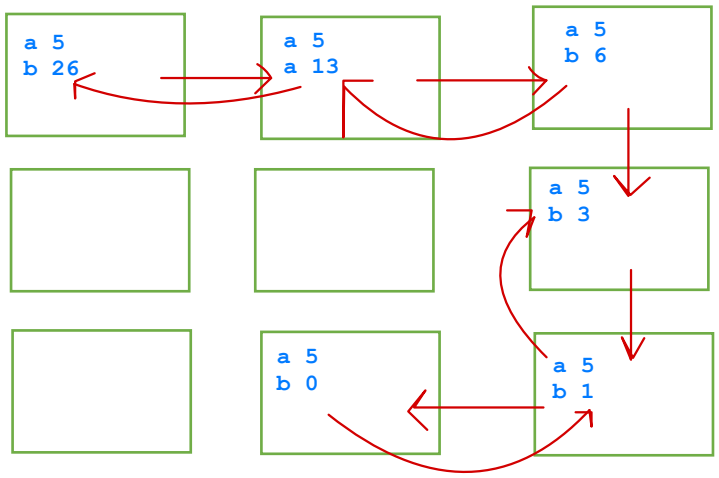
Worksheet # 6 Recursion CIS2500

Submit a single text or pdf file to the dropbox. Name it as lastnameFirstnameW6 followed by the appropriate extension.

Question 1: Hand trace the following code to show what gets returned when fun is called as fun (5, 26)? You may use as many boxes given below as you need to hand-trace (or none).

```
18 int fun (int a, int b) {
19
20   if (b == 0) {
21      return 0;
22   }
23   else if (b % 2 == 0) {
24       return fun (a, b/2);
25   }
26   else {
27       return fun (a, b/2) + a;
28   }
29 }
```

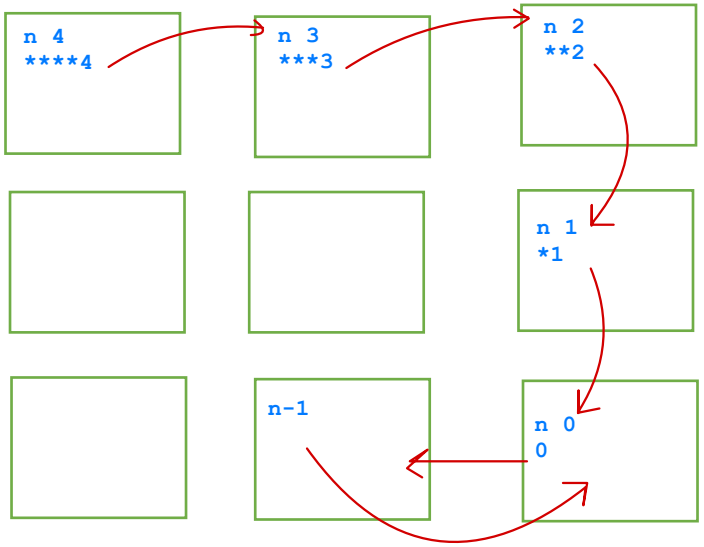


Final output:

15

Question 2: Hand trace the following code to show what gets printed when n = 4.
You may use as many boxes given below as you need to hand-trace (or none).

```
14 void printP (int n) {
15
16    if (n >= 0) {
17
18        for (int i = 0; i < n; i++) {
19            printf ("*");
20        }
21        printf ("%d \n", n);
22
23        printP (n - 1);
24
25        for (int i = 0; i < n; i++) {
26            printf ("*");
27        }
28        printf ("%d \n", n);
29    }
30
31 }
```



Output:

```
****4
***3
**2
*1
0
0
*1
**2
***3
****4
```

Question 3: The function given below falls into an infinite loop. Let's fix it. Do not change the prototype.

```
10 int main () {
11
12    char str [50];
13
14    fgets (str, 50, stdin);
15    str [strlen (str) - 1] = '\0';
16
17    printf ("Length = %d \n", findLen (str));
18     printf ("%s \n", str);
19 }
20
21 int findLen (char n[]) {
22
23     int len;
24
25     if (strlen(n) == 0) {
26         len = 0;
27     }
28     else {
29
30         len = 1 + findLen (n);
31     }
32     return len;
33 }
```

```
int findLen(char n[]) {
   int len;
   if(strlen(n) == 0) {
      len = 0;
   }
   else {
      printf("n = %s \n", n);
      n[strlen(n) - 1] = '\0';
      len = 1 + findLen(n);
   }
   return len;
}
```

Question 4: Write a recursive function that finds the total number of even digits in a given integer number. For example, it returns 2 if the given input is 2879, returns 3 if the given input is 888, returns 0 if the given input is 13579 and so on. It returns 0 if the given input is 0.

```
// Q4 Worksheet 6
int W6Q4(int num) {
   int dig;
   if(num == 1) {
      return 0;
   }
   else {
      dig = num % 10;
      if(dig % 2 == 0) {
         return 1 + W6Q4(num / 10);
      }
      else {
         return W6Q4(num / 10);
      }
   }
}
```