VSIT

Applied Artificial Intelligence
Practical # 7

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Subject/Course:	Applied Artificial Intelligence	**Class**	M.Sc. IT – Sem III
Topic	Implement Conditional Probability And Joint Probability using Python.	**Batch**	1

Topic Design the joint and conditional probability model

a) AIM: Implement joint probability using Python.

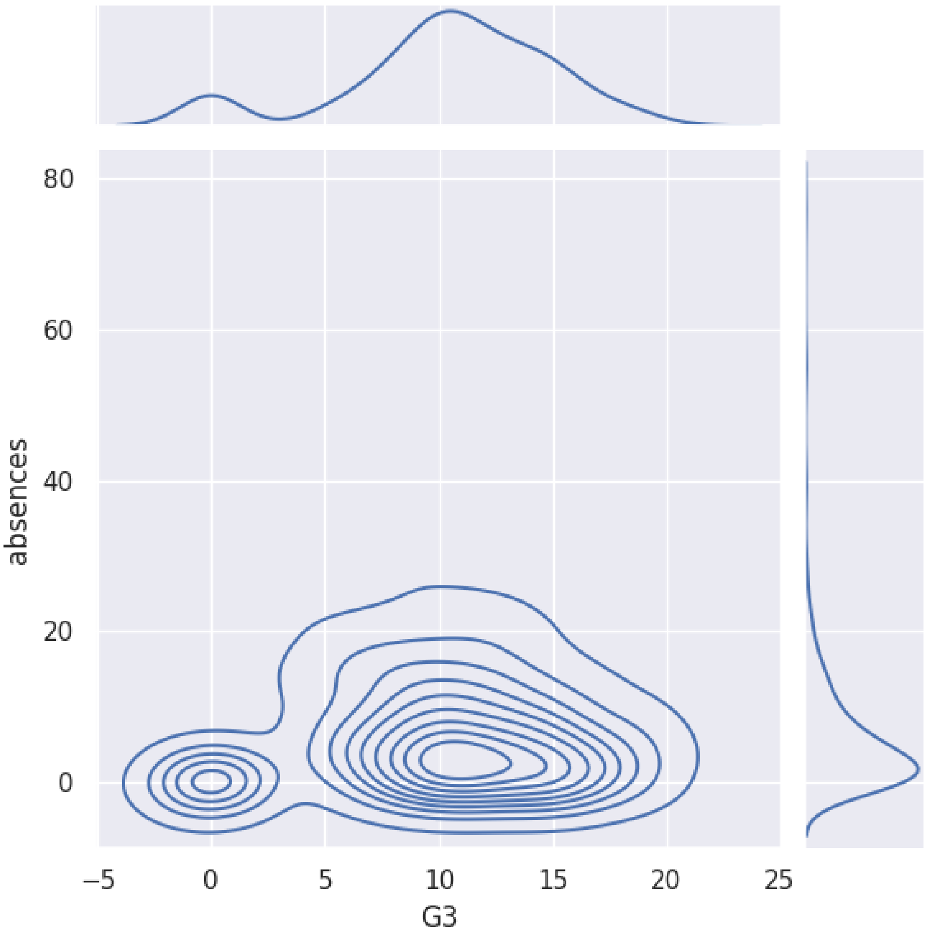
DESCRIPTION:-

Joint probability is defined as the probability of occurrence of two independent events in conjunction. That is, joint probability refers to the probability of both events occurring together. The joint probability of A and B is written as P(A ∩ B) or (A and B). It may be defined as given below.
P(A and B) = P(A) * P(B)
Two events are said to be independent if the occurrence of one event does not affect the probability of occurrence of the other. In the definition given above, * represents multiplication.

Code:

```
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
import pandas as pd

sns.set()

# Read the dataset
data = pd.read_csv('/content/student-mat.csv')

# Create a joint plot
sns.jointplot(data=data, x='G3', y='absences', kind='kde')

# Display the plot
plt.show()
```

Output:



b) AIM: Implement Conditional Probability using Python.

DESCRIPTION:

