

1.

Variable Name	Start Address	End Address	Size (in bytes)
Example	0	9	10
a	104	107	4
b	108	108	1
c	110	111	2
d	112	115	4
next	116	119	4
e	120	120	1
h[0].f	128	143	16
h[0].g	144	144	1
h	128	175	48
i	176	177	2
j	104	183	80

a	a	a	a
b		c	c
d	d	d	d
Next	Next	Next	Next
e			
h[0].f[0]	h[0].f[0]	h[0].f[0]	h[0].f[0]
h[0].f[0]	h[0].f[0]	h[0].f[0]	h[0].f[0]
h[0].f[1]	h[0].f[1]	h[0].f[1]	h[0].f[1]
h[0].f[1]	h[0].f[1]	h[0].f[1]	h[0].f[1]
h[0].g			
h[1].f[0]	h[1].f[0]	h[1].f[0]	h[1].f[0]
h[1].f[0]	h[1].f[0]	h[1].f[0]	h[1].f[0]
h[1].f[1]	h[1].f[1]	h[1].f[1]	h[1].f[1]
h[1].f[1]	h[1].f[1]	h[1].f[1]	h[1].f[1]
h[1].g			
i	i		

2.

```

    mov    r1    #0
    mov    r2    #10
    mov    r3    #-5
    mov    r4    #560
    ldr     r5    [r4]
    ldr     r6    [r4, #4]
loop  add    r3    r5    r6
    add    r7    r3    r1
    cmp    r2    r7
    blt    exit
    lsl     r8    r1    #3
    add    r1    r1    #1
    ldr     r8    [r8, #160]
    cmp    r8    #10
    bge    else
    add    r3    r5    #2
    b      skip
else  sub    r3    r6    r1
skip  add    r2    r2    #-1
    b      loop
exit

```

3.

Variable	Location	Variable	Location
aaron	static	devin	heap
wade	stack	nathan	stack
*asher	stack	matt	static
*devin	stack	batu	stack

4.

a. Caller-saved

Placeholder 1: NIL

Placeholder 2: NIL

Placeholder 3: save r1, r2, r4

Placeholder 4: restore r1, r2, r4

Placeholder 5: NIL

Placeholder 6: NIL

b. Callee-saved

Placeholder 1: save r1, r4, r7

Placeholder 2: restore r1, r4, r7

Placeholder 3: NIL

Placeholder 4: NIL

Placeholder 5: save r2, r3

Placeholder 6: restore r2, r3

c. Caller-saved: r1, r3, r7 Callee-saved: r2, r4

Placeholder 1: save r4
 Placeholder 2: restore r4
 Placeholder 3: save r1
 Placeholder 4: restore r1
 Placeholder 5: save r2
 Placeholder 6: restore r2

5.

a. 6.75 to binary IEEE

110.11
 1.1011
 0 1000001 1011000000000000000000
 Sign bit: 0
 Exponent: 1000001
 Mantissa: 1011000000000000000000
 Final: **0100000110110000000000000000**

b. 0100 0001 0010 0000 0000 0000 0000 0000 to decimal IEEE

0 1000010 0100000000000000000000
 Sign bit: 0
 Exponent: 1000010
 Mantissa: 0100000000000000000000
 1.01000
 1010.00
 Final: **10**

c. Adding a and b together

Mantissa (a): 1011000000000000000000
 Mantissa (b): 0100000000000000000000
 Exponent (a): 1000001
 Exponent (b): 1000010
 Exponents are unequal – therefore shift mantissa (smaller number is a)
 New Mantissa (a): 0.1101100000000000000000
 New Mantissa (b): 1.0100000000000000000000
 Added Mantissas: 10.00011
 Final Mantissa: 0000110000000000000000
 Exponent: 1000011
 Sign bit: 0
01000001100001100000000000000000