### TASK 1

```
def factorial(n):
    result = 1
    for i in range(2, (n+1)):
        result = result * i;

    return result
```

--> The time complexity of this function is O(n);

---

### TASK 2

--> The recursive implementation of the above factorial function:

```
def factorial(n, result = 1):
    if(n < 2):
        return result;

    result *= n
    return factorial(n-1, result)
```

---

### TASK 3

```
def foo(n):
    result = 0
    for i in range(1, n+1):
        for j in range(1, i+1):
            result = result + 1
    return result
```

--> The time complexity of this function is O(n^2)

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### TASK 4

A = [ A B ]  B = [ e ]
[ C D ]  [ f ]

--> The result:

The size of the resulting matrix = number of rows in A * number of columns in B
= 2 * 1

The number of rows of the result matrix = 2

The number of columns of the result matrix = 1

The resulting matrix = [ Ae + Bf ]
[ Ce + Df ]

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### TASK 5

Given function: f(x) = 3x^2 + 5x - 7

A. The derivative of the f(x): f'(x) = 6x + 5
B. f'(5) = 6 * 5 + 5 = 35
C. The second derivative of the f(x) = f''(x) = 6
D. f''(5) = 6

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### TASK 6

Two hens lay 2 eggs in 2 days.
Two hen lay = 1 egg/day
One hen lays 0.5 egg/ day.
Ten hen lays 5 egg in 10 days.

--> Ten hen lays 50 eggs in 10 days.

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### TASK 9

Part A : When the deadline for assignment 5 approaches, a student sends the instructor the following email:

"I really, really need an extension, I have three midterms this week, I do not have time to work on the homework. My homework average is already close to 60, I am afraid of failing the class."

Which of these responses should the student expect from the instructor?

C: No, extensions are not provided except in case of an emergency documented in writing (too much other work, computer/network problems do not qualify). However, remember that you can resubmit (or make late submissions) until Tuesday April 29. For the purposes of making a B, C, or D semester grade, the resubmission score fully replaces the original grade. So, if you do not make the deadline and you get a 0, you can fully replace that score

with a resubmission. The only caveat is that the resubmission score will not be considered for the purposes of giving an A grade for the semester.

Part B: Suppose that instead of "three midterms this week", the reason for the extension request was a computer crash or a network problem. In that case, which of the above three responses should the student expect?

C: No, extensions are not provided except in case of an emergency documented in writing (too much other work, computer/network problems do not qualify). However, remember that you can resubmit (or make late submissions) until Tuesday April 29. For the purposes of making a B, C, or D semester grade, the resubmission score fully replaces the original grade. So, if you do not make the deadline and you get a 0, you can fully replace that score with a resubmission. The only caveat is that the resubmission score will not be considered for the purposes of giving an A grade for the semester.

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### TASK 10

A student sends the instructor the following email:

"For assignment X, can I use library Y, which we never discussed in class? That library already seems to implement what you are asking."

Which of these responses should the student expect from the instructor?

C: Use at your own risk. The lectures have provided all the information that you need for your implementation. Your solution should produce the correct outputs for the test inputs that we will use during grading. If you get that done using an existing library, that is fine. If the library produces results that do not match my specifications, you bear the responsibility.