

Input: High-level Threaded Program

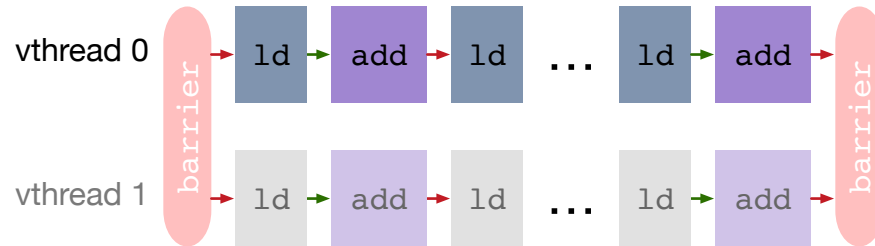


```

for vthread tx in range(2):
    acc_buffer CL[8]
    inp_buffer AL[8]
    for k in range(128):
        VTALoadBuffer2D(AL, AL[k][tx*8:tx*8+8])
        VTAPushALUOp(AL, CL)
    
```

- read after write (RAW) dependence
- read after write (RAW) dependence
- ↑ push RAW dependence
- ↑ push WAR dependence
- ↑ pop RAW dependence
- ↑ pop WAR dependence

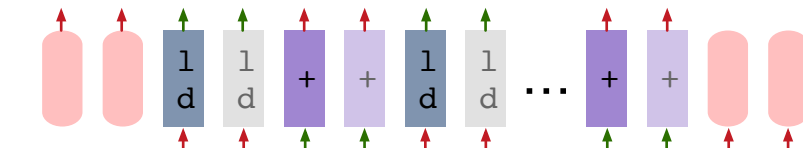
Inject Synchronization Instructions



```

for vthread tx in range(2):
    acc_buffer CL[8]
    inp_buffer AL[8]
    VTADepPush(compute, load)
    for k in range(128):
        VTADepPop(compute, load)
        VTALoadBuffer2D(AL, AL[k][tx*8:tx*8+8])
        VTADepPush(load, compute)
        VTADepPop(load, compute)
        VTAPushALUOp(AL, CL)
        VTADepPush(compute, load)
    VTADepPop(compute, load)
    
```

Final Single Instruction Stream



```

acc_buffer CL[2][8]
inp_buffer AL[2][8]
VTADepPush(compute, load)
VTADepPush(compute, load)
for k in range(128):
    VTADepPop(compute, load)
    VTALoadBuffer2D(AL[0], AL[k][0:8])
    VTADepPush(load, compute)
    VTADepPop(compute, load)
    VTALoadBuffer2D(AL[1], AL[k][8:16])
    VTADepPush(load, compute)
    VTADepPop(load, compute)
    VTAPushALUOp(AL[0], CL[0])
    VTADepPush(compute, load)
    VTADepPop(load, compute)
    VTAPushALUOp(AL[1], CL[1])
    VTADepPush(compute, load)
    VTADepPop(compute, load)
    VTADepPop(compute, load)
    
```