

Assignment 1

Kuntal Sudhir Kokate - EE18BTECH11028

Download all latex-tikz codes from

<https://github.com/Kkuntal990/C-DS/blob/main/Assignment1/assignment1.tex>

2 SOLUTION

$$pp(3, 4) = 81$$

1 PROBLEM

(Q 48) Consider the following C function.

```
int tob(int b, int *arr){
    int i;
    for (int i = 0; b > 0; i++){
        if(b%2)
            arr[i] = 1;
        else
            arr[i] = 0;
        b = b / 2;
    }

    return (i);
}
```

```
int pp(int a, int b){
    int arr[20];
    int i, tot = 1, ex, len;
    ex = a;

    len = tob(b, arr);
    for (int i = 0; i < len; i++)
    {
        if(arr[i] == 1)
            tot = tot * ex;
        ex = ex * ex;
    }

    return tot;
}
```

The value returned by

$$pp(3, 4)$$

is ?

Explanation

Characteristics of *tob* function:

1) If

$$b \geq 2^{(\text{length}(\text{arr}))}$$

tob returns an error due to buffer overflow.

2) Converts positive integers to their binary representation.

3) In the case of negative integer, it returns 1 as output.

For eg.

$$\text{tob}(4) = 100$$

We have

$$a = 3$$

and

$$b = 4$$

In function *pp*, we have

$$\text{len}(\text{arr}) = 20$$

$$\implies b < 2^{20}$$

Final answer is updated in function *pp* only when the corresponding bit is set in binary representation of *b* as evident from the below for loop.

```
for (int i = 0; i < len; i++)
{
    if(arr[i] == 1)
        tot = tot * ex;
    ex = ex * ex;
}
```