Automatic Repeat ReQuest (ARQ) is a group of error – control protocols for transmission of data over noisy or unreliable communication network. These protocols reside in the Data Link Layer and in the Transport Layer of the OSI (Open Systems Interconnection) reference model. They are named so because they provide for automatic retransmission of frames that are corrupted or lost during transmission. ARQ is also called Positive Acknowledgement with Retransmission (PAR).

ARQs are used to provide reliable transmissions over unreliable upper layer services. They are often used in Global System for Mobile (GSM) communication.

**Working Principle**

In these protocols, the receiver sends an acknowledgement message back to the sender if it receives a frame correctly. If the sender does not receive the acknowledgement of a transmitted frame before a specified period of time, i.e. a timeout occurs, the sender understands that the frame has been corrupted or lost during transit. So, the sender retransmits the frame. This process is repeated until the correct frame is transmitted.

**Types of ARQ Protocols**

There are three ARQ protocols in the data link layer.



* **Stop – and – Wait ARQ** − Stop – and – wait ARQ provides unidirectional data transmission with flow control and error control mechanisms, appropriate for noisy channels. The sender keeps a copy of the sent frame. It then waits for a finite time to receive a positive acknowledgement from receiver. If the timer expires, the frame is retransmitted. If a positive acknowledgement is received then the next frame is sent.
* **Go – Back – N ARQ** − Go – Back – N ARQ provides for sending multiple frames before receiving the acknowledgement for the first frame. It uses the concept of sliding window, and so is also called sliding window protocol. The frames are sequentially numbered and a finite number of frames are sent. If the acknowledgement of a frame is not received within the time period, all frames starting from that frame are retransmitted.
* **Selective Repeat ARQ** − This protocol also provides for sending multiple frames before receiving the acknowledgement for the first frame. However, here only the erroneous or lost frames are retransmitted, while the good frames are received and buffered.