EJERCICIO 2

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | NO 2PL | 2PL NORMAL | 2PL ESTATICO | 2PL ESTRICTO | 2PL RIGUROSO |
|  | RLOCK(X) | RLOCK(X) | WLOCK(X) | RLOCK(X) | RLOCK(X) |
|  |  |  | WLOCK(W) |  |  |
|  |  |  | RLOCK(Z) |  |  |
| READ(X) |  |  |  |  |  |
|  | RLOCK(W) | RLOCK(W) |  | RLOCK(W) | RLOCK(W) |
| READ(W) |  |  |  |  |  |
| X=X+W |  |  |  |  |  |
|  | WLOCK(X) | WLOCK(X) |  | WLOCK(X) | WLOCK(X) |
| WRITE(X) |  |  |  |  |  |
|  | UNLOCK(X) |  | UNLOCK(X) |  |  |
|  | RLOCK(Z) | RLOCK(Z) |  | RLOCK(Z) | RLOCK(Z) |
| READ(Z) |  |  |  |  |  |
| W=W+Z |  |  |  |  |  |
|  | WLOCK(W) | WLOCK(W) |  | WLOCK(W) | WLOCK(W) |
|  |  | UNLOCK(X) | UNLOCK(Z) | UNLOCK(Z) |  |
| WRITE(W) |  |  |  |  |  |
|  | UNLOCK(W) | UNLOCK(W) | UNLOCK(W) | UNLOCK(X) | UNLOCK(X) |
|  | UNLOCK(Z) | UNLOCK(Z) |  | UNLOCK(W) | UNLOCK(W) |
|  |  |  |  |  | UNLOCK(Z) |

EJERCICIO 3

|  |  |  |  |
| --- | --- | --- | --- |
| TA | No cumpla 2PL | 2PL normal | 2PL estático |
|  | RLOCK(Y) | RLOCK(Y) | WLOCK(X) |
|  |  |  | WLOCK(Y) |
|  |  |  | WLOCK(Z) |
| READ(Y) |  |  |  |
| X=Y+1 |  |  |  |
|  | UNLOCK(Y) |  |  |
|  | WLOCK(X) | WLOCK(X) |  |
| WRITE(X) |  |  |  |
|  | RLOCK(Z) | RLOCK(Z) |  |
| READ(Z) |  |  |  |
| Y=Z+1 |  |  |  |
|  | UNLOCK(Z) |  |  |
|  | WLOCK(Y) | WLOCK(Y) |  |
|  |  | RLOCK(X) |  |
| WRITE(Y) |  |  |  |
|  | UNLOCK(Y) |  |  |
|  | RLOCK(X) |  |  |
| READ(X) |  |  |  |
| Z=X+1 |  |  |  |
|  | UNLOCK(X) |  |  |
|  | WLOCK(Z) | WLOCK(Z) |  |
|  |  | UNLOCK(Y) |  |
|  |  | UNLOCK(X) |  |
| WRITE(Z) |  |  |  |
|  | UNLOCK(Z) | UNLOCK(Z) | UNLOCK(X) |
|  |  |  | UNLOCK(Y) |
|  |  |  | UNLOCK(Z) |

EJERCICIO 5

a)

|  |  |  |  |
| --- | --- | --- | --- |
| T1 | T2 | T3 | ACCION |
|  |  | START | t(T3) = 1 |
|  |  | WLOCK(Z) | T3 -> WLOCK(Z) |
| START |  |  | T(T1) = 3 |
| WLOCK(X) |  |  | T1 -> WLOCK(X) |
|  | START |  | T(T2) = 5 |
|  | RLOCK(Y) |  | T2 -> RLOCK(Y) |
| WLOCK(Z) |  |  | T(T1) > t(T3) : T1 Rollback |
|  |  | RLOCK(Y) | T3->RLOCK(Y) |
|  |  | UNLOCK(Z) | Continua |
|  | WLOCK(X) |  | T2 -> WLOCK(X) |
|  |  | UNLOCK(Y) | Continua |
| WLOCK(Y) |  |  | NA |
| UNLOCK(X) |  |  | NA |
|  |  | WLOCK(X) | T(T3) < t(T2): T3 Espera |
| UNLOCK(Y) |  |  | NA |
| UNLOCK(Z) |  |  | NA |
|  | UNLOCK(X) |  | T3 -> WLOCK(X) |
|  | UNLOCK(Y) |  | Continua |
|  |  | UNLOCK(X) | Continua |

