──────────────────── MODULE *TCommit* ────────────────────

CONSTANT *RM*   The set of all Resource Managers (*e.g.* $\{\$ r\_1 \$, r\_2, r\_3\}$)

VARIABLE *rmState* $rmState[rm]$ is the state of the Resource Manager *rm*

$TCTypeOK \triangleq rmState \in [RM \rightarrow \{\text{"working"}, \text{"prepared"}, \text{"committed"}, \text{"aborted"}\}]$

$TCInit \triangleq rmState = [r \in RM \mapsto \text{"working"}]$

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$Prepare(r) \triangleq \wedge rmState[r] = \text{"working"}$
$\qquad\qquad\quad \wedge rmState' = [rmState \text{ EXCEPT } ![r] = \text{"prepared"}]$
$\qquad\qquad\qquad [s \in RM \mapsto \text{IF } s = r \text{ THEN } \text{"prepared"} \text{ ELSE } rmState[s]]$

$canCommit \triangleq \forall r \in RM : rmState[r] \in \{\text{"prepared"}, \text{"comitted"}\}$

$notCommited \triangleq \forall r \in RM : rmState[r] \neq \text{"committed"}$

$DecideToCommit(r) \triangleq \wedge rmState[r] = \text{"prepared"}$
$\qquad\qquad\qquad\qquad \wedge canCommit$
$\qquad\qquad\qquad\qquad \wedge rmState' = [rmState \text{ EXCEPT } ![r] = \text{"committed"}]$

$DecideToAbort(r) \triangleq \wedge rmState[r] \in \{\text{"working"}, \text{"prepared"}\}$
$\qquad\qquad\qquad\qquad \wedge notCommited$
$\qquad\qquad\qquad\qquad \wedge rmState' = [rmState \text{ EXCEPT } ![r] = \text{"aborted"}]$

$Decide(r) \triangleq \vee DecideToCommit(r)$
$\qquad\qquad\quad \vee DecideToAbort(r)$

$TCNext \triangleq \exists r \in RM : Prepare(r) \vee Decide(r)$

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$TCConsistent \triangleq \forall r1, r2 \in RM : \neg \wedge rmState[r1] = \text{"aborted"}$
$\qquad\qquad\qquad\qquad\qquad\qquad\qquad \wedge rmState[r2] = \text{"commited"}$

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