Assume all stations can hear all other stations. One station wants to transmit and senses the carrier idle. Why can a collision still occur after the start of transmission?

Step 1:

Early Ethernet technology for local area networking made extensive use of the medium access control technique known as carrier-sense multiple access with collision detection. To delay transmissions until no other stations are transmitting, it employs carrier-sensing.

The MAC (media access control) protocol known as CSMA/CD stands for carrier sense multiple access/collision detection. It specifies how network devices should react when two devices try to use the same data channel at the same time and experience a data collision.

Step 2:

Radio waves can only travel at the speed of light, even in a vacuum. Waves move more slowly the closer they get to matter. Thus, it is possible for a sender to detect an idle medium, initiate a transmission, and then, just as the waves are about to reach another sender, for that sender to detect an idle medium, initiate a second transmission. This is why traditional CSMA/CD Ethernets use CD (listen while talking).

 How are guard spaces realized between users in CDMA?

Step 1:

Any of the various protocols used in second-generation (2G) and third-generation (3G) wireless communications are referred to as CDMA (Code-Division Multiple Access). As the name suggests, CDMA is a type of multiplexing that enables several signals to share a single transmission channel, making the best use of the available bandwidth.

Step 2:

A guard band is a constrained frequency band that lies between two broader frequency bands. This prevents interference on communication channels that are being used concurrently, which would lower the quality of both messages. When using frequency division multiplexing, guard bands are employed (FDM).

In CDMA systems, the spreading codes' orthogonality serves as the guard space between users. The user separation is better the smaller the correlation is.