Isolation

6.033 2008 Lecture 18

“Simple Locking” example

\texttt{xfer(A, B, amt)}
\begin{verbatim}
  BeginTransaction
  acquire A
  acquire B
  read A
  write A
  read B
  write B
  Commit
  release A
  release B
\end{verbatim}

Withdrawal in foreign currency

\texttt{Withdraw(Account, Currency, amt)}
\begin{verbatim}
  BeginTransaction
  acquire Account
  acquire Currency
  if \texttt{amt * Currency < Account}
    \texttt{Account = Account - (amt * Currency)}
  Commit
  release Account
  release Currency
\end{verbatim}

Read / write locks

\texttt{Withdraw(Account, Currency, amt)}
\begin{verbatim}
  BeginTransaction
  write-acquire Account
  read-acquire Currency
  if \texttt{amt * Currency < Account}
    \texttt{Account = Account - (amt * Currency)}
  Commit
  release Account
  release Currency
\end{verbatim}

Cashing a check

\texttt{CashCheck(CheckingAcct, amt)}
\begin{verbatim}
  BeginTransaction
  write-acquire CheckingAcct
  read-acquire ???
  SavingsAcct = FindSavings(CheckingAcct)
  if \texttt{amt \leq SavingsAcct + CheckingAcct}
    \texttt{CheckingAcct = CheckingAcct - amt}
  Commit
  release CheckingAccount
  release SavingsAccount
\end{verbatim}

Delayed lock acquire

\texttt{CashCheck(CheckingAcct, amt)}
\begin{verbatim}
  BeginTransaction
  write-acquire CheckingAcct
  SavingsAcct = FindSavings(CheckingAcct)
  read-acquire SavingsAcct
  if \texttt{amt \leq SavingsAcct + CheckingAcct}
    \texttt{CheckingAcct = CheckingAcct - amt}
  Commit
  release CheckingAccount
  release SavingsAccount
\end{verbatim}
Early release

```plaintext
CashCheck(CheckingAcct, amt)
BeginTransaction
  write-acquire CheckingAcct
  SavingsAcct = FindSavings(CheckingAcct)
  read-acquire SavingsAccount
  if amt ≤ SavingsAcct + CheckingAcct
    CheckingAcct = CheckingAcct - amt
  release SavingsAccount
Commit
  release CheckingAccount
```

Broken early release

```plaintext
CashCheck(CheckingAcct, amt)
BeginTransaction
  write-acquire CheckingAcct
  SavingsAcct = FindSavings(CheckingAcct)
  read-acquire SavingsAccount
  if amt ≤ SavingsAcct + CheckingAcct
    CheckingAcct = CheckingAcct - amt
  release SavingsAccount
  release CheckingAccount
Commit
```