

1.

a. \$t0 0x0000FFFF, \$t1 0xEFF01270, \$t2 0x00000001

\$t0 0xFFFF0000

\$t1 0x00000001

\$t2 0x00000000

\$t2 will hold the value of 0.

b. Submitted files

c. Submitted files

N = 1; 5 instructions

N = 10; 5 + (3 * 11) + (7 * 10) = 108 instructions

N = 100; 5 + (5 * 11) + (95 * 10) = 1010 instructions

N = 1000; 5 + (7 * 11) + (993 * 10) = 10012 instructions

2.

a. not \$t1, \$t2

nor \$t1, \$zero, \$t2

b. rolr \$t0, \$t1, sign_ext_imm:

li \$t1, 0xFF00F000 # test value

addiu \$t0, \$zero, -4 # saved shamt value

addiu \$t3, \$zero, 32 # saved value of 32

addiu \$t0, \$t0, 32 # make shamt amount positive

andi \$t3, \$t0, 31 # shamt % 32

sub \$t4, \$t2, \$t3 # 32 - shamt

srlv \$t4, \$t1, \$t4 # Shift right first

sllv \$t3, \$t1, \$t3 # Shift left

or \$t0, \$t3, \$t4 # Combine both parts

c. There is not enough memory allocation for all the labels. MIPS does not allow adding labels as a function, as keeping arithmetic and memory access separate is more straightforward and intuitive. If MIPS allowed adding two labels together, it would violate their RISC philosophy because that instruction would require two reads and one write to memory in a single instruction.

3.

a. char *strchr (char *str, int character) {

 char *lastPos = NULL;

 for (int i = 0; str[i] != '\0'; i++) {

 if (str[i] == character) {

 lastPos = &str[i];

 }

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    }  
    return lastPos;  
}
```

- b. Submitted files
- c. Test 1: check to see if it prints the last 's' in a string with multiple 's' characters. This check ensures it can correctly identify and print the last occurrence of the searched character.
Test 2: check to see if it can find the last ' ' space in the string. This check ensures it can take blank spaces as input and find the previous position of the blank space occurrence.
Test 3: check to see if it returns -1 when searching for a character not in the string. This check ensures that the correct null value (set as -1) in the code is returned if unable to find a match or occurrence of the character.