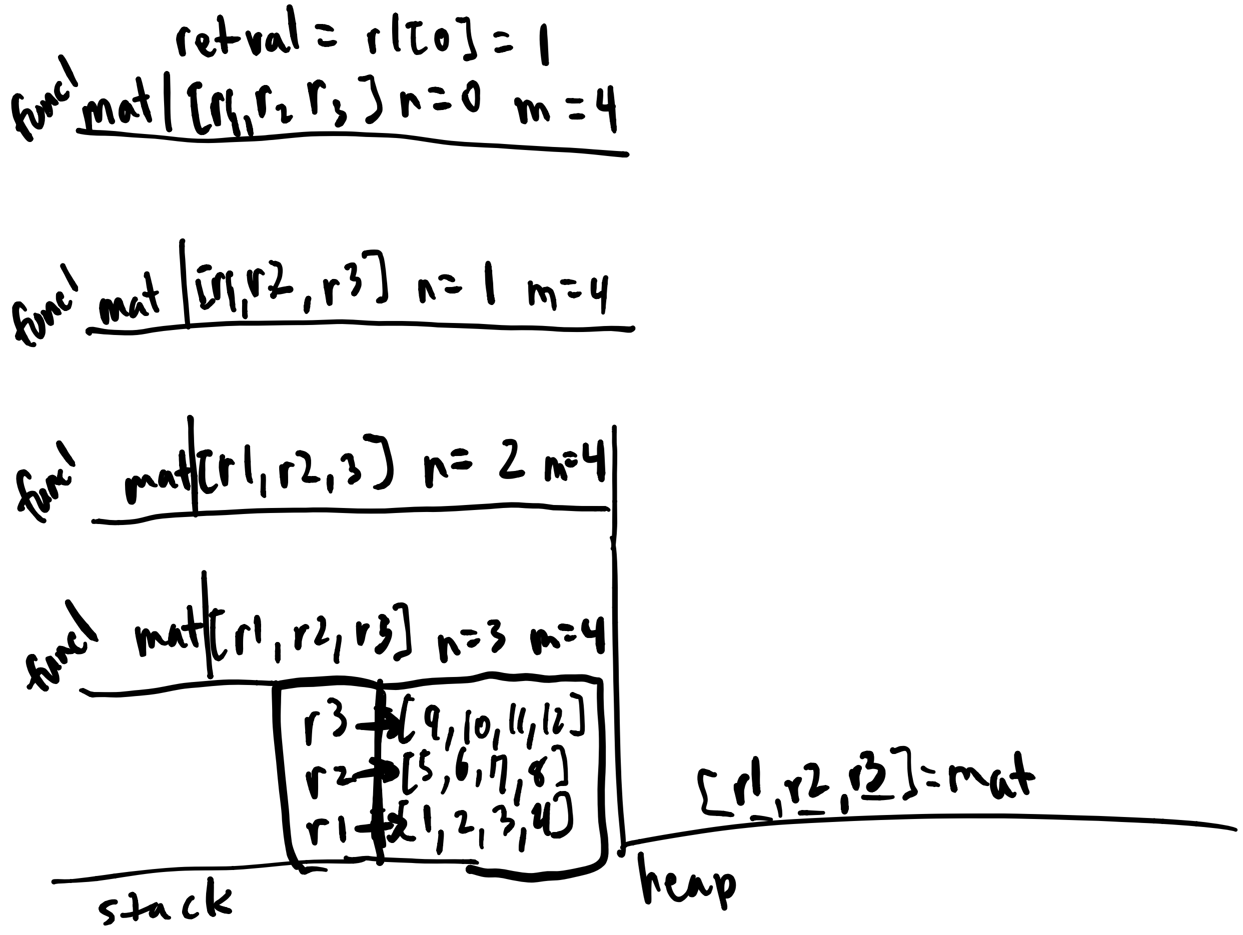
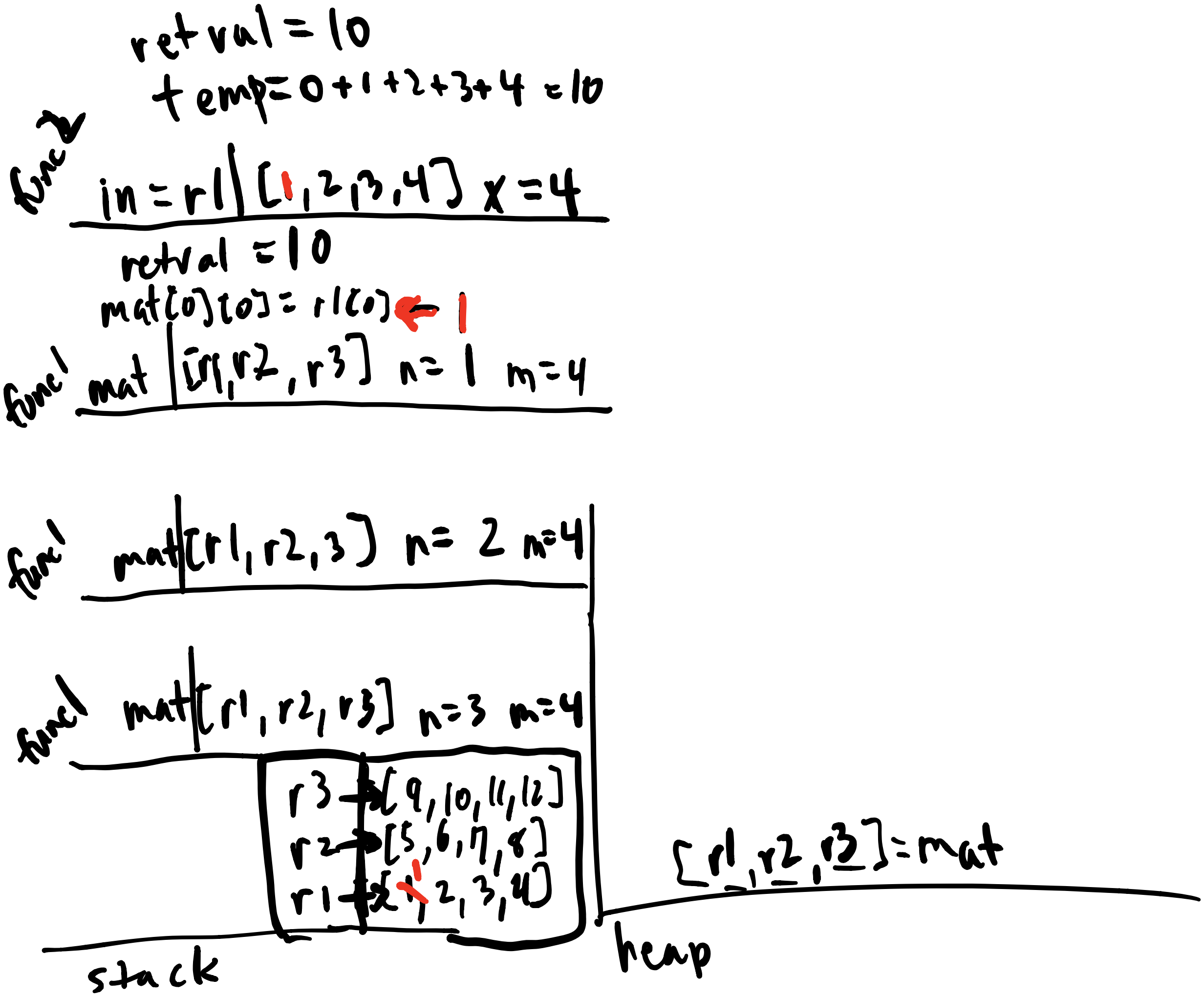
Recursive call untill n == 0.

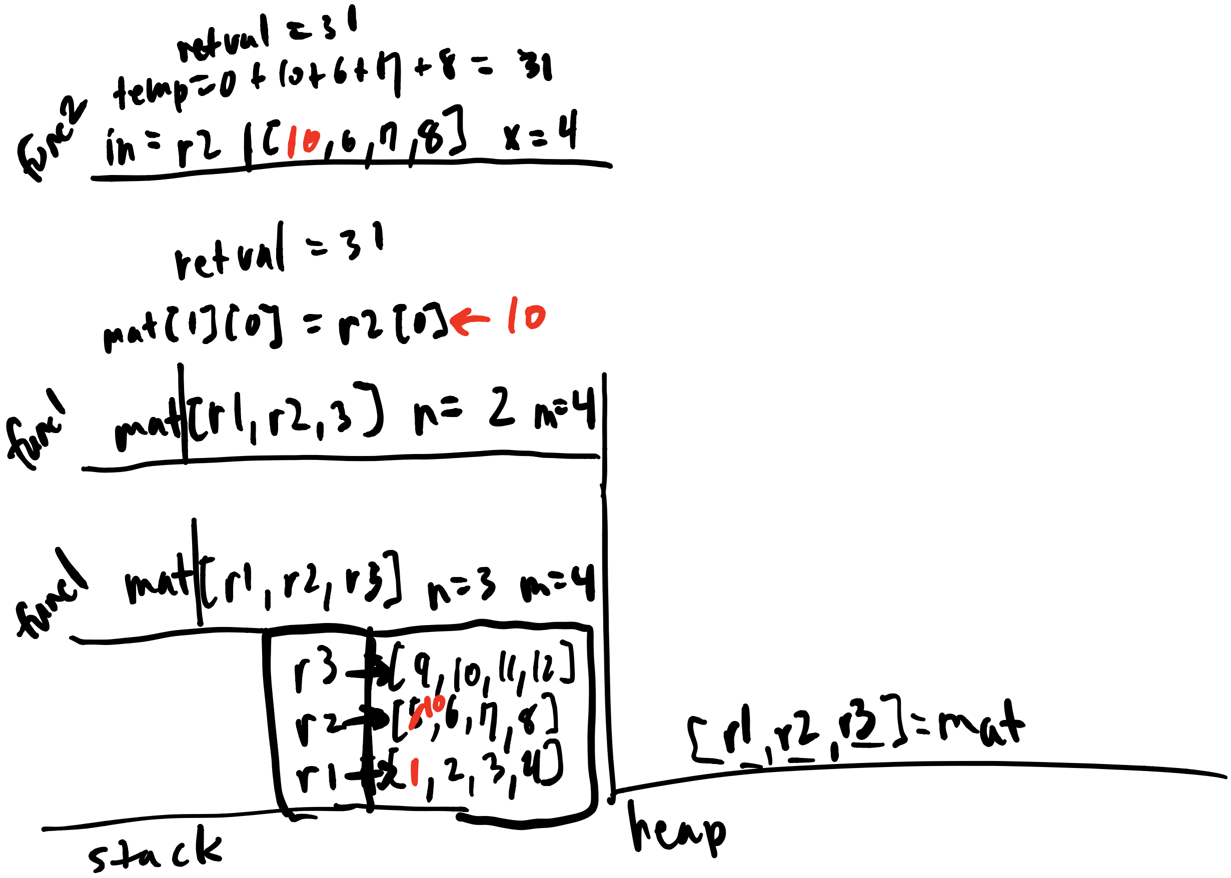

retval = r1[0] = 1
func' mat | [r1, r2 r3] n=0 m=4
func' mat | [r1, r2, r3] n= 1 m=4
func' mat [r1, r2, 3] n= 2 m=4
func' mat [r1, r2, r3] n=3 m=4
r3 → [9, 10, 11, 12]
r2 → [5, 6, 7, 8]
r1 → [1, 2, 3, 4]
stack
[r1, r2, r3] = mat
heap

Return from n==1

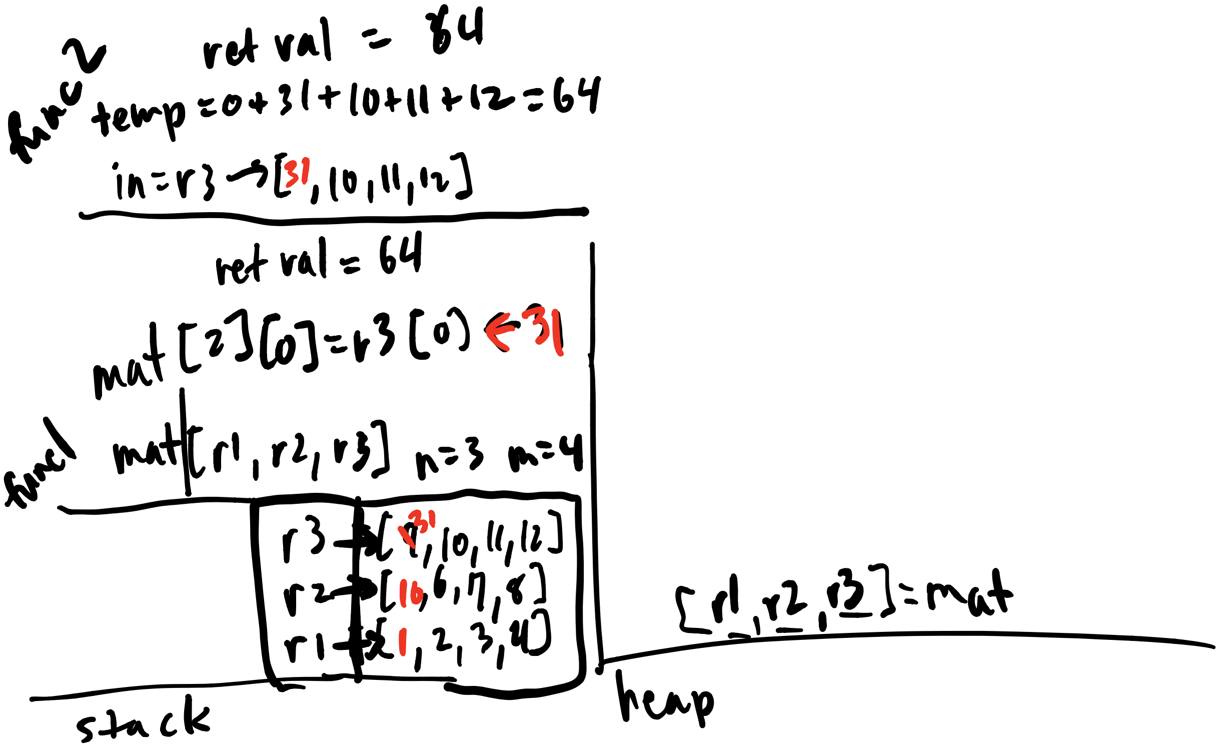
Changes are marked in red



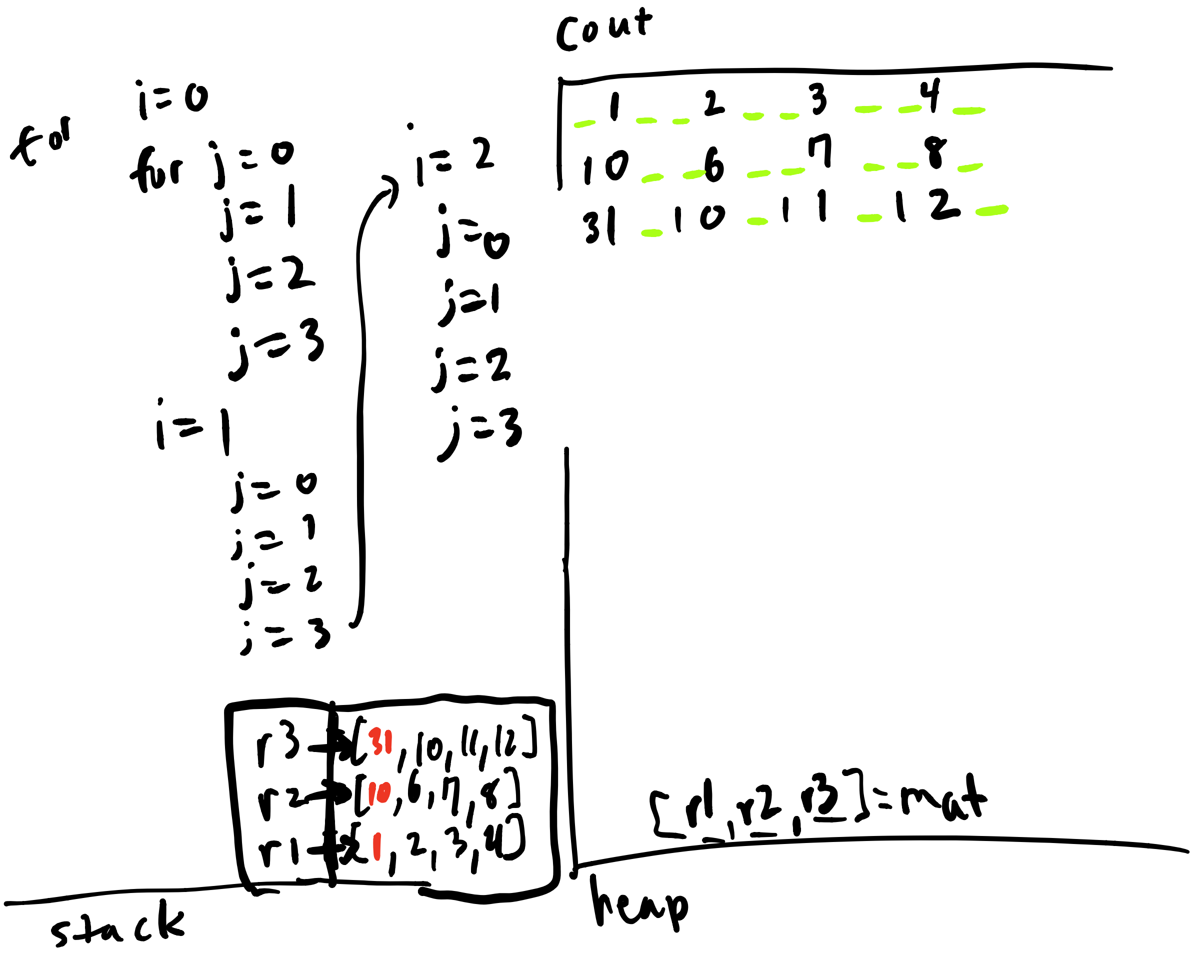
Return from n == 2



Return from n==3



Rest of the main (the for loop)


cout
1 2 3 4
10 6 7 8
31 10 11 12
for
i=0
for j=0
j=1
j=2
j=3
i=1
j=0
j=1
j=2
j=3
i=2
j=0
j=1
j=2
j=3
r3 → [31, 10, 11, 12]
r2 → [10, 6, 7, 8]
r1 → [1, 2, 3, 4]
stack
[r1, r2, r3]=mat
heap