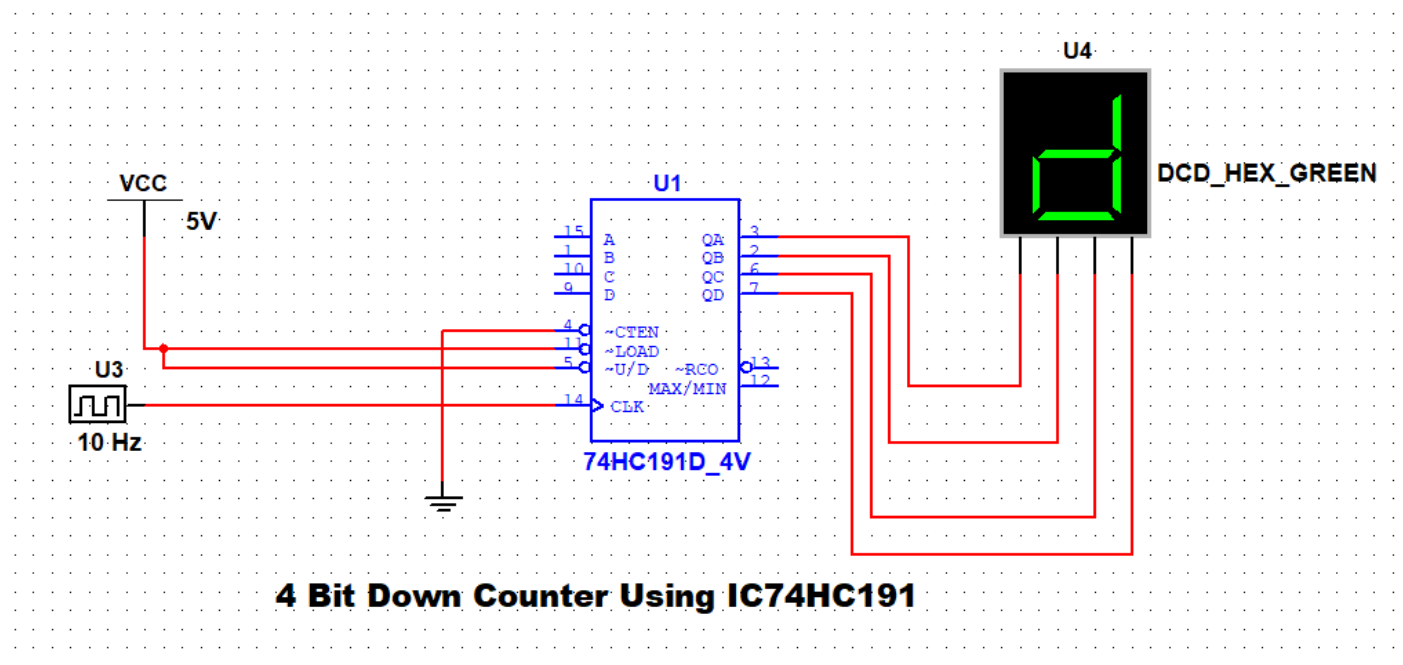
### PROCEDURE :

1. Make the connections as per the Logic circuit of 4-bit Up-Counter, 4-bit Down-Counter, MOD- N up counter and MOD- N down counter using IC74HC191 and Verify its state Table.

