
Your Name (first last)

UC Berkeley
Fall 2018
CS61C Quest

SID

← Name of person on left (or aisle)

Name of person on right (or aisle) →

Q1a) With **3 bits**, how do we represent **-2**? If it can't be done, select "**N/A**". (Select ONE per row)

	000	001	010	011	100	101	110	111	N/A
Unsigned	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sign/Magnitude	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
One's Complement	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Two's Complement	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Bias; use bias of $-(2^{N-1}-1)$ from lecture	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

...scratch space below...

Q1b) Convert 26_{10} to the following bases (and remove any leading zeros)

Binary	Hex
0b	0x

Q1c) Add these *Two's Complement* nibbles:

1001	Does it overflow a nibble? (Select ONE) <input type="radio"/> Yes <input type="radio"/> No
+ 1011	

```
int mystery (unsigned int N) {
    unsigned int counter = 0;
    while (N > 0) {
        counter += N & 1;
        N = N >> 1;
    }
    return counter == 1;
}
```

Q2a) What does the **mystery** return? (Select ONE)

- The number of 1s in the binary representation of N
- 1 if N is odd, otherwise 0
- 1 if N is a power of 2, otherwise 0
- 1 if the binary representation of N is all 1s, otherwise 0
- 1 if the binary representation of N has any 1s, otherwise 0

Q2b) Given this setup to **mystery**:

```
unsigned int myN = GetNFromUser();
int mysteryReturn = mystery(myN);
...could myN be changed by the call to
mystery? (Select ONE)
```

- Yes
- It depends on the value of myN
- No

```
// My project partner wrote this code to duplicate some elements of orig into copy
int orig[] = {1,2,3,4,5,6,7,8}; // ints are 4 bytes wide ...scratch space below...
int main() {
    int *backup, *copy, **copyH;
    backup = copy = (int *) malloc (sizeof(int) * 100);
    copyH = &copy;

    for (int i = 0; i < 2; i++) {
        *copy = orig[i];
        *copyH = *copyH + 4;
    }
}
```

Q3a) Right *before* the **for** loop, where in memory do the following **point**? (Select ONE per row)

	Code	Static	Stack	Heap
orig	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
backup	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
copyH	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q3b) Right *after* the **for** loop, what is the value of the following? If it'd be garbage, write "G".

backup[0]	backup[1]	copy[0]	copy[1]

Q4a) Which RISC-V snippet could be the compilation of the C code: $x15 = 20 - x5$? (Select ALL that apply)
Assume the C variables $x5$ and $x15$ map directly to the registers of the same name.

<input type="checkbox"/> sub x5, 20, x15	<input type="checkbox"/> sub x15, 20, x5	<input type="checkbox"/> addi x15, x0, 20 sub x15, x15, x5	<input type="checkbox"/> addi x15, x5, -20 sub x15, x0, x15
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Q4b) Say we have an **int** array **A[99]** starting at address **0x00010000**, and register **x5** contains **&A[0]**. Assuming **sizeof(int) == 4**, what value is in register **x10** after **lw x10, 8(x5)** ? (Select ALL that apply)

<input type="checkbox"/> A[2]	<input type="checkbox"/> A[8]	<input type="checkbox"/> &A[2]	<input type="checkbox"/> &A[8]	<input type="checkbox"/> 0x00010008	<input type="checkbox"/> 0x00080000
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