* 1. T
  2. Q
  3. Q,R,S
  4. y=0, z=12,x=10,w=0
  5. Transaction T needs to be redone
  6. <Q starts>

<R starts>

<Q,w,20>

<R,x,5>

<Q aborts>

<R,y,0>

<R commits>

<S starts>

<checkpoint record>

<S,x,10>

<T starts>

<T,y,15>

<S commits>

--system crash--

* 1. T
  2. none
  3. Q,R,S
  4. y=0, z=12,x=10,w=0
  5. Transaction T needs to be redone
  6. You would have to undo transaction S
  7. none
  8. a = 40, b = 100
  9. a = 30, b = 100
  10. That the order of execution matters

|  |  |
| --- | --- |
| Transaction S | Transaction T |
| read(a) |  |
|  | read(a) |
| a = a + 10 |  |
|  | a = a \* 2 |
| write(a) |  |
|  | write(a) |
| read(b) |  |
| b = b \* 5 |  |
| write(b) |  |

|  |  |
| --- | --- |
| Transaction S | Transaction T |
| *Growing Phase* | *Growing Phase* |
| request exclusive lock (a) - granted |  |
| read(a) |  |
|  | request exclusive lock (a) - denied |
|  | request exclusive lock (a) - denied |
| a = a + 10 |  |
| write(a) |  |
|  | request exclusive lock (a) - denied |
| request exclusive lock (b) - granted |  |
| read(b) |  |
| b = b \* 5 |  |
| write(b) |  |
| *Shrinking Phase* |  |
| release lock (a) |  |
|  | request exclusive lock (a) - granted |
|  | read(a) |
|  | a = a \*2 |
| release lock (b) |  |
|  | write(a) |
|  | *Shrinking Phase* |
|  | release lock (a) |

The schedule can be executed and deadlock would not occur, it could occur if the schedule was slightly different but it would not in this specific instance.