add   R1 <- R2 + R3

```
T0 : AR <- PC
T1: IR <- M[AR], PC <- PC + 1
T2 : D15 … D0 <- Dec [ IR[30 - 27] ],
     C <- IR[31] , R1 <- IR[26 - 23] , R2 <- IR[22 - 19],
     R3 <- IR[18 - 15]
C'T3 : R1 <- R2 + R3, SC <- 0
```

addi   R1 <- R2 + num

```
T0 : AR <- PC
T1: IR <- M[AR], PC <- PC + 1
T2 : D15 … D0 <- Dec [ IR[30 - 27] ],
     C <- IR[31] , R1 <- IR[26 - 23] , R2 <- IR[22 - 19],
     i <- IR[18 - 0]
T3 : R1 <- R2 + i, SC <- 0
```

move   move $S0, $S1

```
T0 : AR <- PC
T1: IR <- M[AR], PC <- PC + 1
T2 : D15 … D0 <- Dec [ IR[30 - 27] ],
     C <- IR[31] , R1 <- IR[26 - 23] , R2 <- IR[22 - 19],
     i <- IR[18 - 0]
CT3 : R1 <- R2
C'T3 : Nothing, SC <- 0
```

la la $S0, ($S1)

```
T0 : AR <- PC
T1: IR <- M[AR], PC <- PC + 1
T2 : D15 … D0 <- Dec [ IR[30 - 27] ],
     C <- IR[31] , R1 <- IR[26 - 23] , R2 <- IR[22 - 19],
CT3 : R1 <- (R2)
C'T3 : Nothing, SC <- 0
```

lb

```
T0 : AR <- PC, R1 <- 0, R2 <- 0
T1: IR <- M[AR], PC <- PC + 1
T2 : D15 … D0 <- Dec [ IR[30 - 27] ],
     C <- IR[31] , R1 <- IR[26 - 23] , R2 <- IR[22 - 19],
     i <- IR[18 - 0]
CT3 : AR <- R2
CT4 : AR <- i + AR
CT5 : R1 <- M[AR]
C'T5 : Nothing, SC <- 0
```

sb

```
T0 : AR <- PC, R1 <- 0, R2 <- 0
T1: IR <- M[AR], PC <- PC + 1
T2 : D15 … D0 <- Dec [ IR[30 - 27] ],
     C <- IR[31] , R1 <- IR[26 - 23] , R2 <- IR[22 - 19],
     i <- IR[18 - 0]
CT3 : AR <- R2
CT4 : AR <- i + AR
CT5 : M[AR] <- R1
C'T5 : Nothing, SC <- 0
```

input

```
T0 : AR <- PC
T1: IR <- M[AR], PC <- PC + 1
T2 : D15 … D0 <- Dec [ IR[30 - 27] ],
     C <- IR[31] , i <- IR[22 - 0]
CT3 : i <- screen
CT4 : $a0 <- i
C'T5 : Nothing, SC <- 0
```

output   out $v0, $s1

T0 : AR <- PC, R1 <- 0, R2 <- 0
T1: IR <- M[AR], PC <- PC + 1
T2 : D15 … D0 <- Dec [IR[30 - 27]],
     C <- IR[31] , R2 <- IR[22 - 19],
     i <- IR[18 - 0]
CT3 : $v0 <- R2
CT4: screen <- $v0
C'T5 : Nothing, SC <- 0

bun

T0 : AR <- PC
T1: IR <- M[AR], PC <- PC + 1
T2 : D15 … D0 <- Dec [IR[30 - 27]],
     C <- IR[31] , i <- IR[18 - 0]
CT3 : PC <- i
C'T4 : Nothing, SC <- 0