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ECGR 3183: Computer Organization

Project 2: Branch Conditions

Source Code:

main:

ADDI X1, X2, #5 // set j

ADDI X2, X2, #3 // set k

B multiply // call multiply

ADDI X0, X0, #0 // return 0

multiply: // j=a and k=b

ADD X9, XZR, XZR // set i to 0

ADD X10, XZR, XZR // set r to 0

Loop:

SUBS X11, X9, X2 // check if i < b

B.PL Exit // if positive then exit

ADD X10, X10, X1 // r = r + a

ADDI X9, X9, #1 // i = i + 1

B Loop

Exit:

STUR X10, [X28,#0]

PARTICIPATION
ACTIVITY

2.24.3: Branching and labels.



1. Run the simulation step-by-step, observing register values.
2. Change X1's value to 5, then run again.

Assembly

```
Line 9 multiply: // j=a and k=b
Line 10 ADD X9, XZR, XZR // set i to 0
Line 11 ADD X10, XZR, XZR // set r to 0
Line 12
Line 13 Loop:
Line 14
Line 15 SUBS X11, X9, X2 // check if i < b
Line 16 B.PL Exit // if positive then exit
Line 17 ADD X10, X10, X1 // r = r + a
Line 18 ADDI X9, X9, #1 // i = i + 1
Line 19 B Loop
Line 20
Line 21 Exit:
Line 22 STUR X10, [X28,#0]
Line 23
```

Registers

X0	0
X1	5
X2	3
X9	3
X10	15
X11	0
X28	4000
X30	0
XZR	0

Memory

4000 15

EXIT SIMULATION

START AGAIN