b)

|  |  |  |  |
| --- | --- | --- | --- |
| T1 | T2 | T3 | ACCION |
|  |  | START | t(T3) = 1 |
|  |  | WLOCK(Z) | T3 -> WLOCK(Z) |
| START |  |  | T(T1) = 3 |
| WLOCK(X) |  |  | T1 -> WLOCK(X) |
|  | START |  | T(T2) = 5 |
|  | RLOCK(Y) |  | T2 -> RLOCK(Y) |
| WLOCK(Z) |  |  | T(t1)>t(t3): t1 espera |
|  |  | RLOCK(Y) | T3 -> rlock(y) |
|  |  | UNLOCK(Z) | T1->wlock(z) |
|  | WLOCK(X) |  | T(t2)>t(t1): t2 espera |
|  |  | UNLOCK(Y) | Continua |
| WLOCK(Y) |  |  | T(t1)<t(t2): T2 rollback; unlock(y), t1->wlock(y) |
| UNLOCK(X) |  |  | Continua |
|  |  | WLOCK(X) | T3->wlock(x) |
| UNLOCK(Y) |  |  | Continua |
| UNLOCK(Z) |  |  | Continua |
|  | UNLOCK(X) |  | N/A |
|  | UNLOCK(Y) |  | N/A |
|  |  | UNLOCK(X) | Continua |

|  |  |  |  |
| --- | --- | --- | --- |
| T1 | T2 | T3 | ACCION |
| START |  |  | T(T1) = 1 |
| WLOCK(X) |  |  | T1 -> WLOCK(X) |
|  | START |  | T(T2) = 3 |
|  | RLOCK(Y) |  | T2 -> RLOCK(Y) |
|  |  | START | T(T3)=5 |
|  |  | WLOCK(Z) | T3->WLOCK(Z) |
| WLOCK(Z) |  |  | T(T1) < T(T3) : T1 Espera |
|  |  | RLOCK(Y) | T3 > RLOCK(Y) |
|  |  | UNLOCK(Z) | T1 -> WLOCK(Z) |
| WLOCK(Y) |  |  | T(T1)>t(t2),t(t3): t1 espera |
|  | WLOCK(X) |  | T(T2) > t(T1) : T2 Rollback, libera y |
|  |  | UNLOCK(Y) | T1 -> WLOCK(Y) |
| UNLOCK(X) |  |  | Continua |
|  |  | WLOCK(X) | T(t3) -> WLOCK(X) |
| UNLOCK(Y) |  |  | Continua |
| UNLOCK(Z) |  |  | Continua |
|  | UNLOCK(X) |  | N/A |
|  | UNLOCK(Y) |  | N/A |
|  |  | UNLOCK(X) | Continua |

|  |  |  |  |
| --- | --- | --- | --- |
| T1 | T2 | T3 | ACCION |
| START |  |  | T(T1) = 1 |
| WLOCK(X) |  |  | T1 -> WLOCK(X) |
|  | START |  | T(T2) = 3 |
|  | RLOCK(Y) |  | T2 -> RLOCK(Y) |
|  |  | START | T(T3)=5 |
|  |  | WLOCK(Z) | T3->WLOCK(Z) |
| WLOCK(Z) |  |  | t(t1)<t(t3) -> rollback t3; unlock (z);t1->wlock(z) |
|  |  | RLOCK(Y) | N/A |
|  |  | UNLOCK(Z) | N/A |
| WLOCK(Y) |  |  | T(t1)<t(t2) -> rollback t2;unlock(y);t1->wlock(y) |
|  | WLOCK(X) |  | N/A |
|  |  | UNLOCK(Y) | N/A |
| UNLOCK(X) |  |  | Continua |
|  |  | WLOCK(X) | N/A |
| UNLOCK(Y) |  |  | Continua |
| UNLOCK(Z) |  |  | Continua |
|  | UNLOCK(X) |  | N/A |
|  | UNLOCK(Y) |  | N/a |
|  |  | UNLOCK(X) | N/A |

