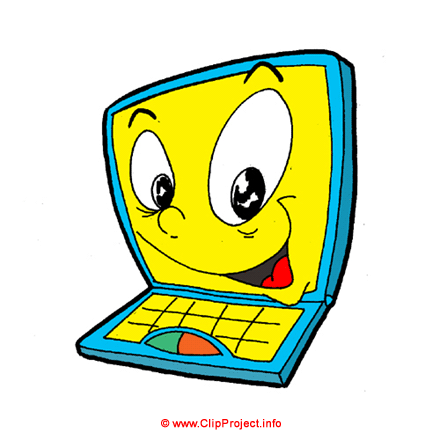
***Practical 4: Binary Elements***

*30‘*

**Functional description**

The following logic table is given for a control system.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| I4 | I3 | I2 | I1 | Q1 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 1 | 0 |
| 0 | 0 | 1 | 0 | 0 |
| 0 | 0 | 1 | 1 | 0 |
| 0 | 1 | 0 | 0 | 0 |
| 0 | 1 | 0 | 1 | 0 |
| 0 | 1 | 1 | 0 | 0 |
| 0 | 1 | 1 | 1 | 0 |
| 1 | 0 | 0 | 0 | 0 |
| 1 | 0 | 0 | 1 | 0 |
| 1 | 0 | 1 | 0 | 0 |
| 1 | 0 | 1 | 1 | 0 |
| 1 | 1 | 0 | 0 | 0 |
| 1 | 1 | 0 | 1 | 0 |
| 1 | 1 | 1 | 0 | 0 |
| 1 | 1 | 1 | 1 | 1 |

**Tasks**

1. Use LOGO!Soft Comfort and draw the circuit with only **3 two-input AND gates**. Use I1, I2, I3 and I4 to simulate 0 or 1 at the input. Verify the accuracy of the circuit’s function!

1. Use LOGO!Soft Comfort and draw the circuit with only **two-input NAND gates**. Use I1, I2, I3 and I4 to simulate 0 or 1 at the input. Verify the accuracy of the circuit’s function!

1. Experimental check using AND gates.

### Apparatus

### http://www.alessioviti.com/lcdprojects/datasheet/7408.gifExperimental board, I.C. 7408. *Pinout:*

### Method

### Draw the circuit in a) by hand using the IEC symbols and taking the pinouts of the I.C. into account! If necessary, look up the different standards for drawing a logic symbol using the following link: [*http://de.wikipedia.org/wiki/Logikgatter*](http://de.wikipedia.org/wiki/Logikgatter)

### Label all the pins with the correct numbers. Connect the supply to the I.C. at pins 7 (0 volts) and 14 (+5 V). Construct your circuit and verify the accuracy of its function with the help of the connecting wires.

 Gitter

1. Experimental check using NAND gates.

### Apparatus

### http://www.physics.mcmaster.ca/phy4d6/Lab/ics/7400.gifExperimental board, I.C. 7400. *Pinout:*

### Method

### Draw the circuit in b) by hand using the IEC symbols and taking the pinouts of the I.C. into account! If necessary, look up the different standards for drawing a logic symbol using the following link: [*http://de.wikipedia.org/wiki/Logikgatter*](http://de.wikipedia.org/wiki/Logikgatter)

### auswert.jpgLabel all the pins with the correct numbers. Connect the supply to the I.C.s at pins 7 (0 volts) and 14 (+5 V). Construct your circuit and verify the accuracy of its function with the help of the connecting wires. Gitter