6.823 Computer Architecture	DUE: 5/8/2002

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Problem Set 6 — *Instructors: Krste Asanovic, Srinivas Devadas*

Problem 4

Note: For all answeres below, we assume that during the compilingg stage, the address issues are not resolved jet. **(a)**

Transfer PSO into SC:

```
if (Operation == Write) {
  If (Next Operation is a Read) {
     Insert a Membar_{wr}
  } else if (Next Operation is a Write) {
     Insert a Membar_{ww}
  }
}
```

Note : we just consider the following operations Read and Write. Other kinds of operations are ignored.

(b)

Transfer WO into SC:

```
if (Operation == Write or Operation == Read) {
  x = (Operation == Write ? w:r)
  If (Next Operation is a Read) {
     Insert a $Membar_{xr}$
  } else if (Next Operation is a Write) {
     Insert a $Membar_{xw}$
  }
}
```

Note : we just consider the following operations Read, Write and Synchronized. Other kinds of operations are ignored.

(c)

Transfer RC into SC:

```
# Consider only Read, Write, and Acquire operations.
# For this part only, assume membars are placed before the
# current operation.  Initially, w, r, wr, and rw are zero.
Loop {
```

```
  if(op == Read) {
    if(w == 1 && wr == 0)
      Membar_{wr}
      wr = 1
    if(r == 1)
      Membar_{rr}
    r = 1
    rw = 0
  }
  if(op == Write) {
    if(w == 1)
      Membar_{ww}
    if(r == 1 && rw == 0)
      Membar_{rw}
      rw = 1
    w = 1
    wr = 0
  }
  if(op == Acquire) {
    w = 0
    r = 0
  }
  op = NextOperation()
}
```