In [382…
```
import pandas as pd
import matplotlib.pyplot as plt
import numpy as np
%matplotlib inline
```

In [383…
```
data = pd.read_csv("patient.csv")
```

Cleaning up the data!

In [384…
```
data.duplicated().sum()
```

Out[384]:
```
1
```

There are 1 duplicated row

In [385…
```
data = data.drop_duplicates() #remove duplicate
```

In [386…
```
data.duplicated().sum()#checking again
```

Out[386]:
```
0
```

Missing Values

In [387…
```
#Checking Null Values
for col in data.columns:
    pct_missing = data[col].isnull().mean()
    print(f'{col} - {pct_missing :.1%}')
```

```
patient_id - 0.0%
first_name - 0.0%
last_name - 0.0%
age - 0.0%
email - 0.0%
phone - 0.0%
address - 0.0%
surgery_done - 0.0%
assigned_room - 0.0%
no_of_nights - 0.0%
is_discharged - 0.0%
employee_id - 0.0%
check_in_time - 0.0%
appointment_end_time - 0.0%
```

there is no missing values

Convert column with proper datatype

In [388…
```
data['check_in_time'] = pd.to_datetime(data['check_in_time'])
data['appointment_end_time'] = pd.to_datetime(data['appointment_end_time'])
```

In [389…
```
#creating a separate column for check in day
data['Day'] = data['check_in_time'].dt.day_name()
```

In [390…
```
data.head()
```

Out[390]:

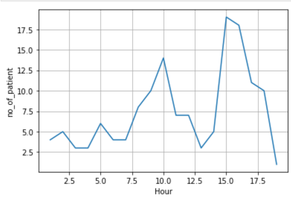
	patient_id	first_name	last_name	age	email	phone	address	surgery_done	assigned_room	no_of_nights	is_discharged	employee_id	check_in_time	appointment_end_time	Day
0	2000	Johnny	Ling	25	johnnylang@gmail.com	(234)347-8970	123 Main St Boston MA	Yes	General ward	3	Yes	17001	2023-01-20 10:26:12	2023-01-20 11:26:12	Friday
1	2001	Simphon	Everest	64	simphon78@gmail.com	(617)346-9349	456 Oak St Virginia	No	Private ward	7	No	17002	2023-01-21 13:59:53	2023-01-21 14:29:53	Saturday
2	2002	Erik	Douglas	45	erik33@gmai.com	(857)546-4568	789 Park Ave Boston MA	Yes	Premium Deluxe	5	Yes	17003	2023-01-20 03:05:49	2023-01-20 03:35:49	Friday
3	2003	Charles	Simon	34	simonc@yahoo.com	(857)469-0980	333 Pine St Boston MA	Yes	Private ward	9	Yes	17004	2023-01-20 08:46:08	2023-01-20 09:16:08	Friday
4	2004	James	Mitchel	22	jamesmitchell@gmail.com	(857)846-0987	812 Willow St Virginia	No	Premium Deluxe	2	No	17011	2023-01-21 04:15:39	2023-01-21 04:45:39	Saturday

1) What time should we increase staff count in the hospital to maximize patient's care?

In [391…
```
data['Hour']=data['check_in_time'].dt.hour
```

In [392…
```
busytime = data.groupby('Hour').count().reset_index()
```

In [393…
```
from matplotlib.ticker import StrMethodFormatter
plt.plot(busytime['Hour'],busytime['patient_id'])
plt.xlabel('Hour')
plt.ylabel('no_of_patient')
plt.grid()
plt.show()
```



Based on the data analysis, it appears that patients tend to check into the hospital more frequently between the hours of 2:30 PM and 6PM. One possible explanation for this trend is that during these hours, traffic is typically heavier in Boston, which may result in an increased likelihood of accidents and injuries requiring medical attention. However, further research would be needed to confirm this hypothesis.

By increasing the number of staff during the peak check-in hours, the hospital may be able to improve the overall patient experience by reducing wait times and ensuring that patients receive timely medical attention. However, it's important to note that increasing staffing levels can also be costly, so any decisions to do so should be carefully evaluated in light of the hospital's budget constraints and patient demand.

2) which day has more number of cases?

In [394…
```
dayCases = data.groupby('Day').count()[['patient_id']].reset_index()
dayCases.sort_values(by='Day')
```

Out[394]:

	Day	patient_id
0	Friday	56
1	Monday	5
2	Saturday	56
3	Sunday	3
4	Thursday	6
5	Tuesday	9
6	Wednesday	7

The data shows a higher incidence of medical cases being reported on Fridays and Saturdays, which may be attributed to the fact that these days mark the end of the work week and people are more likely to be out socializing and engaging in recreational activities, which could lead to accidents. Additionally, the consumption of alcohol during parties and other gatherings may contribute to an increase in the number of accidents, including those resulting from drunk driving.

3) If we were to choose a doctor of the month based on the number of patients they have treated, which doctor would we select?

now since we don't have employee name in patient.csv , we can import Staff.csv file in order to get the name of the doctor

In [395…
```
staff = pd.read_csv("staff.csv")
```

Let's first check which doctor has maximum count of patient

In [396…
```
patient_count = data.groupby('employee_id').count().reset_index().sort_values(by = 'patient_id',ascending=False ).head(1)[['employee_id','patient_id']]
patient_count
```

Out[396]:

	employee_id	patient_id
1	17002	13

we can see that employee_with id 17002 has checked max number of patient in the month of january so we choose him

now to get his name, lets find it in Staff table

In [397…
```
doctor_of_the_month = staff[staff['employee_id']==17002]
doctor_of_the_month
```

Out[397]:

	employee_id	branch_id	employee_first_name	employee_last_name	designation	email	phone_no	department_id
1	17002	16001	Ella	Grey	Doctor	ella.gr@srk.org	(857)234-3554	102

So as per our findings we came to know that , Ella Grey is the doctor of the month

now let's find out which department is she from

In [398…
```
department = pd.read_csv("department.csv")#import department table
```

since we know that the department id for ELLA GREY is 102

In [399…
```
winningDepartment = department[department['department_id'] == 102]
winningDepartment
```

Out[399]:

	department_id	name
1	102	Gynecology

Ella Grey is from Gynecology department, Now let's have all the information together

In [400…
```
winner = pd.merge(doctor_of_the_month, winningDepartment, on='department_id') #merging the table
winner = winner.rename(columns={'name': 'department_name'})
winner
```

Out[400]:

	employee_id	branch_id	employee_first_name	employee_last_name	designation	email	phone_no	department_id	department_name
0	17002	16001	Ella	Grey	Doctor	ella.gr@srk.org	(857)234-3554	102	Gynecology

In [ ]:
```
```