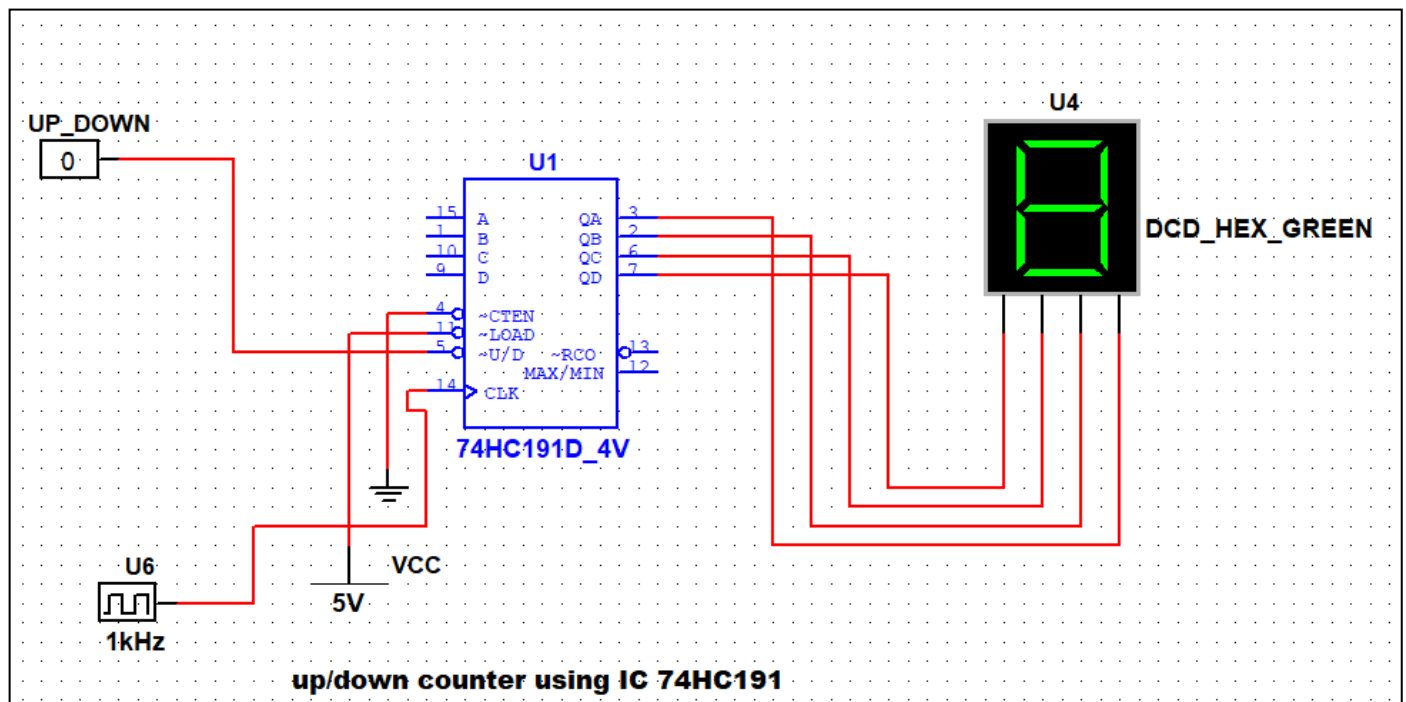
## Logic Diagram: (4-bit Up-Counter using IC-74HC191):