Ejercicio 6

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| t | T1 | T2 | acción | x | | y | | Z | |
| tsread | tswrite | tsread | tswrite | tsread | tswrite |
| 0 |  |  |  | 0 | 0 | 0 | 0 | 0 | 0 |
| 1 | start |  | T(t1)=1 |  |  |  |  |  |  |
| 2 | Read (x) |  | Tswrite(x)<t(t1): read(x), Continua | 1 | 0 |  |  |  |  |
| 3 |  | start | T(t2)=3 |  |  |  |  |  |  |
| 4 | Read(y) |  | Tswrite(y)<t(t1):read(y),conitnua |  |  | 1 | 0 |  |  |
| 5 |  | Read(z) | Tswrite(z)<t(t2):read(z),continua |  |  |  |  | 3 | 0 |
| 6 |  | Read(y) | Tswrite(y)<t(t2):read(y),continua |  |  | 3 | 0 |  |  |
| 7 |  | Z=z+y | Continua |  |  |  |  |  |  |
| 8 | X=x+y |  | Continua |  |  |  |  |  |  |
| 9 |  | Write(z) | Tsread(z)=t(2), tswrite(z)<t(t2):write(z), continua |  |  |  |  | 3 | 3 |
| 10 |  | Read(x) | Tswrite<tt2:read(x),continua | 3 | 0 |  |  |  |  |
| 11 | Write(x) |  | Tsread(x)>t(t1) or tswrite(x)<t(t1): rollback t1 |  |  |  |  |  |  |
| 12 |  | X=x+y | Continua |  |  |  |  |  |  |
| 13 | Read(z) |  | N/A |  |  |  |  |  |  |
| 14 | Y=y+z |  | N/A |  |  |  |  |  |  |
| 15 |  | Write(x) | TSREAD(x)=t(t2) or tswrite(x)<t(t2): write(x), continua | 3 | 3 |  |  |  |  |
| 16 | Write(y) |  | N/A |  |  |  |  |  |  |

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| t | T1 | T2 | acción | w | | x | | y | | Z | |
| tsread | tswrite | tsread | tswrite | tsread | tswrite | tsread | tswrite |
| 0 |  |  |  |  |  | 0 | 0 | 0 | 0 | 0 | 0 |
| 1 | start |  | T(t1)=1 |  |  |  |  |  |  |  |  |
| 2 | Read (z) |  | Tswrite(z)<t(t1):read(z);continua |  |  |  |  |  |  | 1 | 0 |
| 3 | Z=z+1 |  | Continua |  |  |  |  |  |  |  |  |
| 4 |  | Start | T(t2)=4 |  |  |  |  |  |  |  |  |
| 5 |  | Read(x) | Tswrite(x)<t(t2):read(x);continua |  |  | 4 | 0 |  |  |  |  |
| 6 |  | W=x+1 | Continua |  |  |  |  |  |  |  |  |
| 7 | Write(z) |  | Tsread(z)<t(t1) or tswrite(z)<t(t1):write(z);continua |  |  |  |  |  |  | 1 | 1 |
| 8 |  | Write(w) | Tsread(w)<t(t2) or tswrite(w)<t(t2):write(w);continua | 0 | 4 |  |  |  |  |  |  |
| 9 |  | Read(y) | Tswrite(y)<t(t2):read(y):continua |  |  |  |  | 4 | 0 |  |  |
| 10 | Read(x) |  | Tswrite(x)<t(t1):read(x):continua |  |  |  |  |  |  |  |  |
| 11 |  | Read(z) | Tswrite(z)<t(t2):read(z);continua |  |  | 4 | 0 |  |  | 4 | 1 |
| 12 | Read(y) |  | tswrite(y)<t(t1):read(y);continua |  |  |  |  | 4 | 0 |  |  |
| 13 |  | X=y+z | Continua |  |  |  |  |  |  |  |  |
| 14 | Y=x+y |  | Continua |  |  |  |  |  |  |  |  |
| 15 |  | Write(x) | Tsread(x)=t(t2) or tswrite(x)<t(t2): write(x);continua |  |  | 4 | 4 |  |  |  |  |
| 16 | Write(y) |  | Tsread(y)>t(t1) or tswrite(y)<t(t1):rollback |  |  |  |  | 4 | 0 |  |  |

