

CS107 Quiz 2 Solution

This is a closed book, closed note, closed computer quiz. You have 7 minutes to complete it.

SUNet ID (@**stanford.edu**): _____

First and Last Name: _____

I accept the letter and spirit of Stanford's Honor Code.

[signed] _____

**Do not turn over until
instructed to do so.**

Problem 1: Two's Complement and Bitwise Operators

- a. [2 points] What's the binary—i.e., base-2—representation of -2? Express your answer as an 8-bit constant. Express your answer in binary.

1111 1110

Why? $+2_{10} = 0000\ 0010_2$, so invert all eight bits and add 1 to obtain the two's complement representation $-2_{10} = 1111\ 1110_2$.

- b. [2 points] What does the expression **0xABCDEF77 & 0x000000FF** evaluate to? Express your answer in hexadecimal.

0x00000077

Why? Because AND-ing any byte with 0x00 produces 0x00, and AND-ing any byte with 0xFF leaves the original byte unchanged.

- c. [2 points] What does the expression **0xABCDEF77 ^ 0x000000FF** evaluate to? Express your answer in hexadecimal.

0xABCDEF88

Why? ^-ing any byte with 0x00 leaves it as is, and ^-ing any byte with 0xFF produces its bitwise inverse.

Problem 2: C String Starter Pack

Recall that **strcpy** copies a C string from a source string to a destination character array. We assume the source is a valid C string and that the destination is large enough to store the full copy, including the `'\0'`.

- a. [2 points] What is the output of the following code snippet? Place your answer to the right of the code.

```
char course[6];
strcpy(course, "CS107");
course[3] = '\0';
printf("%s\n", course);
```

CS1

Why? By dropping a null byte in position three, you truncate the string.

- b. [2 points] You contemplate switching to CS107E from CS107 this quarter and think to adapt the code from part a. to build **"CS107E"**. What's the problem with the code presented below? Be brief.

```
char class[6];
strcpy(class, "CS107");
class[5] = 'E';
printf("%s\n", class);
```

The code overwrites the only `'\0'` relevant to the entire string, rendering it invalid and unsafe to print.