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**Program 2**

**Running order:**

Receiver1 (the receiver to 251 and 997) is responsible for creating the queue. So it needs to be run first. Besides that, the remaining programs can be run in any order. While receiver1 remains active, the other programs can be re-run. Receiver2 must be re-run if re-running 997.

**Sender 997:**

**Event Restriction:**

Sender997 will not send events that are also divisible by 251 so that receiver1 can distinguish it from sender 251 and avoid sending acks to 251.

**Acknowledgement:**

This sender contains flags which track whether either of its receivers has terminated. It contains logic for determining which receiver has received a message and which receiver has yet to receive a message. 997 will alternate its mtype to match that which the appropriate receiver is expecting. And it uses the flags to know when to stop sending to a particular receiver.

**Termination:**

Upon termination it sends a death message to both of its receivers.

**Sender 251:**

**Running:**

Sender 251 is constantly sending messages; without any pause.

**Termination:**

Sender251 will send a death message to receiver1 when killed by kill -10 command.

**Sender 257:**

**Receiving Receiver 2’s Death Message:**

Sender 257 receives a message after sending one. However its purpose is to eventually set a flag which tracks the termination of its receiver. This flag is only set once during its run.

**Termination:**

Upon termination, Sender 251 does not send any further messages

**The Receivers:**

**Mtypes:**

Each receiver has two associated mtypes. One is for receiving and one is for sending back (to 997 and or 257).

**Termination:**

Upon termination a receiver will send death messages to senders with flags for their deaths (997, 257). Receiver2 sends death messages to 997 and 227. 997 cannot intercept a death message meant for 257 as 997 will stop receiving from receiver2 upon knowledge of its death. Likewise, 257 will terminate upon knowledge of its sender’s death. Finally, a receiver contains a flag of whether the other receiver is alive and send them a death message if they are alive.

**The Queue:**

Receiver1 must run first to create the queue. However, either receiver will delete the queue depending on whether the other receiver is alive.