**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 **Θ(n)** due to the function always iterating n-1 times.

**Task 2**

def factorial(n):

if n == 0:

return 1

else:

return n\*factorial(n-1)

**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 **Θ(n2)** because i is used to iterate through n and j is used to iterate through i. This result has a time complexity similar to ½n2 which results in Θ(n2).

**Task 4**

\* =

**Task 5**

f(x) = 3x2 + 5x - 7

a. f’(x) = **6x+5**

b. f’(5) = 6(5)+5 = **35**

c. f’’(x) = **6**

d. f’’(5) = **6**

**Task 6**

f(x,y) = 3x2y + 5x – 7y

a. fx = **6xy + 5**

b. fx(5,2) = 6(5)(2)+5 = **65**

**Task 7**

* P(A and B) = 0.3 \* 0.6 = **0.18**
* P(A or B) = 0.3 + 0.6 – 0.18 = **0.72**
* P(not A) = 1.0 – 0.3 = **0.7**
* P(A|B) = **0.3** because they are independent

**Task 8**

|  |  |  |  |
| --- | --- | --- | --- |
| Color | Price $20 to $40 | Price $50 to $70 | Price $80 to $100 |
| Red | 40 | 70 | 35 |
| Green | 15 | 50 | 30 |
| blue | 60 | 20 | 80 |

a. P(price < $75) = (70+50+20+40+15+60)/400 = **0.6375**

b. P(price < $75 | color=green) = (15+50)/95 = **0.6842**

c. P(price < 75, color=green) = (15+50)/400 = **0.1625**

**Task 9**

Two hens lay a combined total of two eggs in two days. If this rate of egg production per hen per day continues, how many eggs do ten hens lay in ten days?

H=Hen, E=Egg, D=Day

2H = 2E/2D so 10H = ?E/10D

10H = 10E/2d

10H = 50E/10D

Ten hens lay **50 eggs** in ten days.

**Task 10**

Completed in the file file\_stats.py

**Task 11**

Completed in the file nth\_smallest.py

**Task 12**

"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.”

a. The student can expect **B or C**. I don’t know how verbose you are in your emails but C is almost word for word from the syllabus

b. The student can still expect **B or C**. I don’t know how verbose you are in your emails but C is almost word for word from the syllabus

**Task 13**

"For assignment X, can I use library Y? That library already seems to implement what you are asking."

The student can expect **C.** Use at your own risk. The lectures have provided all the…