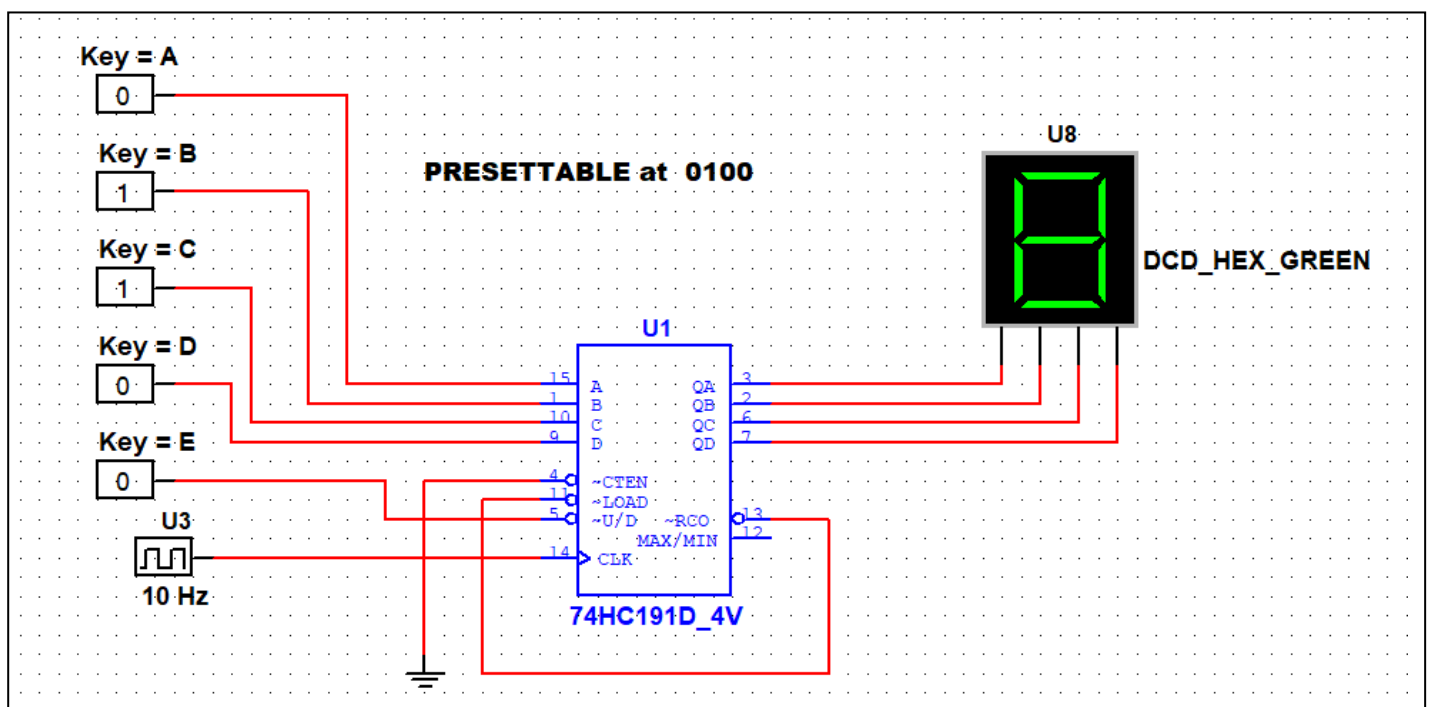
## Logic Diagram: (4-bit Down-Counter using IC-74HC191):



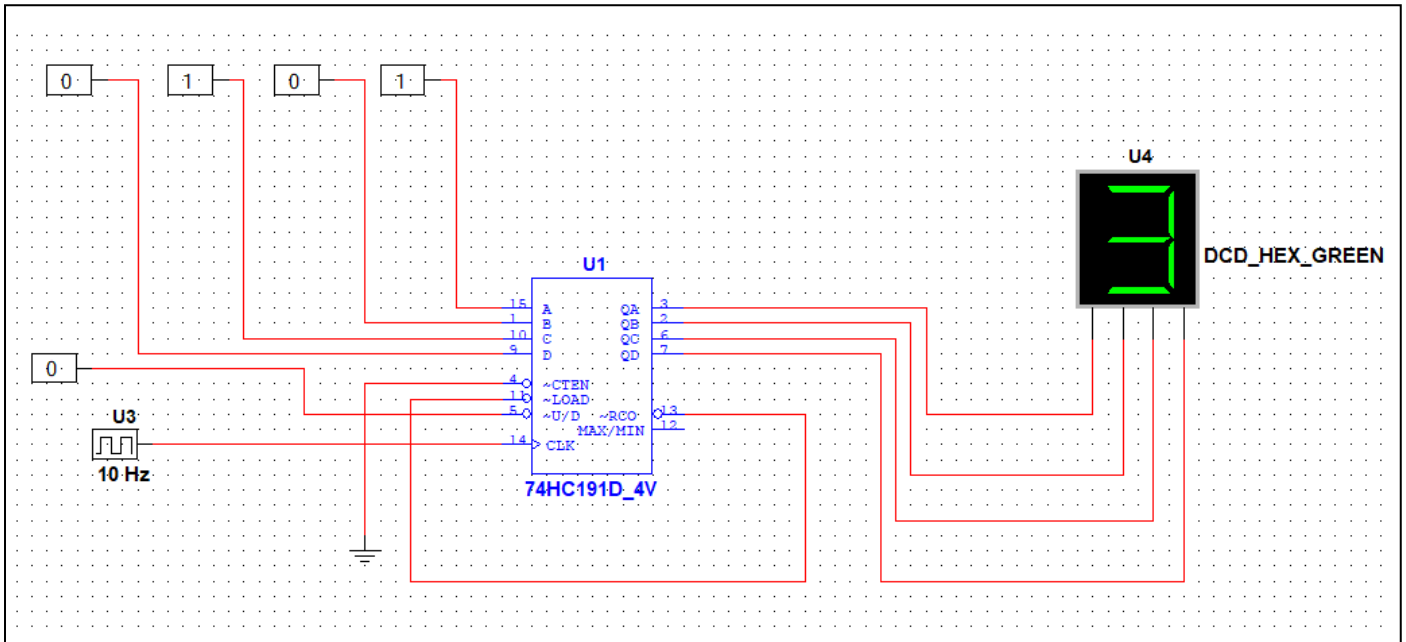
## Design & Implement UP/DOWN counter using 74HC191:



## Design & Implement 74HC191 as a Presetable Counter:

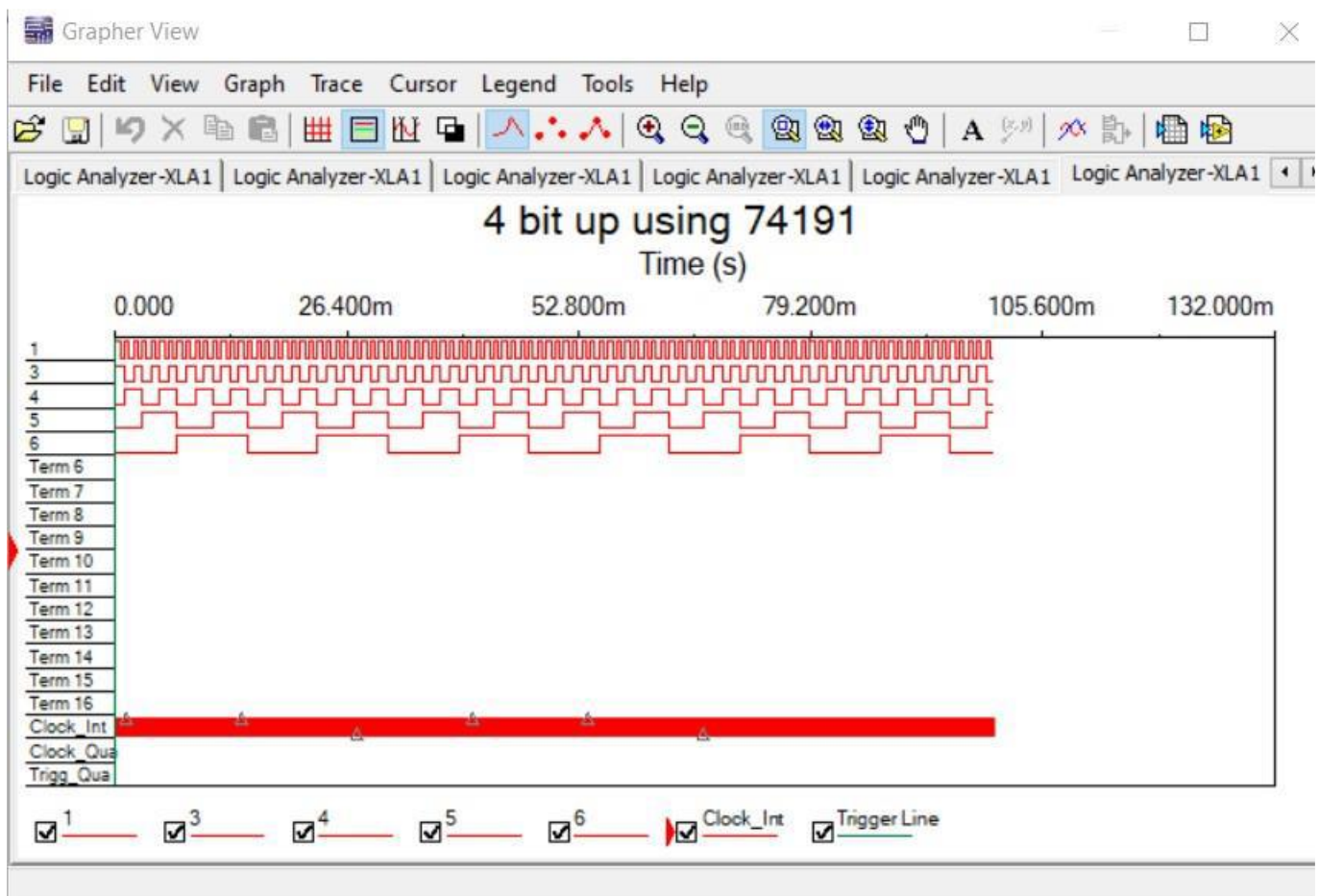


## Design & Implement 