SNS COLLEGE OF TECHNOLOGY

Coimbatore-35
An Autonomous Institution

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DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

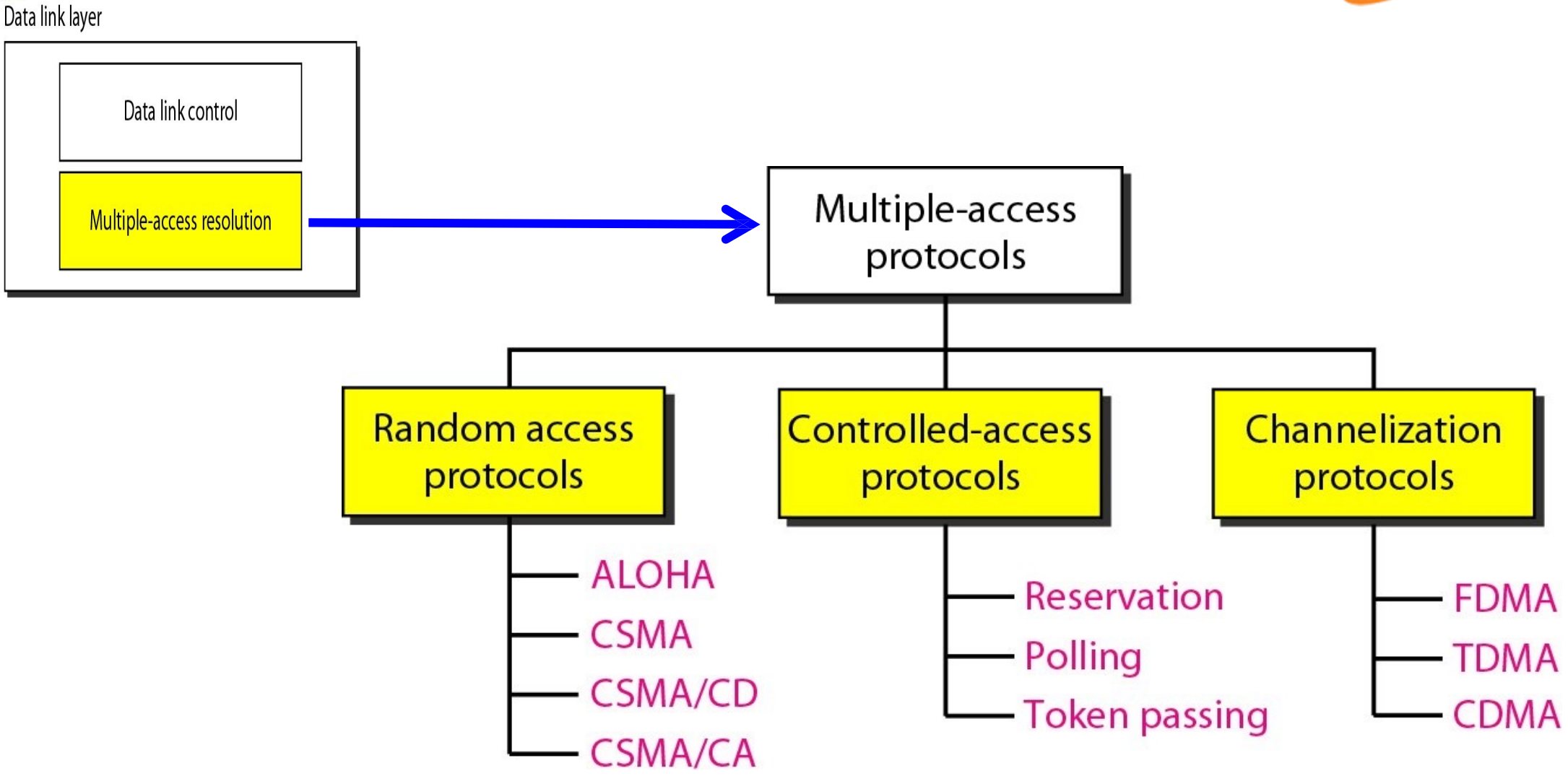
19CSB302- COMPUTER NETWORKS

UNIT-2 DATALINK LAYER AND MEDIA ACCESS

Why Multiple Access Protocols

- If the channel or the medium is shared among many stations data cannot be simply transmitted since the channel will be already involved in any other data transmission.
- Data could be lost, corrupted or overlapped when multiple channels try to access the medium simultaneously
- Multiple Access Protocols are used to decrease collision and avoid cross talk

MAC – Multiple Access Protocols



Random Access

In **random access**, no station is superior to another station and none is assigned the control over another.

