Transaction

- commit
  termination with success of the transaction
  all operations are executed and changes to the database are persistent
- abort (or rollback)
  abort of the transaction
  none operation is executed

Transfers $50 from account *A* to account *B*

```
start transaction;
update Account
        set balance = balance – $50  where Accout_number = A;
update Account
        set balance = balance + $50 where Account_number = B;
commit;
```

Abort of a Transaction

1) Abort if balance of A less than $50

```
start transaction;
update Account
        set balance = balance – $50  where Accout_number = A;
update Accont
        set balance = balance + $50 where Account_number = B;
select balance into V
        from Account where Account_number = A;
if (V>=0)    then commit
             else abort;
```

2) Abort if the system has entered an undesirable state (e.g. deadlock)

Data Access

- **Physical blocks** are those blocks residing on the disk.
- **Buffer blocks** are the blocks residing temporarily in main memory.
- Block movements between disk and main memory are initiated through the following two operations:
  - **input**(*B*) transfers the physical block *B* to main memory.
  - **output**(*B*) transfers the buffer block *B* to the disk, and replaces the appropriate physical block there.

- Each transaction T_i has its private work-area in which local copies of all data items accessed and updated by it are kept.
  - T_i's local copy of a data item *X* is called x_i.
- We assume, for simplicity, that each data item fits in, and is stored inside, a single block.

Data Access (Cont.)

- Transaction transfers data items between system buffer blocks and its private work-area using the following operations :
  - **read**(X) assigns the value of data item X to the local variable x_i.
  - **write**(X) assigns the value of local variable x_i to data item {X} in the buffer block.
  - both these commands may necessitate the issue of an **input**(B_X) instruction before the assignment, if the block B_X in which X resides is not already in memory.
- Transactions
  - Perform **read**(X) while accessing X for the first time;
  - All subsequent accesses are to the local copy.
  - After last access, transaction executes **write**(X).
- **output**(B_X) need not immediately follow **write**(X). System can perform the **output** operation when it deems fit.

Example of Data Access