5---15 using IC 74HC191 as a Presettable Counter:

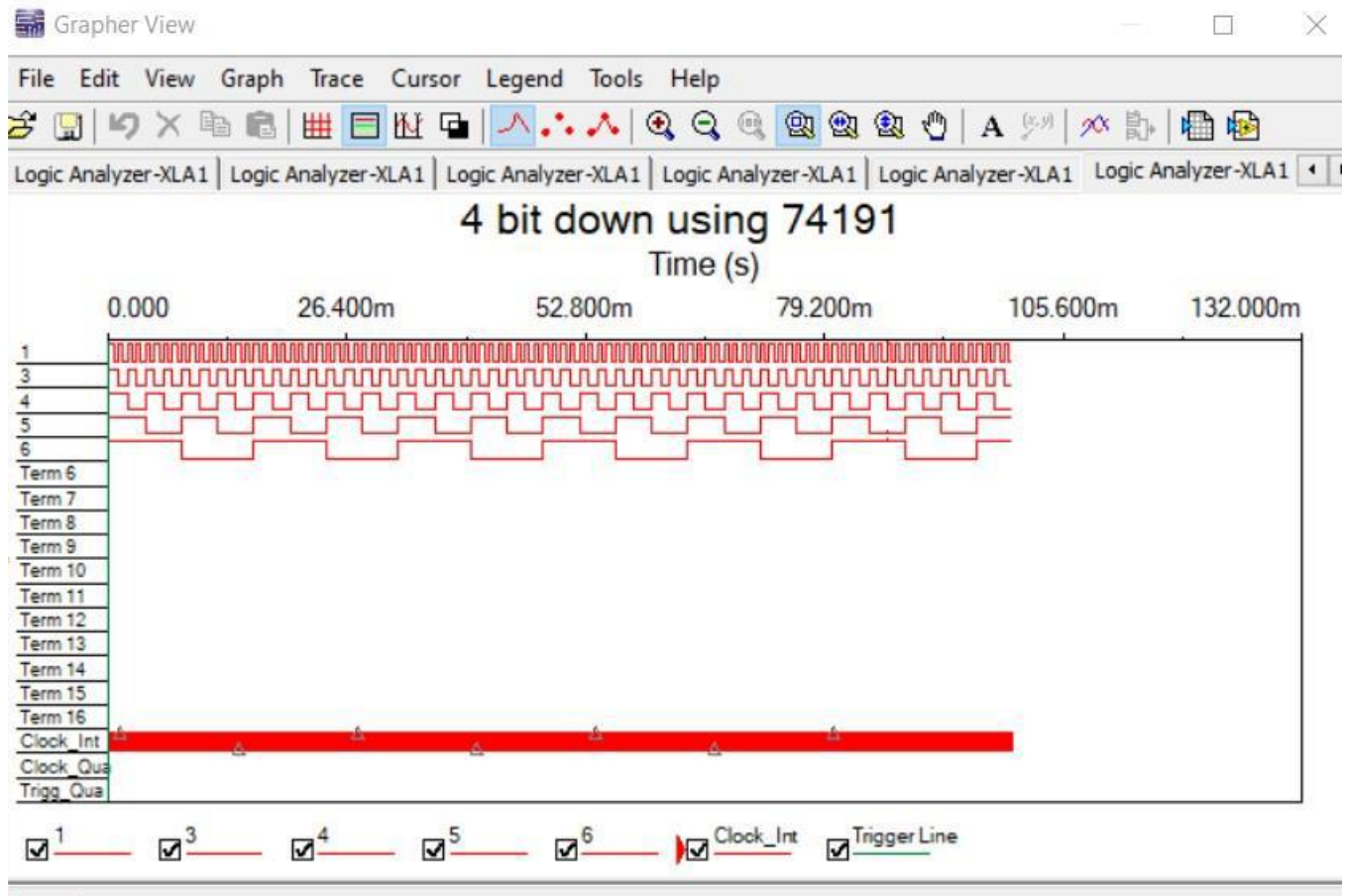


**GRAPHS:** Draw all