CSE 5331/4331 **Summer 2017**

Project 1 – Output

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Programming Language: JAVA

Input 1:
b1;
r1 (Y);
w1 (Y);
r1 (Z);
b2;
r2 (X);
w2 (X);
w1 (Z);
e1;
r2 (Y);
b3;
r3 (Z);
w3 (Z);
w2 (Y);
e2;
r3 (X);
w3 (X);
e3;

Output 1:

```
b1
Transaction has begun
TranasctionID - 1 Timestamp - 1 State - Active

r1(Y)
Read Lock acquired for Y
New lock table for Y is [1]
Items held by Transaction 1 are [Y]

w1(Y)
Transaction 1 upgraded item Y to WL
New lock table for Y is [1]

r1(Z)
Read Lock acquired for Z
New lock table for Z is [1]
Items held by Transaction 1 are [Y, Z]

b2
Transaction has begun
```

```
TranasctionID - 2 Timestamp - 2 State - Active

r2(X)
Read Lock acquired for X
New lock table for X is [2]
Items held by Transaction 2 are [X]

w2(X)
Transaction 2 upgraded item X to WL
New lock table for X is [2]

w1(Z)
Transaction 1 upgraded item Z to WL
New lock table for Z is [1]

e1
Transaction 1 is committed
Lock held by Transaction 1 for item Y is released
As there are no waiting transaction item Y is unlocked
Lock held by Transaction 1 for item Z is released
As there are no waiting transaction item Z is unlocked

r2(Y)
Read Lock acquired for Y
New lock table for Y is [2]
Items held by Transaction 2 are [X, Y]

b3
Transaction has begun
TranasctionID - 3 Timestamp - 3 State - Active

r3(Z)
Read Lock acquired for Z
New lock table for Z is [3]
Items held by Transaction 3 are [Z]

w3(Z)
Transaction 3 upgraded item Z to WL
New lock table for Z is [3]

w2(Y)
Transaction 2 upgraded item Y to WL
New lock table for Y is [2]

e2
Transaction 2 is committed
Lock held by Transaction 2 for item X is released
As there are no waiting transaction item X is unlocked
Lock held by Transaction 2 for item Y is released
As there are no waiting transaction item Y is unlocked

r3(X)
Read Lock acquired for X
New lock table for X is [3]
Items held by Transaction 3 are [Z, X]
```

```
w3(X)
Transaction 3 upgraded item X to WL
New lock table for X is [3]

e3
Transaction 3 is committed
Lock held by Transaction 3 for item X is released
As there are no waiting transaction item X is unlocked
Lock held by Transaction 3 for item Z is released
As there are no waiting transaction item Z is unlocked
```

Input 2:

b1;
r1 (Y);
w1 (Y);
r1 (Z);
b2;
r2 (X);
w2 (X);
w1 (Z);
r2 (Y);
e1;
b3;
r3 (Z);
w3 (Z);
w2 (Y);
e2;
r3 (X);
w3 (X);
e3;

Output 2:

```
b1
Transaction has begun
TranasctionID - 1 Timestamp - 1 State - Active

r1(Y)
Read Lock acquired for Y
New lock table for Y is [1]
Items held by Transaction 1 are [Y]

w1(Y)
Transaction 1 upgraded item Y to WL
New lock table for Y is [1]

r1(Z)
Read Lock acquired for Z
New lock table for Z is [1]
Items held by Transaction 1 are [Y, Z]
```

```
b2
Transaction has begun
TranasctionID - 2 Timestamp - 2 State - Active

r2(X)
Read Lock acquired for X
New lock table for X is [2]
Items held by Transaction 2 are [X]

w2(X)
Transaction 2 upgraded item X to WL
New lock table for X is [2]

w1(Z)
Transaction 1 upgraded item Z to WL
New lock table for Z is [1]

r2(Y)
Write Read Conflict! between Transaction [1] and Transaction 2
Transaction 2 Aborts as Timestamp of 2 is greater than Transaction1
Lock held by Transaction 2 for item X is released
As there are no waiting transaction item X is unlocked

e1
Transaction 1 is committed
Lock held by Transaction 1 for item Y is released
As there are no waiting transaction item Y is unlocked
Lock held by Transaction 1 for item Z is released
As there are no waiting transaction item Z is unlocked

b3
Transaction has begun
TranasctionID - 3 Timestamp - 3 State - Active

r3(Z)
Read Lock acquired for Z
New lock table for Z is [3]
Items held by Transaction 3 are [Z]

w3(Z)
Transaction 3 upgraded item Z to WL
New lock table for Z is [3]

w2(Y)
Transaction 2 is already aborted

e2
Transaction 2 is already aborted

r3(X)
Read Lock acquired for X
New lock table for X is [3]
Items held by Transaction 3 are [Z, X]
```

```
w3(X)
Transaction 3 upgraded item X to WL
New lock table for X is [3]

e3
Transaction 3 is committed
Lock held by Transaction 3 for item X is released
As there are no waiting transaction item X is unlocked
Lock held by Transaction 3 for item Z is released
As there are no waiting transaction item Z is unlocked
```

Input 3:

b1;
r1 (Y);
w1 (Y);
r1 (Z);
b2;
r2 (X);
w2 (X);
w1 (Z);
r2 (Y);
b3;
r3 (Z);
e1;
w3 (Z);
w2 (Y);
e2;
r3 (X);
w3 (X);
e3;

Output 3:

```
b1
Transaction has begun
TranasctionID - 1 Timestamp - 1 State - Active

r1(Y)
Read Lock acquired for Y
New lock table for Y is [1]
Items held by Transaction 1 are [Y]

w1(Y)
Transaction 1 upgraded item Y to WL
New lock table for Y is [1]

r1(Z)
Read Lock acquired for Z
New lock table for Z is [1]
Items held by Transaction 1 are [Y, Z]
```

```
b2
Transaction has begun
TranasctionID - 2 Timestamp - 2 State - Active

r2(X)
Read Lock acquired for X
New lock table for X is [2]
Items held by Transaction 2 are [X]

w2(X)
Transaction 2 upgraded item X to WL
New lock table for X is [2]

w1(Z)
Transaction 1 upgraded item Z to WL
New lock table for Z is [1]

r2(Y)
Write Read Conflict! between Transaction [1] and Transaction 2
Transaction 2 Aborts as Timestamp of 2 is greater than Transaction1
Lock held by Transaction 2 for item X is released
As there are no waiting transaction item X is unlocked

b3
Transaction has begun
TranasctionID - 3 Timestamp - 3 State - Active

r3(Z)
Write Read Conflict! between Transaction [1] and Transaction 3
Transaction 3 Aborts as Timestamp of 3 is greater than Transaction1

e1
Transaction 1 is committed
Lock held by Transaction 1 for item Y is released
As there are no waiting transaction item Y is unlocked
Lock held by Transaction 1 for item Z is released
As there are no waiting transaction item Z is unlocked

w3(Z)
Transaction 3 is already aborted

w2(Y)
Transaction 2 is already aborted

e2
Transaction 2 is already aborted

r3(X)
Transaction 3 is already aborted

w3(X)
Transaction 3 is already aborted

e3
Transaction 3 is already aborted
```

Input 4:

b1;
r1 (Y);
w1 (Y);
r1 (Z);
b2;
r2 (Y);
b3;
r3 (Z);
w1 (Z);
w2 (Y);
r2 (X);
e1;
e3;
w2 (X);
e2;