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| t | T1 | T2 | T3 |  | w | | x | | y | | Z | |
| tsread | tswrite | tsread | tswrite | tsread | tswrite | tsread | tswrite |
| 0 |  |  |  |  |  |  | 0 | 0 | 0 | 0 | 0 | 0 |
| 1 |  | START |  | T(t2)=1 |  |  |  |  |  |  |  |  |
| 2 |  | Read(x) |  | Tswrite(x)<t(T2):read(x);continua |  |  | 1 | 0 |  |  |  |  |
| 3 | Start |  |  | T(t1)=3 |  |  |  |  |  |  |  |  |
| 4 | Read(z) |  |  | Tswrite(z)<t(t1):read(z);continua |  |  |  |  |  |  | 3 | 0 |
| 5 |  | Read(z) |  | Tswrite(z)<t(t2):read(z);continua |  |  |  |  |  |  | 3 | 0 |
| 6 |  | X+xz |  | continua |  |  |  |  |  |  |  |  |
| 7 |  |  | Start | T(t3)=7 |  |  |  |  |  |  |  |  |
| 8 |  |  | Read(y) | Tswrite(y)<t(t3):read(y);continua |  |  |  |  | 7 | 0 |  |  |
| 9 |  | Write(x) |  | Tsread(x)=t(t2),tswrite(x)<t(t2):write(x);continua |  |  | 1 | 1 |  |  |  |  |
| 10 |  |  | Read(x) | Tswrite(x)<t(t3):read(x);continua |  |  | 7 | 1 |  |  |  |  |
| 11 | Read(y) |  |  | Tswrite(y)<t(t1):read(y);continua |  |  |  |  | 7 | 0 |  |  |
| 12 |  |  | Y=y-x | Continua |  |  |  |  |  |  |  |  |
| 13 |  |  | Write(y) | Tsread(y)=t(t3), tswrite(y)<t(t3): write(y);continua |  |  |  |  | 7 | 7 |  |  |
| 14 |  | Read(w) |  | Tswrite(w)<t(t2):read(w):continua | 1 | 0 |  |  |  |  |  |  |
| 15 | Z=z+y |  |  | Continua |  |  |  |  |  |  |  |  |
| 16 | Write(z) |  |  | Tsread(z)=t(t1) tswrite(z)<t(t1):write(z) |  |  |  |  |  |  | 3 | 3 |
| 17 |  | W=w+1 |  | Continua |  |  |  |  |  |  |  |  |
| 18 | Read(w) |  |  | Tswrite(w)<t(t1):read(2) | 3 | 0 |  |  |  |  |  |  |
| 19 | Y=y-w |  |  | Continua |  |  |  |  |  |  |  |  |
| 20 | Write(y) |  |  | Tsread(y)>t(t1), tswrite(y)>t(t1):rollback t1 |  |  |  |  | 7 | 7 |  |  |
| 21 |  | Write(w) |  | Tsread(w)>t(t2), tswrite(w)<t(t2):rollback t2 | 3 | 1 |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |