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HW- 4
CS-3810
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Answer 1:

So the procedure is a function which tries to find the given element is register $a1 within the sorted array whose address is in $a0 by calling the function recursively.

If the element is not present in the array then it returns -1 and if the element is in the array then it returns the offset of element index.

Here are my comments:

new_proc:

beq $a2,$zero,proc_fail #condition for exit_loop if the element length hits zero

srl $a2,$a2,1 #dividing by 2 ;to find the middle element index

add $t0,$a2,$a3 #$t0 stores the middle element index of the particular rotation

sll $t1,$t0,2 #calculating the offset

add $t2,$a0,$t1 #calculating the physical address

lw $t3,0($t2) #loading the middle element value

beq $t3,$a1,proc_succ #checking the value with the finding element

bgt $t3,$a1,call_again #checking for the x is left of the middle element or right

add $a3,$zero,$t0 #if x is to right then shifting the base by half of the size

call_again:

addi $sp,$sp,-4

sw $ra, 0($sp) #storing the return address as it recursive calling

```
jal new_proc

lw $ra, 0($sp) #retreiving back the return address

addi $sp, $sp, 4 #decrement the sp pointer

jr $ra #returning back

proc_succ:

add $v0, $zero, $t0 #returning the index of the finding element

jr $ra

proc_fail:

addi $v0, $zero, -1 #returning -1 if element is not there in array

jr $ra
```