Define the following terms and give an example.

1. **coding** - a method for detecting and correcting errors in digital communication
2. **bitstring** - a sequence of 0’s and 1’s, e.g., 100101
3. **a (5,3) linear block code** - a code consisting of bitstrings of length 5, with 3 information bits and 2 parity check bits. A crucial property is that the sum of any two codewords is again a codeword. (Put in your favorite example here.)
4. **information bits** - the bits of the codeword that contain the message
5. **parity check bits** - the extra bits added to detect and correct errors in transmission
6. **the equations for a linear code** - the equations that determine the parity check bits, as in $x_1 = x_4 + x_5 + x_6$.
7. **codeword** - a bitstring that satisfies the defining equations for the code. These are the messages that are sent.
8. **syndrome** - the values calculated to detect errors in the received message. The syndrome corresponding to the above equation is $s_1 = x_1 + x_4 + x_5 + x_6$.
9. **error detection** - determining whether the message has been correctly sent
10. **error correction** - fixing errors that have occurred.
11. **Hamming weight** - the number of 1’s in a bitstring. For example, $w(001011) = 3$.
12. **Hamming distance** - the number of places where two bitstrings differ. This is the Hamming weight of their sum.
13. **minimum distance of a code** - the minimum weight of a non-zero code word, or equivalently, the minimum distance between two distinct codewords.

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