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CSC 363 Homework #3

1.

a.128

b.32

c.35

d.leftmost, rightmost

2.

//adds 0 into the AC

MAR← ZERO

MBR← M[MAR]

AC← MBR

//loads x and stores 0 – x into AC

MAR← X

MBR← M[MAR]

AC← AC – MBR

//store x

MAR← X

MBR← AC

M[MAR]← MBR

3.

//loads x

MAR← X

MBR← M[MAR]

AC← MBR

//adds X + AC

MAR← X

MBR← M[MAR]

AC← AC + MBR

//jump to X in memory

PC← X

4.

MAR← X

MBR← M[MAR]

If IR[MBR–AC] = 01 then

AC←one

MAR← *X*, MBR← AC

M[MAR]← MBR

5.

//load the pc counter

MAR←PC

MBR←M[MAR]

IR←MBR

PC←PC+1

//Decode

MAR←M[MAR]

Decode IR[15-12]

//Get operand

MBR←M[MAR]

//Execute the stack

SP←SP+1

MAR←SP

M[MAR] ←MBR

6.

Load x

Subt y

Skipcond 10

Jump Else

Load y

Add one

Store y

Jump End

Else: Load x

Subt z

Skipcond 01

Jump Next

Load y

Subt one

Store y

Jump End

Next: Load z

Subt one

Store z

End: Halt

7.

Input

Store x

Loop: Load x

Skipcond 00

Jump Next

Load x

Subt y

Skipcond 01

Jump Else

Load count

Add one

Store count

Else: Input

Jump Loop

Next: Load count

Output

9.

a.1000

b.1600

c.1200

d.1800

10.

a. 9 \* 1000 = 9000

1000 + (9-1) = 1008

The pipelined machine is around 9 times faster

b. 9000/1508 times faster or about 6 times faster

c. 50 \* x + 1008 = 6000

50 \* x = 4992

X = 99.84 branches