timing diagrams on graph paper

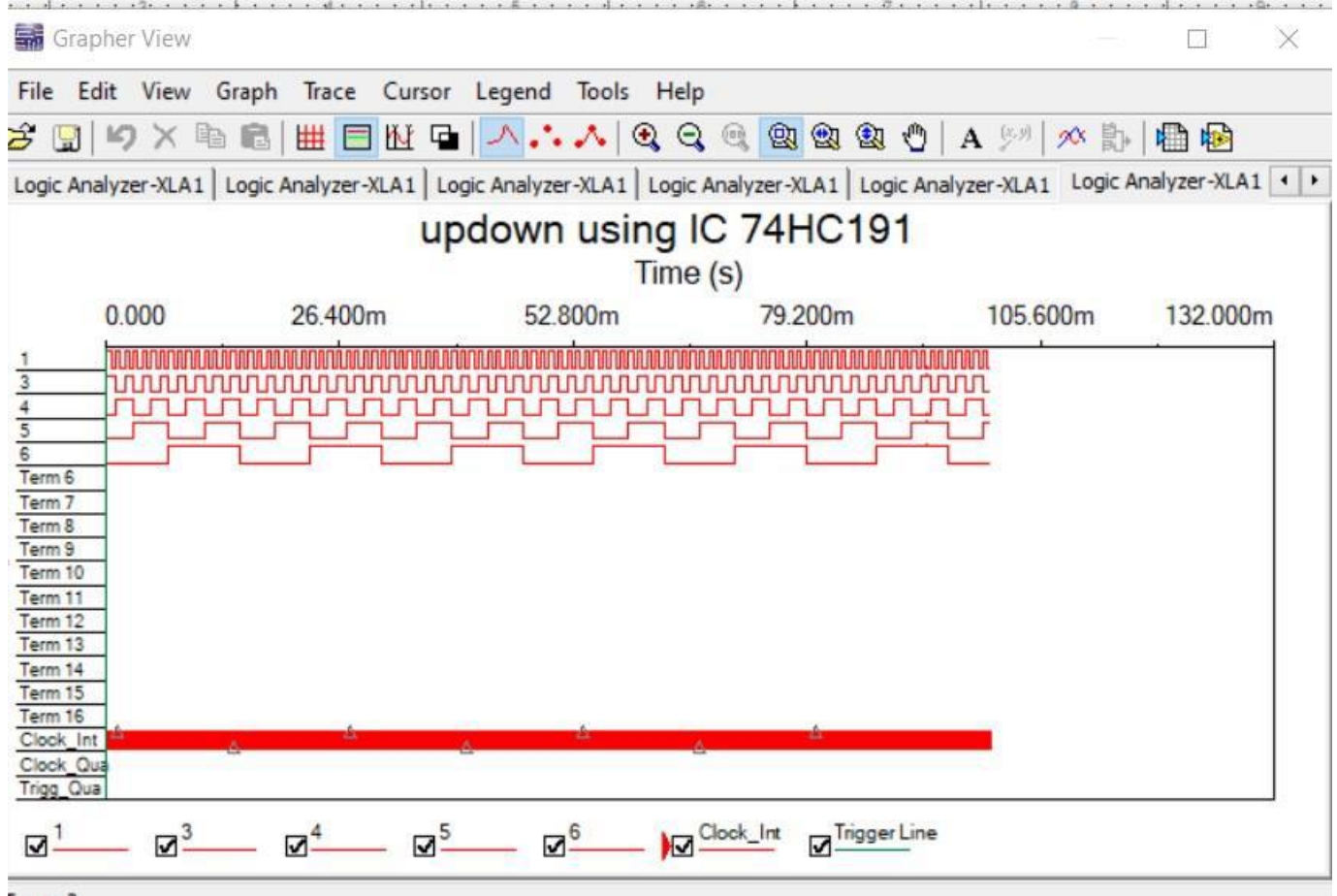
### 1.(4-bit Up-Counter using IC-74HC191):



