```
!pip install pip
```

```
Requirement already satisfied: pip in /usr/local/lib/python3.12/dist-packages (24.1.2)
```

```python
import pandas as pd
import matplotlib.pyplot as plt

# Load data
df = pd.read_csv("/patients.csv")

# Convert dates
df["admission_date"] = pd.to_datetime(df["admission_date"])
df["discharge_date"] = pd.to_datetime(df["discharge_date"])

# Length of stay
df["stay_days"] = (df["discharge_date"] - df["admission_date"]).dt.days

print("\n--- Dataset Overview ---")
print(df.head())

# 1. Average bill amount
avg_bill = df["bill_amount"].mean()
print(f"\nAverage Bill Amount: Rs.{avg_bill:.2f}")

# 2. Patients count by disease
disease_count = df["disease"].value_counts()
print("\nPatients by Disease:")
print(disease_count)

# 3. Average stay by disease
avg_stay = df.groupby("disease")["stay_days"].mean()
print("\nAverage Stay Days by Disease:")
print(avg_stay)

# 4. Gender wise billing
gender_bill = df.groupby("gender")["bill_amount"].sum()
print("\nTotal Bill Amount by Gender:")
```

```python
print(gender_bill)

# 5. Highest bill patient
highest_bill = df.loc[df["bill_amount"].idxmax()]
print("\nHighest Bill Patient:")
print(highest_bill)

# 6. Top 3 highest billing patients
top3_bill = df.nlargest(3, "bill_amount")
print("\nTop 3 Highest Billing Patients:")
print(top3_bill[["patient_id","disease","bill_amount"]]) # Changed 'name' to 'patient_id'

# 7. Average stay by gender
avg_stay_gender = df.groupby("gender")["stay_days"].mean()
print("\nAverage Stay Days by Gender:")
print(avg_stay_gender)

# 8. Disease with longest average stay
longest_stay = avg_stay.idxmax()
print(f"\nDisease with Longest Average Stay: {longest_stay} ({avg_stay.max():.1f} days)")

# -----------------------
# Matplotlib Charts
# -----------------------

# Chart 1: Patients by Disease
plt.figure(figsize=(6,4))
disease_count.plot(kind='bar', color='skyblue')
plt.title('Patients by Disease')
plt.xlabel('Disease')
plt.ylabel('Number of Patients')
plt.xticks(rotation=45)
plt.tight_layout()
plt.show()

# Chart 2: Average Stay Days by Disease
plt.figure(figsize=(6,4))
avg_stay.plot(kind='bar', color='lightgreen')
plt.title('Average Stay Days by Disease')
plt.xlabel('Disease')
```

```python
plt.ylabel('Average Stay Days')
plt.xticks(rotation=45)
plt.tight_layout()
plt.show()

# Chart 3: Total Bill Amount by Gender
plt.figure(figsize=(6,4))
gender_bill.plot(kind='pie', autopct='%1.1f%%', colors=['pink','lightblue'])
