

1. $X = X + Y + Z + Q$; Assume X, Y, Z and Q are stored in registers $X_{18} - X_{21}$.

Add $X_5, X_{18}, X_{19} \# X_5 \leftarrow X + Y$

Add $X_5, X_5, X_{20} \# X_5 \leftarrow X + Y + Z$

Add $X_{19}, X_5, X_{21} \# X_{19} \leftarrow X + Y + Z + Q$

2. `int A[100], B[100];
for (i = 1; i < 100; i++) {
 A[i] = A[i-1] + B[i];
}`

Base addresses of A and B are in X_{19} , and X_{20} . And i is in X_{21} .

Addi $X_5, X_5, 1 \# X_5 \leftarrow 1$

Addi $X_6, X_6, 100 \# X_6 \leftarrow 100$

loop:

ld $X_7, 0(X_{19}) \# X_7 \leftarrow A[i-1]$

ld $X_8, 8(X_{20}) \# X_8 \leftarrow B[i]$

Add $X_9, X_7, X_8 \# X_9 \leftarrow A[i-1] + B[i]$

sd $X_9, 8(X_{19}) \# A[i] \leftarrow A[i-1] + B[i]$

Addi $X_{19}, X_{19}, 8 \# \text{For } i+1 \text{ of } A$

Addi $X_{20}, X_{20}, 8 \# \text{For } i+1 \text{ of } B$

Addi $X_5, X_5, 1 \# i \leftarrow i+1$

bne $X_5, X_6, \text{loop} \# \text{Compare with loop}$

beq X_0, X_0, Exit

Exit;

3. $X = 5Y + 6Z$;
 $Y = 3X + 7Y$;
 $Z = 9X + 11Y$;

Assume that X, Y and Z are in registers X_{19} , X_{20} and X_{21}

Slli $X_5, X_{20}, 2 \# X_5 \leftarrow 4 * Y$

Add $X_5, X_5, X_{20} \# X_5 \leftarrow 5Y$

$Sll\ i\ X_6, X_{21}, 2 \# X_6 \leftarrow 4 * 2$
 $Add\ X_6, X_6, X_{21} \# X_6 \leftarrow 5 * 2$
 $Add\ X_6, X_6, X_{21} \# X_6 \leftarrow 6 * 2$
 $Add\ X_{19}, X_{19}, X_6 \# X \leftarrow 5Y + 6Z$

$X = 5Y + 6Z$

$Sll\ i\ X_5, X_{19}, 1 \# X_5 \leftarrow 2 * X$
 $Add\ X_5, X_5, X_{19} \# X_5 \leftarrow 3 * X$
 $Sll\ i\ X_6, X_{20}, 3 \# X_6 \leftarrow 8 * Y$
 $Sub\ X_6, X_6, X_{20} \# X_6 \leftarrow 7 * Y$
 $Add\ X_{20}, X_{20}, X_6 \# Y \leftarrow 3X + 7Y$

$Y = 3X + 7Y$

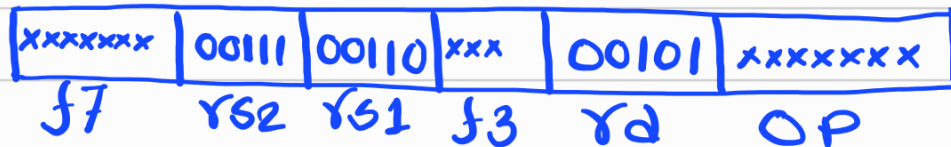
$Sll\ i\ X_5, X_{19}, 3 \# X_5 \leftarrow 8 * X$
 $Add\ X_5, X_5, X_{19} \# X_5 \leftarrow 9 * X$
 $Sll\ i\ X_6, X_{20}, 3 \# X_6 \leftarrow 8 * Y$

$Z = 9X + 11Y$

$Add\ X_6, X_6, X_{20} \# X_6 \leftarrow 9 * Y$
 $Add\ X_6, X_6, X_{20} \# X_6 \leftarrow 10 * Y$
 $Add\ X_6, X_6, X_{20} \# X_6 \leftarrow 11 * Y$
 $Add\ X_{21}, X_{21}, X_6 \# Z \leftarrow 9X + 11Y$

Encoding:

$Add\ X_5, X_6, X_7$ — R TYPE



$Addi\ X_7, X_6, 10$ — I TYPE