Output 4:

```
b1
Transaction has begun
TranasctionID - 1 Timestamp - 1 State - Active

r1(Y)
Read Lock acquired for Y
New lock table for Y is [1]
Items held by Transaction 1 are [Y]

w1(Y)
Transaction 1 upgraded item Y to WL
New lock table for Y is [1]

r1(Z)
Read Lock acquired for Z
New lock table for Z is [1]
Items held by Transaction 1 are [Y, Z]

b2
Transaction has begun
TranasctionID - 2 Timestamp - 2 State - Active

r2(Y)
Write Read Conflict! between Transaction [1] and Transaction 2
Transaction 2 Aborts as Timestamp of 2 is greater than Transaction1

b3
Transaction has begun
TranasctionID - 3 Timestamp - 3 State - Active

r3(Z)
Read Lock acquired for Z
New lock table for Z is [1, 3]
```

```
Items held by Transaction 3 are [Z]

w1(Z)
Read Write Conflict! between Transaction [1, 3] and Transaction 1
Transaction  1 Waits as Timestamp of 1 is less than Transaction3
Current transaction is blocked and operation w1(Z); is added to waiting
Operations
Waiting operations of Transaction1 are[w1(Z);]

w2(Y)
Transaction 2 is already aborted

r2(X)
Transaction 2 is already aborted

e1
Current transaction is blocked and operation e1; is added to waiting
Operations
Waiting operations of Transaction1 are[w1(Z);, e1;]

e3
Transaction 3 is committed
Lock held by Transaction 3 for item Z is released
Started waiting transaction 1
Transaction State- blocked Waiting operation of the transaction [w1(Z);, e1;]

w1(Z)
Transaction 1 upgraded item Z to WL
New lock table for Z is [1]

e1
Transaction 1 is committed
Lock held by Transaction 1 for item Y is released
As there are no waiting transaction item Y is unlocked
Lock held by Transaction 1 for item Z is released
As there are no waiting transaction item Z is unlocked

w2(X)
Transaction 2 is already aborted

e2
Transaction 2 is already aborted
```

Input 5:

b1;
r1 (Y);
w1 (Y);
r1 (Z);
b2;
r2 (Y);
b3;
r3 (Z);
w1 (Z);
w2 (Y);
r2 (X);
e1;
w3 (Z);
e3;
w2 (X);
e2;

Output 5:

```
b1
Transaction has begun
TranasctionID - 1 Timestamp - 1 State - Active

r1(Y)
Read Lock acquired for Y
New lock table for Y is [1]
Items held by Transaction 1 are [Y]

w1(Y)
Transaction 1 upgraded item Y to WL
New lock table for Y is [1]

r1(Z)
Read Lock acquired for Z
New lock table for Z is [1]
Items held by Transaction 1 are [Y, Z]

b2
Transaction has begun
TranasctionID - 2 Timestamp - 2 State - Active

r2(Y)
Write Read Conflict! between Transaction [1] and Transaction 2
Transaction 2 Aborts as Timestamp of 2 is greater than Transaction1

b3
Transaction has begun
TranasctionID - 3 Timestamp - 3 State - Active

r3(Z)
```

```
Read Lock acquired for Z
New lock table for Z is [1, 3]
Items held by Transaction 3 are [Z]

w1(Z)
Read Write Conflict! between Transaction [1, 3] and Transaction 1
Transaction  1 Waits as Timestamp of 1 is less than Transaction3
Current transaction is blocked and operation w1(Z); is added to waiting
Operations
Waiting operations of Transaction1 are[w1(Z);]

w2(Y)
Transaction 2 is already aborted

r2(X)
Transaction 2 is already aborted

e1
Current transaction is blocked and operation e1; is added to waiting
Operations
Waiting operations of Transaction1 are[w1(Z);, e1;]

w3(Z)
Read Write Conflict! between Transaction [1, 3] and Transaction 3
Transaction 3 Aborts as Timestamp of 3 is greater than Transaction1
Lock held by Transaction 3 for item Z is released
Started waiting transaction 1
Transaction State- blocked Waiting operation of the transaction [w1(Z);, e1;]

w1(Z)
Transaction 1 upgraded item Z to WL
New lock table for Z is [1]

e1
Transaction 1 is committed
Lock held by Transaction 1 for item Y is released
As there are no waiting transaction item Y is unlocked
Lock held by Transaction 1 for item Z is released
As there are no waiting transaction item Z is unlocked

e3
Transaction 3 is already aborted

w2(X)
Transaction 2 is already aborted

e2
Transaction 2 is already aborted
```