plt.title('Total Bill Amount by Gender')
plt.ylabel('')
plt.show()

# Chart 4: Top 3 Highest Billing Patients
plt.figure(figsize=(6,4))
plt.bar(top3_bill["patient_id"].astype(str), top3_bill["bill_amount"], color='orange') # Changed 'name' to 'patient_id' and cc
plt.title('Top 3 Highest Billing Patients')
plt.xlabel('Patient ID') # Changed label
plt.ylabel('Bill Amount (Rs)')
plt.tight_layout()
plt.show()
```

```
--- Dataset Overview ---
   patient_id  age  gender          disease admission_date discharge_date  \
0           1   45    Male         Diabetes     2024-01-05     2024-01-10
1           2   30  Female            Fever     2024-01-07     2024-01-09
2           3   60    Male    Heart Disease     2024-01-10     2024-01-20
3           4   25  Female           Dengue     2024-01-12     2024-01-18
4           5   50    Male         Diabetes     2024-01-15     2024-01-22

   bill_amount  stay_days
0        55000          5
1        12000          2
2       150000         10
3        40000          6
4        60000          7

Average Bill Amount: Rs.55333.33

Patients by Disease:
disease
Diabetes         2
Fever            2
Heart Disease    1
Dengue           1
Name: count, dtype: int64

Average Stay Days by Disease:
disease
Dengue            6.0
Diabetes          6.0
Fever             2.0
Heart Disease    10.0
Name: stay_days, dtype: float64

Total Bill Amount by Gender:
gender
Female      67000
Male       265000
Name: bill_amount, dtype: int64

Highest Bill Patient:
patient_id                          3
age                                60
```

```
gender                              Male
disease                    Heart Disease
admission_date       2024-01-10 00:00:00
discharge_date       2024-01-20 00:00:00
bill_amount                       150000
stay_days                             10
Name: 2, dtype: object

Top 3 Highest Billing Patients:
    patient_id           disease  bill_amount
2            3    Heart Disease       150000
4            5         Diabetes        60000
0            1         Diabetes        55000

Average Stay Days by Gender:
gender
Female     3.333333
Male       7.333333
Name: stay_days, dtype: float64

Disease with Longest Average Stay: Heart Disease (10.0 days)
```
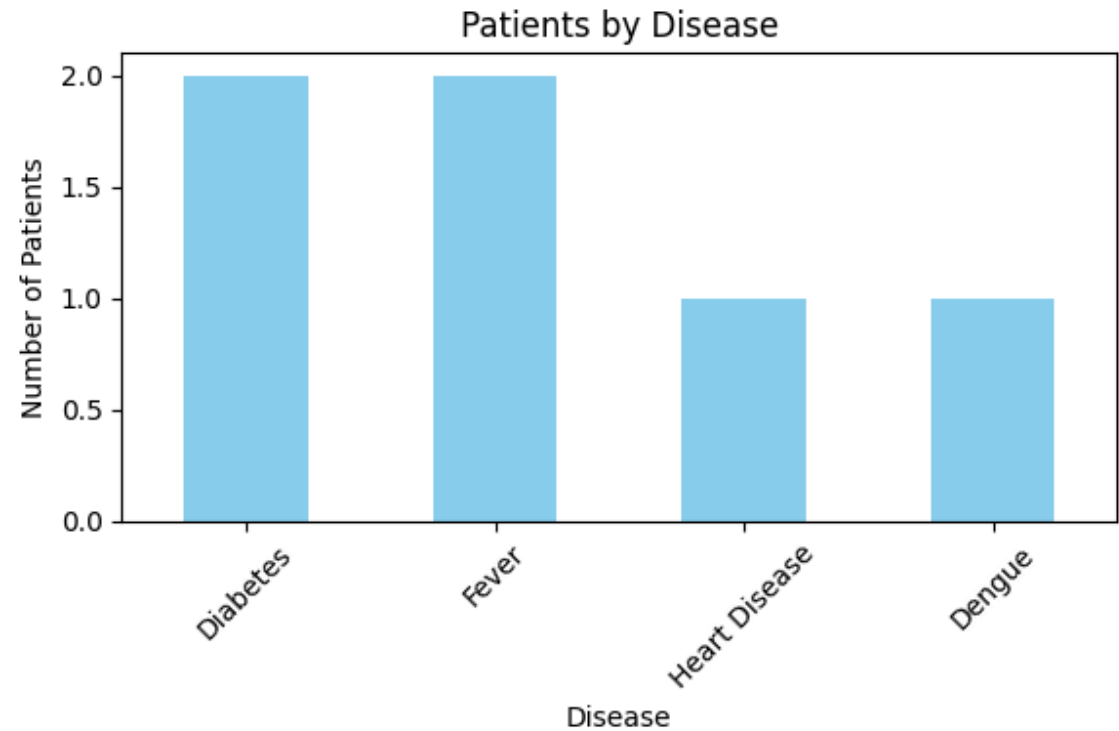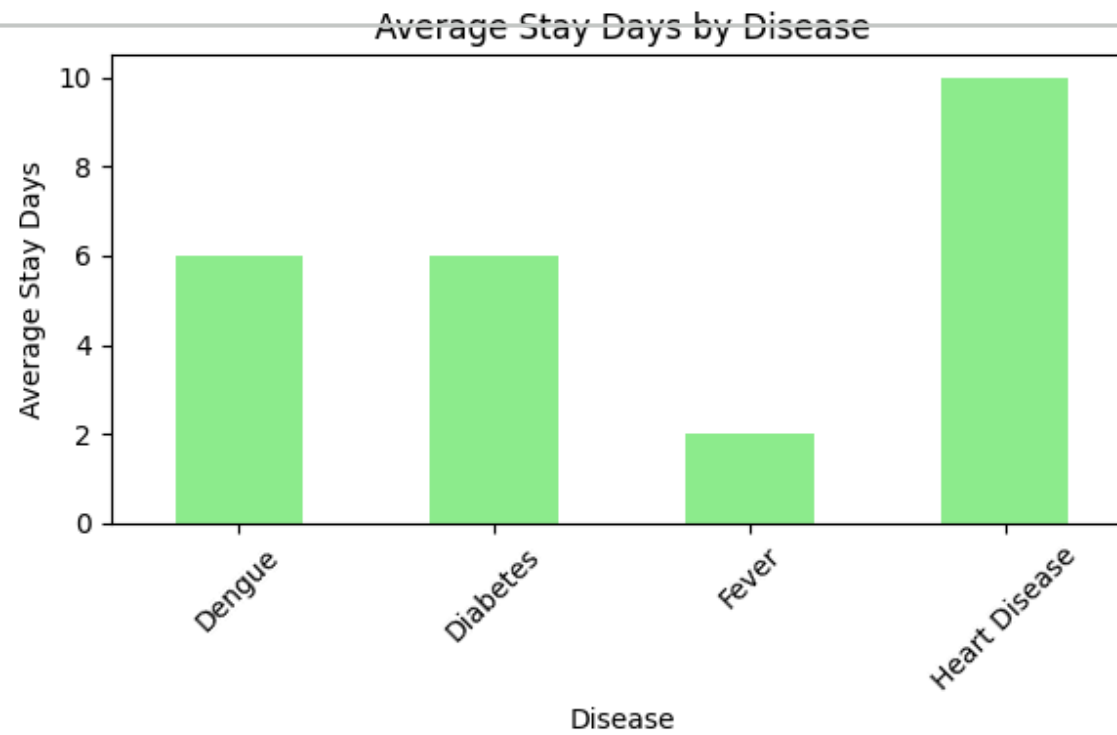

Patients by Disease

Average Stay Days by Disease

Total Bill Amount by Gender