**Lab 3 PSD**

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Kelas: PSD-C

Kode Asdos: RAI

**DESIGN EXAMPLE**

1. **Specification**
2. Design merupakan realisasi konverter atau pengubah bentuk Binary Code Decimal ke bentuk Excess-5.
3. Bentuk Binary Code Decimal untuk bilangan 0-9 dengan 4 bit (0000 sampai 1001)
4. Bentuk Excess-5 untuk bilangan Binary Code Decimal 0-9 dengan 4 bit yang mengandung nilai 5 yang akan ditambahkan ke masing-masing bentuk binary.
5. Don’t care terletak di Binary Code Decimal 1010 hingga 1111 karena di luar digit Binary Code Decimal yang hanya sampai 9 atau 1001 saja.
6. Implementasi:

* NOR gates

1. **Formulation**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Input Binary Code Decimal | | | | Output Excess-5 | | | |
| A | B | C | D | W | X | Y | Z |
| 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 |
| 0 | 0 | 0 | 1 | 0 | 1 | 1 | 0 |
| 0 | 0 | 1 | 0 | 0 | 1 | 1 | 1 |
| 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 |
| 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 |
| 0 | 1 | 0 | 1 | 1 | 0 | 1 | 0 |
| 0 | 1 | 1 | 0 | 1 | 0 | 1 | 1 |
| 0 | 1 | 1 | 1 | 1 | 1 | 0 | 0 |
| 1 | 0 | 0 | 0 | 1 | 1 | 0 | 1 |
| 1 | 0 | 0 | 1 | 1 | 1 | 1 | 0 |
| 1 | 0 | 1 | 0 | x | x | x | x |
| 1 | 0 | 1 | 1 | x | x | x | x |
| 1 | 1 | 0 | 0 | x | x | x | x |
| 1 | 1 | 0 | 1 | x | x | x | x |
| 1 | 1 | 1 | 0 | x | x | x | x |
| 1 | 1 | 1 | 1 | x | x | x | x |

- Variabel:

* BCD : A, B, C, dan D
* Excess-5 : W, X, Y, dan Z

- Don’t Cares

* Pada Binary Code Decimal 1010 sampai dengan 1111

1. **Optimization**
2. 2-level using K-Maps

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| W | C’ | | C | |  |
| A’ | 0  0 | 1  0 | 3\  1 | 2  0 | B’ |
| 4  1 | 5  1 | 7  1 | 6  1 | B |
| A | 12  x | 13  x | 15  x | 14  x |
| 8  1 | 9  1 | 11  x | 10  x | B’ |
|  | D’ | D | | D’ |  |

**Maka, W = A + B + CD**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| X | C’ | | C | |  |
| A’ | 0  1 | 1  1 | 3\  0 | 2  1 | B’ |
| 4  0 | 5  0 | 7  1 | 6  0 | B |
| A | 12  x | 13  x | 15  x | 14  x |
| 8  1 | 9  1 | 11  x | 10  x | B’ |
|  | D’ | D | | D’ |  |

**Maka, X = B’C’ + B’D’ + BCD**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Y | C’ | | C | |  |
| A’ | 0  0 | 1  1 | 3\  0 | 2  1 | B’ |
| 4  0 | 5  1 | 7  0 | 6  1 | B |
| A | 12  x | 13  x | 15  x | 14  x |
| 8  0 | 9  1 | 11  x | 10  x | B’ |
|  | D’ | D | | D’ |  |

**Maka, Y = C’D + CD’**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Z | C’ | | C | |  |
| A’ | 0  1 | 1  0 | 3\  0 | 2  1 | B’ |
| 4  1 | 5  0 | 7  0 | 6  1 | B |
| A | 12  x | 13  x | 15  x | 14  x |
| 8  1 | 9  0 | 11  x | 10  x | B’ |
|  | D’ | D | | D’ |  |

**Maka, Z = D’**

**W = A + B + CD**

**X = B’C’+ B’D’ + BCD**

**Y = C’D + CD’**

**Z = D’**

Sehingga, G = 5 + 10 + 6 + 0 = 21

1. Mapping Procedures

- To NOR Gates (with using only NOR Gates)

Sebuah gambar berisi diagram, teks, Rencana, garis

Deskripsi dibuat secara otomatis

Sebuah gambar berisi teks, cuplikan layar, nomor, tipografi

Deskripsi dibuat secara otomatis

🡪 Sama dengan Formulation di atas. (Index 10 ke bawah adalah don’t cares)