$\text{------} \text{ MODULE } UML1 \text{ ------}$

EXTENDS *Naturals*
VARIABLES *credentials*, *loggedIn*, *attempt*, *rfidScan*, *patientInfo*, *symptomsChecked*, *testNeeded*, *addedToDB*

$TypeOK \triangleq$
    $\land$ *loggedIn* $\in \{$ "yes", "no" $\}$
    $\land$ *credentials* $\in \{$ "correct", "incorrect" $\}$
    $\land$ *attempt* $\in (1 \mathinner{\ldotp\ldotp} 3)$
    $\land$ *rfidScan* $\in \{$ "done", "notDone" $\}$
    $\land$ *patientInfo* $\in \{$ "retrieved", "notRetrieved", "error" $\}$
    $\land$ *symptomsChecked* $\in \{$ "yes", "no" $\}$
    $\land$ *testNeeded* $\in \{$ "undetermined", "yes", "no" $\}$
    $\land$ *addedToDB* $\in \{$ "yes", "no" $\}$

$Init \triangleq$
    $\land$ *loggedIn* $=$ "no"
    $\land$ *credentials* $\in \{$ "correct", "incorrect" $\}$
    $\land$ *attempt* $= 1$
    $\land$ *rfidScan* $=$ "notDone"
    $\land$ *patientInfo* $=$ "notRetrieved"
    $\land$ *symptomsChecked* $=$ "no"
    $\land$ *testNeeded* $=$ "undetermined"
    $\land$ *addedToDB* $=$ "no"

$Var \triangleq \langle loggedIn, credentials, attempt, rfidScan, patientInfo, symptomsChecked, testNeeded, addedToDB \rangle$

$Login \triangleq$
    $\lor$ $\land$ *loggedIn* $=$ "yes"
        $\land$ UNCHANGED $\langle loggedIn, credentials, attempt \rangle$
    $\lor$ $\land$ *loggedIn* $=$ "no"
        $\land$ *credentials* $=$ "correct"
        $\land$ *loggedIn′* $=$ "yes"
        $\land$ UNCHANGED $\langle credentials, attempt \rangle$
    $\lor$ $\land$ *loggedIn* $=$ "no"
        $\land$ *credentials* $=$ "incorrect"
        $\land$ *credentials′* $\in \{$ "correct", "incorrect" $\}$
        $\land$ *attempt* < 3
        $\land$ *attempt′* $=$ *attempt* $+ 1$
        $\land$ UNCHANGED $\langle loggedIn \rangle$

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$Scan \triangleq$
 $\quad \lor \; \land loggedIn = \text{"yes"}$
 $\qquad \land rfidScan = \text{"notDone"}$
 $\qquad \land rfidScan' = \text{"done"}$
 $\qquad \land \text{UNCHANGED } \langle patientInfo \rangle$
 $\quad \lor \; \land loggedIn = \text{"yes"}$
 $\qquad \land rfidScan = \text{"done"}$
 $\qquad \land patientInfo = \text{"notRetrieved"}$
 $\qquad \land patientInfo' \in \{ \text{"retrieved"}, \text{"error"} \}$
 $\qquad \land \text{UNCHANGED } \langle rfidScan \rangle$
 $\quad \lor \; \land loggedIn = \text{"yes"}$
 $\qquad \land rfidScan = \text{"done"}$
 $\qquad \land patientInfo \in \{ \text{"retrieved"}, \text{"error"} \}$
 $\qquad \land \text{UNCHANGED } \langle rfidScan, patientInfo \rangle$
 $\quad \lor \; \land loggedIn = \text{"no"}$
 $\qquad \land \text{UNCHANGED } \langle rfidScan, patientInfo \rangle$

$Diagnosis \triangleq$
  $\lor$ $\land$ $patientInfo = $ "retrieved"
     $\land$ $symptomsChecked = $ "no"
     $\land$ $symptomsChecked' = $ "yes"
     $\land$ UNCHANGED $\langle testNeeded, addedToDB \rangle$
  $\lor$ $\land$ $patientInfo = $ "retrieved"
     $\land$ $symptomsChecked = $ "yes"
     $\land$ $testNeeded = $ "undetermined"
     $\land$ $testNeeded' \in \{$ "yes", "no" $\}$
     $\land$ UNCHANGED $\langle symptomsChecked, addedToDB \rangle$
  $\lor$ $\land$ $patientInfo = $ "retrieved"
     $\land$ $symptomsChecked = $ "yes"
     $\land$ $testNeeded = $ "yes"
     $\land$ $addedToDB = $ "no"
     $\land$ $addedToDB' = $ "yes"
     $\land$ UNCHANGED $\langle symptomsChecked, testNeeded \rangle$
  $\lor$ $\land$ $patientInfo = $ "retrieved"
     $\land$ $symptomsChecked = $ "yes"
     $\land$ $testNeeded = $ "yes"
     $\land$ $addedToDB = $ "yes"
     $\land$ $addedToDB' = $ "no"
     $\land$ $testNeeded' \in \{$ "yes", "no" $\}$
     $\land$ UNCHANGED $\langle symptomsChecked \rangle$
  $\lor$ $\land$ $patientInfo = $ "retrieved"
     $\land$ $symptomsChecked = $ "yes"
     $\land$ $testNeeded = $ "no"
     $\land$ UNCHANGED $\langle symptomsChecked, testNeeded \rangle$
     $\land$ UNCHANGED $\langle addedToDB \rangle$
  $\lor$ $\land$ $patientInfo = $ "notRetrieved"
     $\land$ UNCHANGED $\langle symptomsChecked, testNeeded \rangle$
     $\land$ UNCHANGED $\langle addedToDB \rangle$

$Next \triangleq$
  $\land$ $Login$
  $\land$ $Scan$
  $\land$ $Diagnosis$
  $\land$ $TypeOK$

$Spec \triangleq Init \land \Box[Next]_{Var}$

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