**Error Correction vs Error Detection**

Type of errors
• Only one bit of a given data unit
is changed
• The least likely type of error in
serial transmission
• Si...

Redundancy
• Error detection uses the concept of redundancy, which means
adding extra (redundant) bits for detecting error...

Error control
• Detection VS Correction
 Detection: error ? yes or no
 Correction: Need to know the exact number of bits...

Block Coding
• Divide the message into blocks, each of k bits, called datawords.
• Add r redundant bits to each block to m...

Error Detection
1. The receiver receives 011 which is a
valid codeword. The receiver extracts
the dataword 01 from it.
2. ...

Error detection block diagram
Error correction block diagram
 

**Parity Schemes :**A parity bit is an error detection mechanism . A *parity bit*is an extra bit transmitted with a data item, chose to give the resulting bit seven or odd parity. *Parity*refers to the number of bits set to 1 in the data item.

There are 2 types of parity

* ***Even parity***– an even number of bits are 1 Even parity – data: 10010001, parity bit
* ***Odd parity***– an odd number of bits are 1 Odd parity – data: 10010111, parity bit 0

**Error detection codes** − are used to detect the errorss present in the received data bitstreambitstream. These codes contain some bitss, which are included appendedappended to the original bit stream. These codes detect the error, if it is occurred during transmission of the original data bitstreambitstream. **Example** − Parity code, Hamming code.

**Error correction codes** − are used to correct the errorss present in the received data bitstreambitstream so that, we will get the original data. Error correction codes also use the similar strategy of error detection codes.**Example** − Hamming code.

Therefore, to detect and correct the errors, additional bitss are appended to the data bits at the time of transmission.

**Parity Code**

It is easy to include appendappend one parity bit either to the left of MSB or to the right of LSB of original bit stream. There are two types of parity codes, namely even parity code and odd parity code based on the type of parity being chosen.

**Even Parity Code**

The value of even parity bit should be zero, if even number of ones present in the binary code. Otherwise, it should be one. So that, even number of ones present in **even parity code**. Even parity code contains the data bits and even parity bit.

The following table shows the **even parity codes** corresponding to each 3-bit binary code. Here, the even parity bit is included to the right of LSB of binary code.

|  |  |  |
| --- | --- | --- |
| **Binary Code** | **Even Parity bit** | **Even Parity Code** |
| 000 | 0 | 0000 |
| 001 | 1 | 0011 |
| 010 | 1 | 0101 |
| 011 | 0 | 0110 |
| 100 | 1 | 1001 |
| 101 | 0 | 1010 |
| 110 | 0 | 1100 |
| 111 | 1 | 1111 |

**Odd Parity Code**

The value of odd parity bit should be zero, if odd number of ones present in the binary code. Otherwise, it should be one. So that, odd number of ones present in **odd parity code**. Odd parity code contains the data bits and odd parity bit.

The following table shows the **odd parity codes** corresponding to each 3-bit binary code. Here, the odd parity bit is included to the right of LSB of binary code.

|  |  |  |
| --- | --- | --- |
| **Binary Code** | **Odd Parity bit** | **Odd Parity Code** |
| 000 | 1 | 0001 |
| 001 | 0 | 0010 |
| 010 | 0 | 0100 |
| 011 | 1 | 0111 |
| 100 | 0 | 1000 |
| 101 | 1 | 1011 |
| 110 | 1 | 1101 |
| 111 | 0 | 1110 |