All Stations have same priority, all are equal in the network.Each station has the right to the medium without being controlled by any other station.

No station permits, or does not permit, another station to send. At each instance, a station that has data to send uses a procedure defined by the rotocol to make a decision on whether or not to send.

Protocols

ALOHA

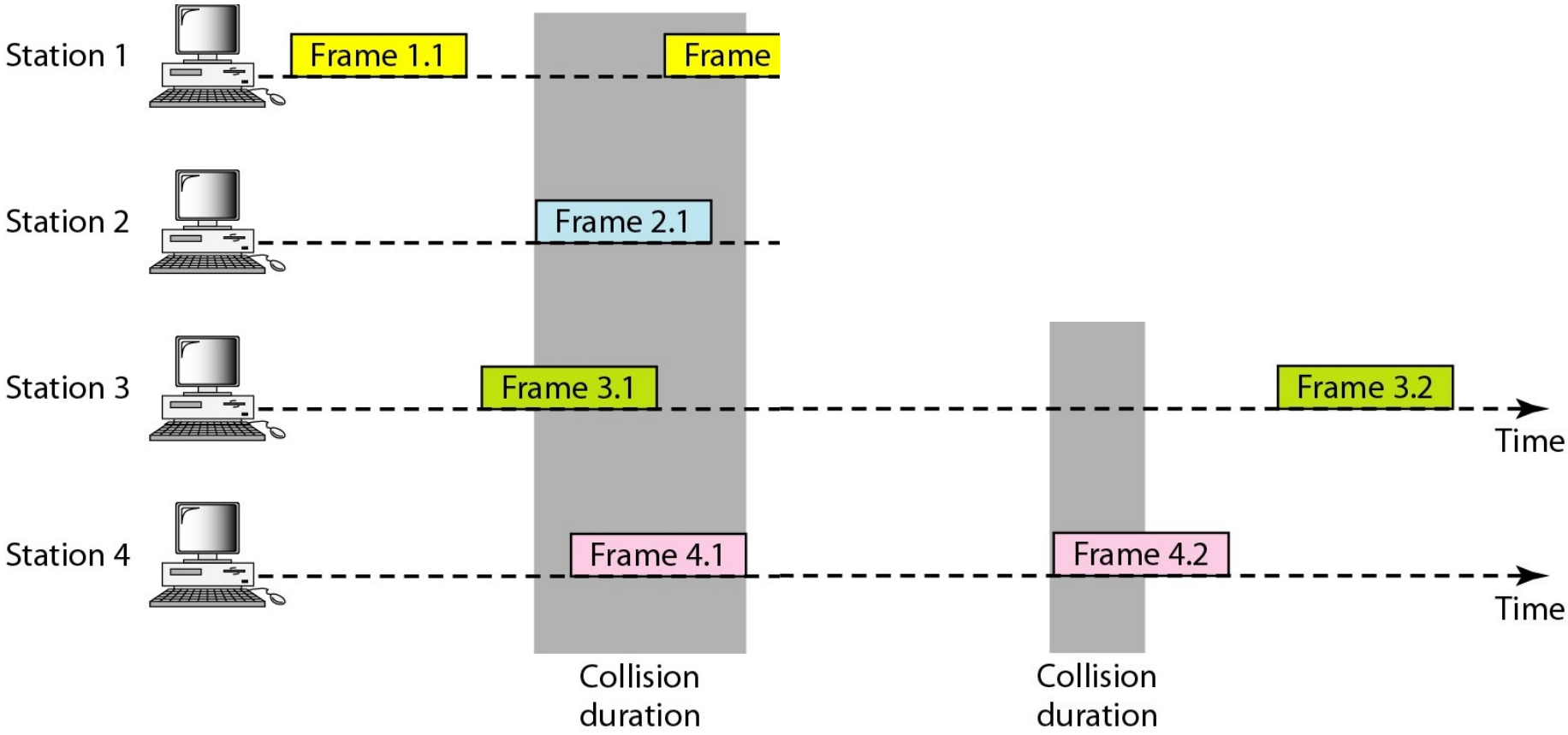
Carrier Sense Multiple Access

Carrier Sense Multiple Access with Collision Detection

Carrier Sense Multiple Access with Collision Avoidance

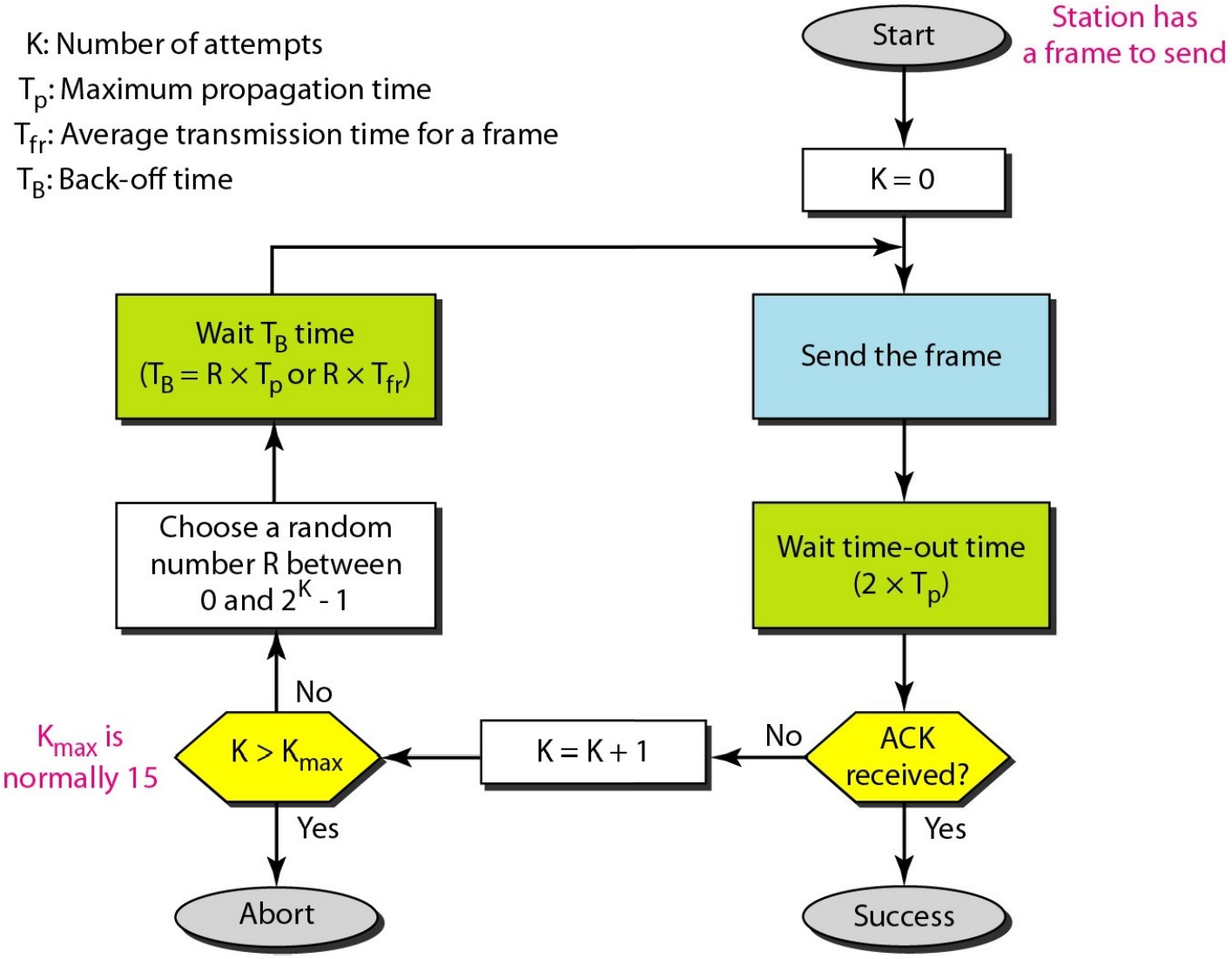
Frame Transr

Pure ALOHA allows the station to transr
transmit



