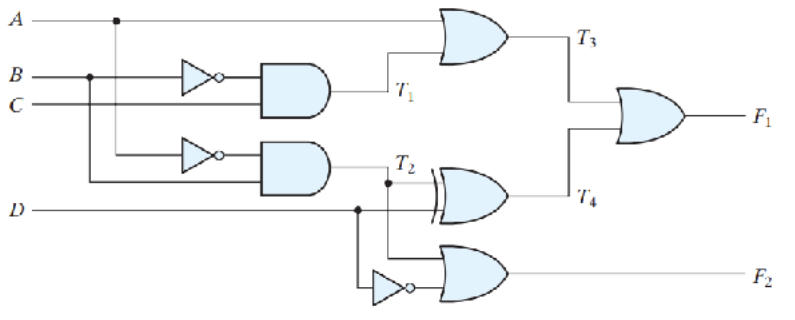
**Question 1 Consider the combinational circuit shown in Fig**





1. Derive the Boolean expressions for T1 through T4. Evaluate the outputs F1 and F2 as a function of the four inputs.
2. List the truth table with 16 binary combinations of the four input variables. Then list the binary values for T1 through T4 and outputs F1 and F2 in the table.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| No | A | B | C | D | A’ | B’ | D’ |  |  |  | |  |  |  |
|  |
| 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | | 0 | 1 |
| 1 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | | 1 | 0 |
| 2 | 0 | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 0 | 1 | 0 | | 1 | 1 |
| 3 | 0 | 0 | 1 | 1 | 1 | 1 | 0 | 1 | 0 | 1 | 1 | | 1 | 0 |
| 4 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | | 1 | 1 |
| 5 | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | | 0 | 1 |
| 6 | 0 | 1 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | | 1 | 1 |
| 7 | 0 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | | 0 | 1 |
| 8 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | | 1 | 1 |
| 9 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 1 | 1 | | 1 | 0 |
| 10 | 1 | 0 | 1 | 0 | 0 | 1 | 1 | 1 | 0 | 1 | 0 | | 1 | 1 |
| 11 | 1 | 0 | 1 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 1 | | 1 | 0 |
| 12 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | | 1 | 1 |
| 13 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | | 1 | 0 |
| 14 | 1 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | | 1 | 1 |
| 15 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | | 1 | 0 |

1. Plot the output Boolean functions obtained in part (b) on maps and show that the simplified Boolean expressions are equivalent to the ones obtained in part (a).

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| CD  AB | 00 | 01 | 11 | 10 |
| 00 | 0 | 1 | 1 | 1 |
| 01 | 1 | 0 | 0 | 1 |
| 11 | 1 | 1 | 1 | 1 |
| 10 | 1 | 1 | 1 | 1 |



|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| CD  AB | 00 | 01 | 11 | 10 |
| 00 | 1 | 0 | 0 | 1 |
| 01 | 1 | 1 | 1 | 1 |
| 11 | 1 | 0 | 0 | 1 |
| 10 | 1 | 0 | 0 | 1 |



**Question 2 Obtain the simplified Boolean expressions for output F and G in terms of the input variables in the circuit of Fig.**

A diagram of a circuit

Description automatically generated



= **A’D’+ABC +BCD’**