Computer Networks and Distributed Systems
Exercise Sheet 5

Exercise 5.1 What types of error can occur during message transmission?
Name five different types of error with a cause for each as an example for the error. What mechanisms can be used to detect or correct the error?

Type of error	Cause	Detection	Correction
...	...	...	...

1. Complete the table.

2. Which of the protocols (rdt 1, rdt 2,...) introduced in the lecture treat the different types of error?

Exercise 5.2

The syntax for automata to describe protocol instances used by Kurose and Ross was discussed in the lecture.

On the next page you find a problem from an old exam using an extended Mealy automaton to describe a simple transport protocol instance.

Complete the automaton.

Transport system and protocols, extended Mealy automaton

Consider a transport protocol instance S that has to transmit data to a remote transport protocol instance E. The underlying channel is unreliable and can loose packets. A combination of positive acknowledgments, timers and retransmissions is used in a stop-and-go manner to handle packet loss. If a data packet has been transmitted unsuccessful for three times, instance S aborts its activity. No further mechanism are provided.

Addressing of the network service is only treated in an abstract manner, i.e. we only consider the payload tpdu of the packets. Furthermore we assume, that for packets send from S to E we have tpdu="payload d". For packets send from E to S we have tpdu="ACK".

S has the following inputs:

- TDatReq(d): Transfer data d from the application process to S

- NDatInd(tpdu): Transfer data tpdu from network service to S

- TimerAlert: Timer signals that it has elapsed

S has the following outputs:

- TAbortInd: Notify application process of abort of S

- NDatReq(tpdu): Transfer data pdu from S to network service

- TimerStart: Start timer (active timers are stopped prior to that)

- TimerStop: Stop timer

The behavior of S should be described using the following extended Mealy automaton. Complete the definition of variables, the initialization and the transitions in the diagram.