# MATA KULIAH KONSEP TEKNOLOGI INFORMASI

“KODE HAMMING”



**Penyusun :**

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**D4 Teknik Informatika B**

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# Program Studi Teknik Informatika Departemen Teknik Informatika dan Komputer

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1. Masukkan data 00111001 kemudian ganti bit data ke 3 dari 0 menjadi 1 sebagai error-nya. Bentuk benar : 00111001

Bentuk salah : 00111**1**01

Bagaimanakah cara mendapatkan bit data ke 3 sebagai bit yang terdapat error?

## 00111001

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |
| 0 | 0 | 1 | 1 | **0** | 1 | 0 | 0 | **1** | 1 | **1** | **1** |
| D8 | D7 | D6 | D5 | **C8** | D4 | D3 | D2 | **C4** | D1 | **C2** | **C1** |

* + C1 = D1 ⊕ D2 ⊕ D4 ⊕ D5 ⊕ D7 = 1 + 0 + 1 + 1 + 0 = 1
  + C2 = D1 ⊕ D3 ⊕ D4 ⊕ D6 ⊕ D7 = 1 + 0 + 1 + 1 + 0 = 1
  + C4 = D2 ⊕ D3 ⊕ D4 ⊕ D8 = 0 + 0 + 1 + 0 = 1
  + C8 = D5 ⊕ D6 ⊕ D7 ⊕ D8 = 1 + 1 + 0 + 0 = 0

## 00111101

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |
| 0 | 0 | 1 | 1 | **0** | 1 | 1 | 0 | **0** | 1 | **0** | **1** |
| D8 | D7 | D6 | D5 | **C8** | D4 | D3 | D2 | **C4** | D1 | **C2** | **C1** |

* + C1 = D1 ⊕ D2 ⊕ D4 ⊕ D5 ⊕ D7 = 1 + 0 + 1 + 1 + 0 = 1 (SAMA)
  + C2 = D1 ⊕ D3 ⊕ D4 ⊕ D6 ⊕ D7 = 1 + 1 + 1 + 1 + 0 = 0 (BEDA)
  + C4 = D2 ⊕ D3 ⊕ D4 ⊕ D8 = 0 + 1 + 1 + 0 = 0 (BEDA)
  + C8 = D5 ⊕ D6 ⊕ D7 ⊕ D8 = 1 + 1 + 0 + 0 = 0 (SAMA)

Kesalahan terdapat pada **C2 + C4 = 2 + 4 = 6**

## Jadi kesalahan terdapat pada posisi bit ke-6 atau data ke-3

1. Masukkan data 10101010 kemudian ganti bit data ke 4 dari 1 menjadi 0 sebagai error-nya. Bentuk benar : 10101010

Bentuk salah : 1010**0**010

Bagaimanakah cara mendapatkan bit data ke 4 sebagai bit yang terdapat error?

## 10101010

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |
| 1 | 0 | 1 | 0 | **0** | 1 | 0 | 1 | **1** | 0 | **0** | **0** |
| D8 | D7 | D6 | D5 | **C8** | D4 | D3 | D2 | **C4** | D1 | **C2** | **C1** |

* + C1 = D1 ⊕ D2 ⊕ D4 ⊕ D5 ⊕ D7 = 0 + 1 + 1 + 0 + 0 = 0
  + C2 = D1 ⊕ D3 ⊕ D4 ⊕ D6 ⊕ D7 = 0 + 0 + 1 + 1 + 0 = 0
  + C4 = D2 ⊕ D3 ⊕ D4 ⊕ D8 = 1 + 0 + 1 + 1 = 1
  + C8 = D5 ⊕ D6 ⊕ D7 ⊕ D8 = 0 + 1 + 0 + 1 = 0

## 10100010

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |
| 1 | 0 | 1 | 0 | **0** | 0 | 0 | 1 | **0** | 0 | **1** | **1** |
| D8 | D7 | D6 | D5 | **C8** | D4 | D3 | D2 | **C4** | D1 | **C2** | **C1** |

* + C1 = D1 ⊕ D2 ⊕ D4 ⊕ D5 ⊕ D7 = 0 + 1 + 0 + 0 + 0 = 1 (BEDA)
  + C2 = D1 ⊕ D3 ⊕ D4 ⊕ D6 ⊕ D7 = 0 + 0 + 0 + 1 + 0 = 1 (BEDA)
  + C4 = D2 ⊕ D3 ⊕ D4 ⊕ D8 = 1 + 0 + 0 + 1 = 0 (BEDA)
  + C8 = D5 ⊕ D6 ⊕ D7 ⊕ D8 = 0 + 1 + 0 + 1 = 0 (SAMA)

Kesalahan terdapat pada **C1 + C2 + C4 = 1 + 2 + 4 = 7**

## Jadi kesalahan terdapat pada posisi bit ke-7 atau data ke-4