**רשתות תקשורת מחשבים**

**תרגיל תיאורטי 1**

## **מגישים:**

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# שאלה 1

1. There is no 2 bits’ error that can be corrected. Consider the message is ABCD:

|  |  |  |
| --- | --- | --- |
|  |  |  |
|  |  |  |
|  |  |  |

* If the errors are in , the error can be at
* If the errors are in so we have other options for errors that the parity will not be able to determine which one of them happened.
* In longer messages, it is even harder to determine what the error was.
* It can be formally proofed that the hamming distance of 2d-parity fulfils so it can correct only less than errors: .

1. Yes. For example, consider the message :

|  |  |  |
| --- | --- | --- |
| 1 | 1 | 0 |
| 1 | 1 | 0 |
| 0 | 0 | 0 |

And after bit-flipping all the message we get:

|  |  |  |
| --- | --- | --- |
| 0 | 0 | 0 |
| 0 | 0 | 0 |
| 0 | 0 | 0 |

1. The parity code seems to be correct, so we cannot detect this error.

Yes. For example, consider the message :

|  |  |  |  |
| --- | --- | --- | --- |
| 1 | 1 | 1 | 1 |
| 1 | 1 | 1 | 1 |
| 1 | 1 | 1 | 1 |
| 1 | 1 | 1 | 0 |

And after bit-flipping all the message we get :

|  |  |  |  |
| --- | --- | --- | --- |
| 0 | 1 | 0 | 1 |
| 1 | 0 | 0 | 1 |
| 0 | 0 | 1 | 1 |
| 1 | 1 | 1 | 0 |

The parity code seems to be correct, so we cannot detect this error

# שאלה 2

* Choose one red station-
* The probability that the chosen station succeeded transmitting the message-
* The probability that any other red station didn’t transmit-
* The probability that no green station succeeded to transmit-
* In total, the probability for one red station to transmit-
* The probability that one green station succeeded to transmit-
* The probability that no red station succeeded to transmit-
* In total, the probability for one green station to transmit- .
* In total, the probability that a frame will be sent successfully in a slot is
* Choose one red station-
* The probability that the chosen station succeeded transmitting the message-
* The probability that any other red station didn’t transmit-
* The probability that no green station succeeded to transmit in an odd or even slot-
* In total, we get

Pure Aloha is better in the case of multiple stations that want to transmit messages, because for every station, there is a good probability that it could transmit if it has a message waiting for transmission, without waiting to its “next slot”.

Slotted Aloha requires more complex architecture since the time-slots are discrete intervals (and not continues as in Pure Aloha). So in many stations case, it would be harder per station to transmit a message.

# שאלה 3