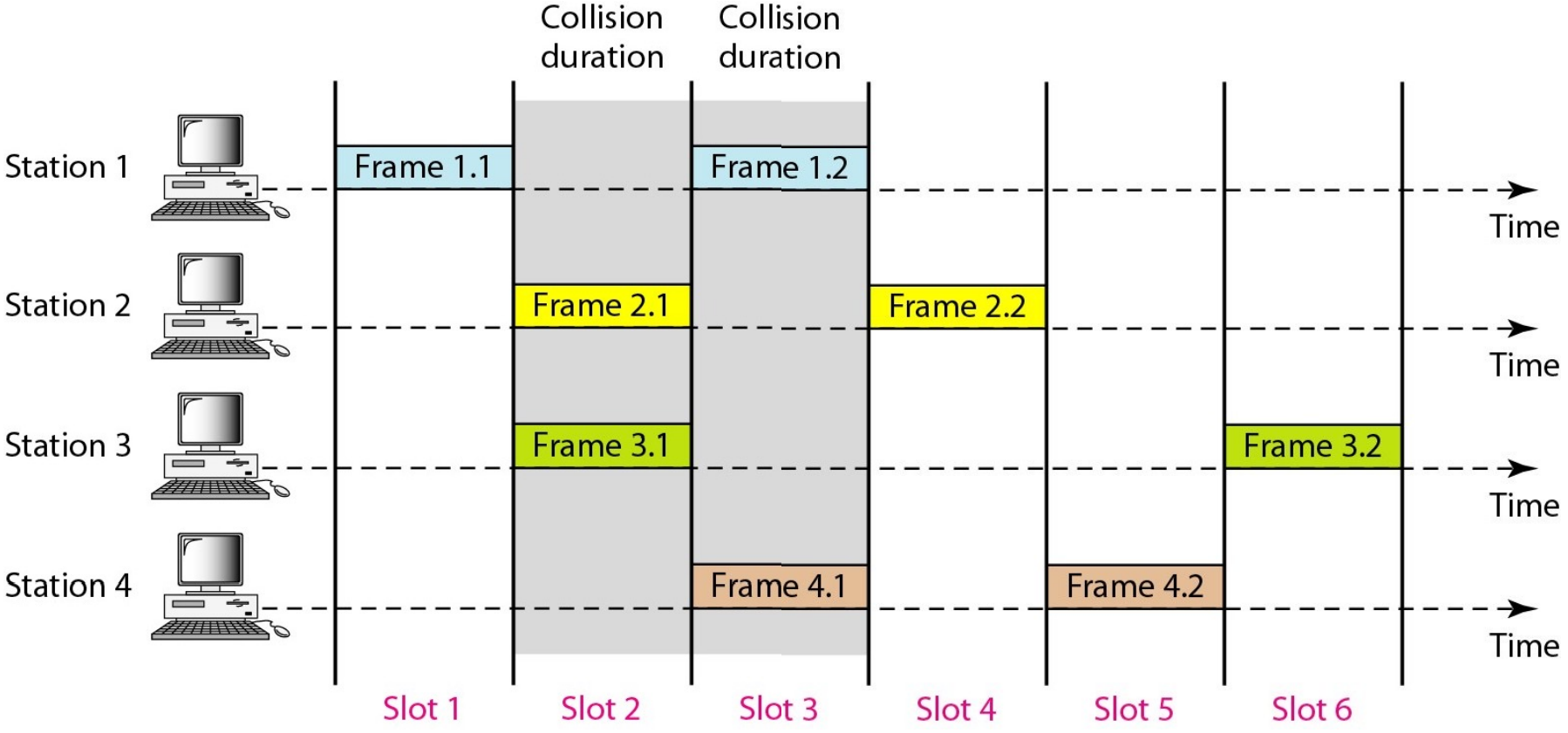
Vulnerable Time=2*T_{fr}

Procedure for pure ALOHA protocol



Frames in slotted ALOHA protocol

Time of the shared channel is divided into time slots
sending of data is allowed only at the beginning of the slots



If the station misses out the time slot it must wait for next slot, which reduces the probability of collision

Vulnerable Time=T_{fr}

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Difference Between Pure Aloha vs Slotted Aloha

Pure Aloha	Slotted Aloha
In this Aloha, any station can transmit the data at any time.	In this, any station can transmit the data at the beginning of any time slot.
In this, The time is continuous and not globally synchronized.	In this, The time is discrete and globally synchronized.
Vulnerable time for Pure Aloha = 2 x Tt	Vulnerable time for Slotted Aloha = Tt
In Pure Aloha, the Probability of successful transmission of the data packet $= G \times e^{-2G}$	In Slotted Aloha, the Probability of successful transmission of the data packet $= G \times e^{-G}$
In Pure Aloha, Maximum efficiency = 18.4%	In Slotted Aloha, Maximum efficiency = 36.8%
Pure Aloha doesn't reduce the number of collisions to half.	Slotted Aloha reduces the number of collisions to half and doubles the efficiency of Pure Aloha.

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