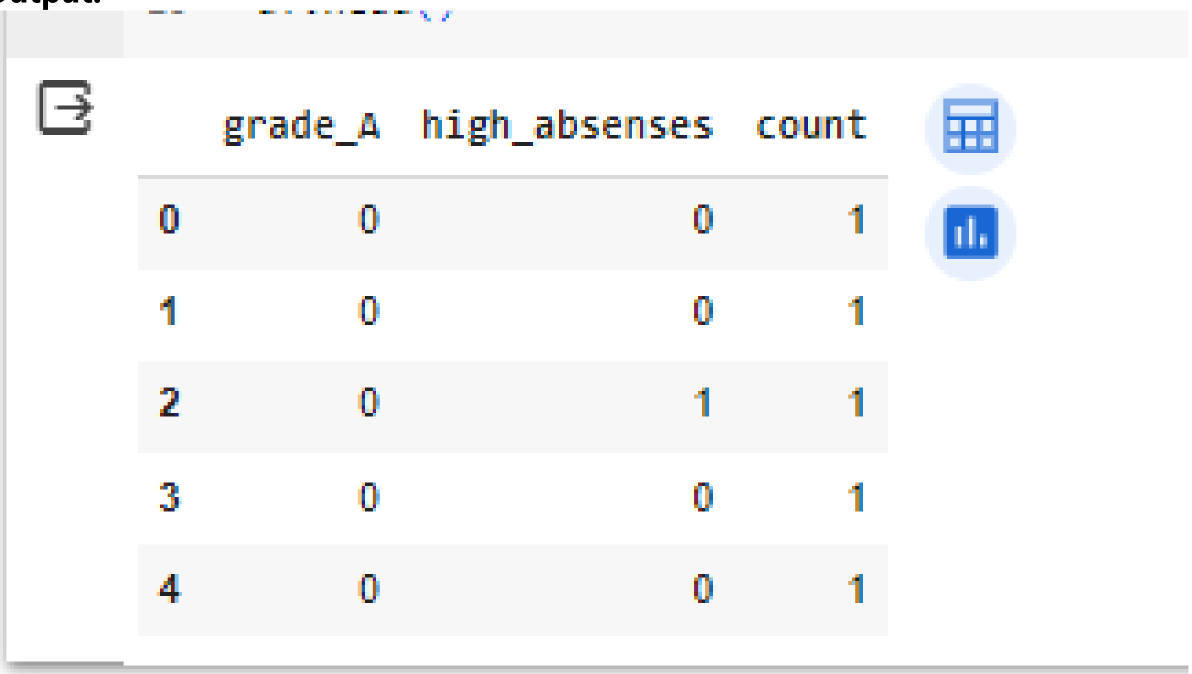
The concept of conditional probability relates the probability of one event to the occurrence of another. It is defined as probability of the occurrence of an event H (hypothesis) provided an event (evidence) is known to have occurred. It is denoted by P(H | E) and may be represented as follows:

P(H | E) = Number of events favourable to H which are also favourable to E / Number of events favourable to E
P(H | E) = P(H | E)/ P(E)
However, this rule cannot be used in cases where P(E) = 0.

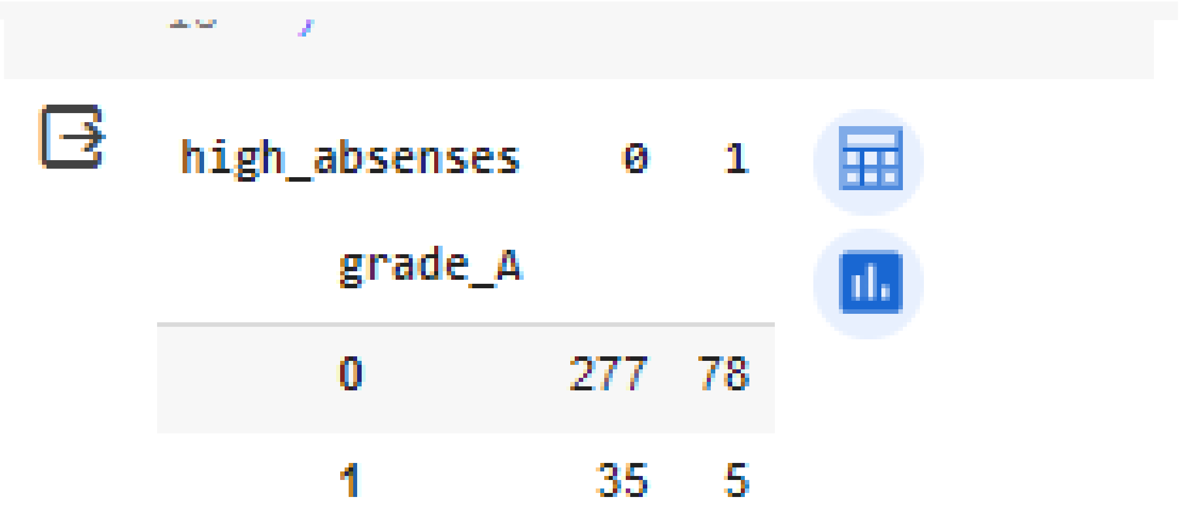
Code:

```
import pandas as pd
df = pd.read_csv('/content/student-mat.csv')

f.head(3)

len(df)

import numpy as np
df['grade_A'] = np.where(df['G3']*5 >= 80, 1, 0)
df['high_absenses'] = np.where(df['absences'] >= 10, 1, 0)
df['count'] = 1


df = df[['grade_A','high_absenses','count']]


df.head()

pd.pivot_table(
    df,
    values='count',
    index=['grade_A'],
    columns=['high_absenses'],
    aggfunc=np.size,
    fill_value=0
)
```

Output:



```
   grade_A  high_absenses  count
0        0              0      1
1        0              0      1
2        0              1      1
3        0              0      1
4        0              0      1
```



```
high_absenses    0   1
grade_A
0              277  78
1               35   5
```