

CS120 Fall 2018 Quiz 7. What's the value of X?

```
#include <stdio.h>

void f(int a)
{
    a = 10;
}

int main()
{
    int x;

    x = 20;
    f(x);
    printf("x is %d\n", x);
}
```

```
#include <stdio.h>

void f(int *a)
{
    *a = 10;
}

int main()
{
    int x;

    x = 20;
    f(&x);
    printf("x is %d\n", x);
}
```

Here's some sample MIPS code for the C shown above.

```
.text
# Function sets value
# on stack to 10
f: li $t0, 10
   sw $t0, 0($sp)
   jr $ra

main:
# Store return address
addi $sp, $sp, -4
sw $ra, 0($sp)
# Make space for local
# var X, set to 20
addi $sp, $sp, -4
li $t0, 20
sw $t0, 0($sp)

# Get X, push on stack
lw $t0, 0($sp)
addi $sp, $sp, -4
sw $t0, 0(sp)
# Call the function
jal f
# pop X back off
addi $sp, $sp, 4

# Remove local var
addi $sp, $sp, 4

# Restore RA
$addi $sp, $sp, 4
lw $ra, 0($sp)
# Return
jr $ra
```

```
.text
# We use a pointer here
f: li $t0, 10
   lw $t1, 0($sp)
   sw $t0, 0($t1)
   jr $ra

main:
# Store return address
addi $sp, $sp, -4
sw $ra, 0($sp)
# Make space for local
# var X, set to 20
addi $sp, $sp, -4
li $t0, 20
sw $t0, 0($sp)

# Get LOCATION of x,
# push on stack
addi $t0, $sp, $0
addi $sp, $sp, -4
sw $t0, 0($sp)
# Call the function
jal f
# pop X back off
addi $sp, $sp, 4

# Remove local var
addi $sp, $sp, 4

# Restore RA
$addi $sp, $sp, 4
lw $ra, 0($sp)
# Return
jr $ra
```

```

#include <stdio.h>

void f(int *a)
{
    *a = 10;
}

int main()
{
    int x[4] = {3, 4, 5, 6};
    f(x);

    // What's in X?
}

```

If \$s0 is a pointer to an integer, write MIPS code to set the integer to the number 10.

```

#include <stdio.h>

void f(int *a)
{
    a[2] = 10;
}

int main()
{
    int x[4] = {3, 4, 5, 6};

    f(&x[1]);
    // What's in X?
}

```

If \$s0 is a pointer an array, write MIPS code to set array element 2 to the number 10.

```

#include <stdio.h>

void f(int *a, int *b)
{
    *a = *b;
}

int main()
{
    int x, y;

    x = 20;
    y = 30;
    f(&y, &x);
    printf("x, y are %d, %d\n",
           x, y);
}

```

If \$s0 and \$s1 are pointers to integers, write MIPS code to set the integer pointed to by \$s0 to the value pointed to by \$s1