Variant 4

6.1903: Quiz 3 (11/16/2026)

Name:	**Kerberos:**

Enter your answers in the boxes designated for each problem. Additional scratch paper can be provided but will not be considered in grading.

`app_main` calls `mystery_sum(a, b)`, shown on the next page, with two starting values that you are not told. The call to `mystery_sum` in `app_main` occurs at instruction `0x42007a90`. The base case calls `mystery_bottom()`, which prints the stack at the moment it was called, starting at the current `sp` and going toward higher addresses. Study the code and stack snapshot on the next page and answer the questions below. (Feel free to separate the second page since we will only grade the first page.)

1. What two values `(a, b)` did `app_main` pass to `mystery_sum`? Give them in hexadecimal.

`a = 0x1`	`b = 0x7`

2. How many times had `mystery_sum` been called when the snapshot was taken, including the call that went to `mystery_base`?

`9`

3. What was the value of `sp` in `app_main` immediately before the `call mystery_sum` was executed?

`0x3fc9a650`

4. What is the address of the `add a0, a0, s0` instruction in `mystery_sum`?

`0x42006ea0`

5. When execution reaches `mystery_base`, what values (in hexadecimal) are in registers `a0` and `s0`?

`a0 = 0xa0`	`s0 = 0x63`

6. What value does `mystery_sum` eventually return to `app_main`? **Give your answer in decimal.** (Show work in box for partial credit.)

`252`

Variant 4

Feel free to separate this page from the first page! We will not be scanning it for grading.

```
mystery_sum:
    li    t0, 100
    bgt   a0, t0, mystery_base  # a > limit: done
    addi  sp, sp, -12
    sw    ra, 8(sp)
    sw    s0, 4(sp)
    sw    a0, 0(sp)
    mv    s0, a0
    add   t1, a0, a1
    mv    a0, a1
    mv    a1, t1
    call  mystery_sum
    add   a0, a0, s0 # <--question 4
    lw    s0, 4(sp)
    lw    ra, 8(sp)
    addi  sp, sp, 12
    ret
mystery_base:
    addi  sp, sp, -4
    sw    ra, 0(sp)
    call  mystery_bottom # stack snapshot here
    lw    ra, 0(sp)
    addi  sp, sp, 4
    li    a0, 0
    ret
```

```
0x3fc9a5ec: 0x42006ea0
0x3fc9a5f0: 0x00000063
0x3fc9a5f4: 0x0000003d
0x3fc9a5f8: 0x42006ea0
0x3fc9a5fc: 0x0000003d
0x3fc9a600: 0x00000026
0x3fc9a604: 0x42006ea0
0x3fc9a608: 0x00000026
0x3fc9a60c: 0x00000017
0x3fc9a610: 0x42006ea0
0x3fc9a614: 0x00000017
0x3fc9a618: 0x0000000f
0x3fc9a61c: 0x42006ea0
0x3fc9a620: 0x0000000f
0x3fc9a624: 0x00000008
0x3fc9a628: 0x42006ea0
0x3fc9a62c: 0x00000008
0x3fc9a630: 0x00000007
0x3fc9a634: 0x42006ea0
0x3fc9a638: 0x00000007
0x3fc9a63c: 0x00000001
0x3fc9a640: 0x42006ea0
0x3fc9a644: 0x00000001
0x3fc9a648: 0x0000000e
0x3fc9a64c: 0x42007a94
0x3fc9a650: 0x0000000c
0x3fc9a654: 0x3fc93e88
0x3fc9a658: 0x3fc9a6a0
0x3fc9a65c: 0x420082d4
```