Assignment 1

Nabin Chapagain
1001551151

Task 1

The loop runs from 2 to n+1. So, the total number of times loop will run will be n + 1 − 2 = n − 1 times. Since we don't care about constants or lower terms while calculating time complexities, in θ notation, time complexity of this function is n.

Task 2

The matlab function is saved as fact.m

```
function [factorial] = fact(x)
   if x == 1
      factorial = 1;
      return;
   end
   factorial = x* fact(x-1);
end
```

Task 3

There is a nested loop in use here. For the first loop with i, it will run for n times and the second loop will have a run time depending on i. The run time of this code looks like an arithmetic series which will be:

$$n(n+1)/2 = n^2/2 + n/2$$

we don't care about the constants and lower indexed value so, the time complexity for this function, in θ notation is n^2.

Task 4

A = $\begin{bmatrix} a & b \\ c & d \end{bmatrix}$ and B = $\begin{bmatrix} e \\ f \end{bmatrix}$ which gives us:

A*B = $\begin{bmatrix} ae+bf \\ ce+df \end{bmatrix}$

Assignment 1

Nabin Chapagain
1001551151

Task 5

Given, the function: f (x) = $3x^2 + 5x - 7$.

The first derivative f'(x) would be: **f'(x) = 6x + 5**

For x=5, **f'(5)= 30+5 =35**

Second derivative of f(x) which is **f"(x) = 6**

and, for x=5 , **f"(5) = 6**

Task 6

We are given, for two events A and B which are independent of each other, P(A)=0.3 and P(B)=0.6

P(A and B) = 0.3*0.6 =0.18 (*Because these are independent events*)

P(A or B) = 0.3 + 0.6 -0.3*0.6 = 0.72

P(not A) = P(universal) - P(A) = 1-0.3 = 0.7 (*Total probability is 1.*)

P(A|B) = P[A and B] / P[B] = 0.18/0.6 = 0.3

Here, probability of getting A given B is 0.3

Task 7

the matlab function is attached in the zipped folder together.

```
%Nabin Chapagain, 1001551151%
function [avg,stdev] = file_stats(pathname)
   fileID = fopen(pathname,'r');
   A = fscanf(fileID, '%f');
   avg = mean(A);
   stdev = std(A);
   fclose(fileID);
end
```

Assignment 1

Nabin Chapagain
1001551151

Task 8

Here, total number of hats available is 40+70+35+15+50+30+60+20+80 = 400.

Part a: P(price< $75) = (40 + 70 + 15 + 50 + 60 + 20)/400 = 255/400 = 51/80
Part b: P(price< $75 | color = green) = P[under 75 and green] / P[green] =65/95 = 13/19
Part c: P(price<$75, color = green) = (50+15)/400 = 65/400 = 13/80