```
EXTENDS Integers , Naturals, Sequences, FiniteSets

CONSTANTS Mailboxes, Addr, Actors, Mutexes, ValTrue, ValFalse, SendIns,
ReceiveIns, WaitIns, TestIns, LocalIns, LockIns, UnlockIns,  MwaitIns, MtestIns

VARIABLES Communications, memory, pc,  waitingQueue, Requests

ASSUME ValTrue \in Nat
ASSUME ValFalse \in Nat

NoActor == CHOOSE p : p \notin Actors
NoAddr == CHOOSE a : a \notin Addr

Partition(S) == \forall x,y \in S : x \cap y /= {} => x = y

ASSUME Partition({SendIns, ReceiveIns, WaitIns, TestIns, LocalIns , LockIns,
                                                  UnlockIns, MwaitIns, MtestIns})

Instr ==UNION {SendIns, ReceiveIns, WaitIns, TestIns, LocalIns ,LockIns,
                                                 UnlockIns, MwaitIns, MtestIns}

(* getIndex(e,q) gives the position of e in the sequence q *)
getIndex(e,q) == CHOOSE n \in DOMAIN q : q[n] = e

(* isHead(m,q) checks whether m is the first element in the sequence q *)
isHead(m,q) == IF q = <<>> THEN FALSE
               ELSE IF m = Head(q) THEN  TRUE
                    ELSE FALSE

(* Remove(e,q) removes e from sequence q*)
Remove(e,q) == SubSeq(q, 1, getIndex(e,q)-1) \circ SubSeq(q, getIndex(e,q)+1,
Len(q))

(* isMember(m, q) checks whether m is a member of sequence q*)
isMember(m, q) == IF \E i \in (1..Len(q)): m = q[i] THEN TRUE
                  ELSE FALSE
```