## (4-bit Down-Counter using IC-74HC191):

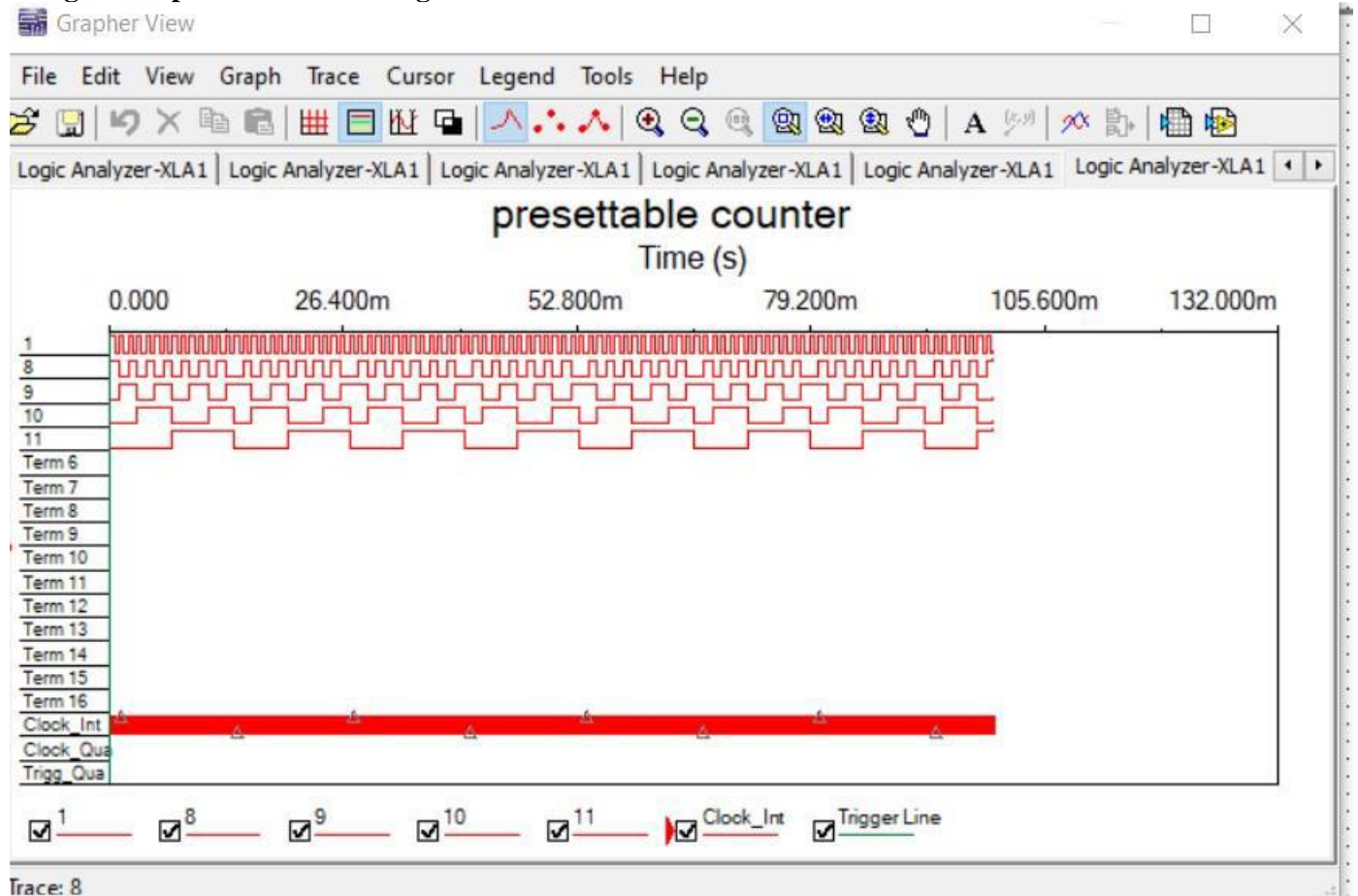


## Design & Implement UP/DOWN counter using 74HC191:

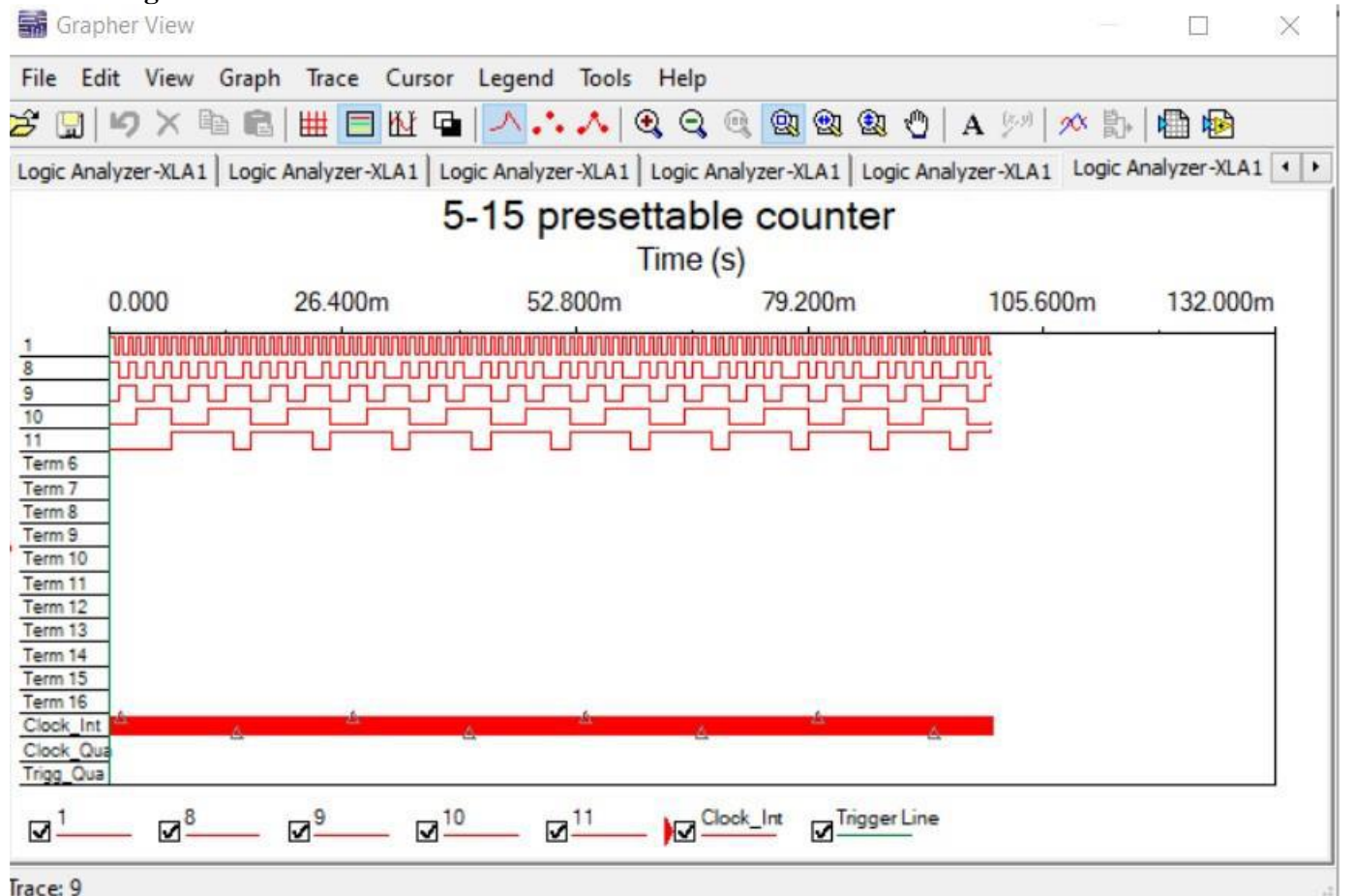




## Design & Implement 5---15 using IC 74HC191 as a Presetable Counter:



## 5---15 using IC 74HC191 as a Presetable Counter:



## CONCLUSION:

- IC 74HC191 can be use as up/down counter.
  - IC 74HC191 can also be used as a Presettable Counter
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## REFERENCE:

- 1) : R.P. Jain, “Modern digital electronics”, 3<sup>rd</sup> edition**
- 2) : A. Anand Kumar, “Fundamentals of digital circuits” 1<sup>st</sup> edition**

Subject teacher Sign with Date

Remark