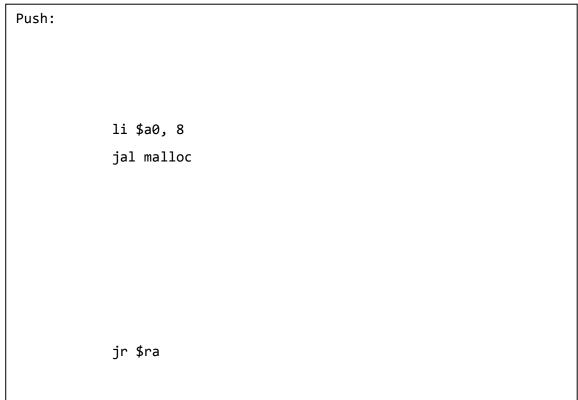
CS61C Final Review – Problems

$1. \quad 1001 \quad 0010 \quad 0000 \quad 1000 \quad 1111 \quad 1111 \quad 1111 \quad 1111 \\$

- a. Interpret this binary string as a two's compliment integer
- b. Interpret this binary string as a floating point number
- c. Interpret this binary string as a MIPS instruction
- 2. How many things can N bits represent?
- 3. C Problem:

```
typedef struct node {
    int value;
    struct node* next;
} ent;
stack push(stack s,int val){
}
typedef ent * stack;
int peek(stack s){
}
stack pop(stack s,int * val){
```

4. Implement the push function above in MIPS



5. Determine the Boolean expression for F

A	<u>B</u>	<u>C</u>	Ē
0	0	0	0
0	0	1	1
0	1	0	0
0	1	1	1
1	0	0	1
1	0	1	1
1	1	0	1
1	1	1	1

- 6. How many gates are there for a Boolean function of m inputs and n outputs?
- 7. Simplify your Boolean expression from 5 using Boolean Algebra

8. Draw the cache and label each access as a hit or miss (and what type of miss)

32 KiB Addressable Memory,1 KiB Cache Size,128 B Block Size,LRU Replacement,2-way set associative

Memory Accesses: 0x000C 0x10D0 0x2000 0x12D0 0x10D8 0x14D0

9. Indicate the mappings and provide the PPNs for each access:

MiB Virtual Memory Space,
 KiB Physical Memory
 KiB Page Size

Memory Accesses: 0x0000C 0x200D0 0x10000 0x202D0 0x200D8 0x204D0 10. Give an expression for AMAT of a system with VM (with TLB) and Cache

11. Memory Read – 10%, CPI = 18 Memory Write – 15%, CPI = 20 ALU – 30%, CPI = 1 Branch – 45%, CPI = 2 Overall CPI?

CPU Speed = 1 GHz, 1 Million instructions, CPU Time?

Cache added. Memory Read/Write halved. Improvement?

12. What is the effective speed of a 100 Mbps network that has a 100ms overhead for a transfer of 2 Megabytes.

13. Define and draw each of the Following RAID systems: 0, 1, 4, 5