***Binary Operations***

*60‘*

**Introduction**

You remember the basic logic functions:

**NOT**, **AND**, **OR**

The logical operations **NAND**, **NOR**, **ExOR** and **ExNOR** are derived basic functions. By combining an AND gate or an OR gate with a NOT gate we are able to produce the inverse of each function. NOT AND is called NAND and NOT OR is called NOR. The production of ExOR and ExNOR functions using basic functions is explained in your „Fachbuch Mechatronik“ on pages 399 and 400.

**Goal**

You know how to produce a contact circuit for each binary operation.

**Tasks**

1. Complete the table using your book of tables!

|  |  |  |
| --- | --- | --- |
| Circuit symbol with identification of the connection | Description | Code letter |
|  | normally open contact (NO), manually actuated | S |
|  | Normally closed contact (NC), manually actuated | S |
|  | Changeover contact/ Single-pole double throw (SPDT) manually actuated | S. |
|  | Signal lamp | P . |

1. Use FluidSim and draw an equivalent contact circuit (switch circuit) of each binary operation. Label all the connections with the correct numbers and mark the components with the correct code letter. Use the simulation mode to verify the accuracy of each function. Press the PRINT-SCREEN key on your laptop’s keybord and insert your contact circuit in the table below!

Example:

|  |  |
| --- | --- |
| Binary operation: | Contact circuit: |
| NOT |  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Binary operation: | Contact circuit: |  | Binary operation: | Contact circuit: |
| AND |  |  | OR |  |
| NAND |  |  | NOR |  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Binary operation: | Contact circuit: |  | Binary operation: | Contact circuit: |
| ExOR |  |  | ExNOR |  |

1. Complete the wordlist using your book of tables and your „Tabellenbuch Mechatronik“.

|  |  |
| --- | --- |
| English: | German: |
| Circuit Symbol. | Schaltzeichen, Symbol |
| Identfication of th connection | Anschlusskennzeichnung |
| Code letter | Kennbuchstabe |
| Normally open contcact (NO) | Schliesser |
| Normally closed contact (NC) | Öffner |
|  | ... |
| Single-pole double throw (SPDT) | Wechsler |
| manually actuated | Handbetätigt |
| signal lamp | Leutchtelder |
| contact circuit | Kontaktschaltung |
| Circiut diagramm | Schaltplan |
| ... | ... |
| ... | ... |
| ... | ... |
| ... | ... |

1. Make your own vocab cards and learn the new vocabulary!