

Machine Learning Assignment 72

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Problem 3

(aa)

$$\frac{\binom{20}{4}\binom{30}{6}}{\binom{50}{10}}$$

(ab)

$$\frac{\binom{20}{2}\binom{30}{8} + \binom{20}{1}\binom{30}{9} + \binom{20}{0}\binom{30}{10}}{\binom{50}{10}} \approx 13\%$$

(ba)

$$P(\text{at least 2 born in same month}|k) = \begin{cases} 1 - \frac{{}_{12}P_k}{12^k} & \text{for } k \leq 12 \\ 1 & \text{otherwise} \end{cases}$$

$$\begin{aligned} P(\text{at least 2 born in same month}) &= P(\text{at least 2 born in same month}|k=5)P(k=5) + \\ P(\text{at least 2 born in same month}|k=10)P(k=10) + \\ P(\text{at least 2 born in same month}|k=15)P(k=15) \end{aligned}$$

$$\begin{aligned} &= \frac{1}{4} \left(1 - \frac{{}_{12}P_5}{12^5} \right) + \frac{1}{4} \left(1 - \frac{{}_{12}P_{10}}{12^{10}} \right) + \frac{1}{2} \\ &\approx 0.903 \end{aligned}$$

(bb)

$$P(k=10|\text{at least 2 born in same month}) = P(\text{at least 2 born in same month}|k=10)$$

$$* \frac{P(k=10)}{P(\text{at least 2 born in same month})}$$

$$\begin{aligned} &\approx 0.996 \frac{\frac{1}{4}}{0.903} \\ &\approx 0.276 \end{aligned}$$

Problem 4

Winners from 1950

1. 😊

Change the query shown so that it displays Nobel prizes for 1950.

```
SELECT yr, subject, winner
FROM nobel
WHERE yr = 1950
```

Submit SQL

Restore default

Correct answer

yr	subject	winner
1950	Chemistry	Kurt Alder
1950	Chemistry	Otto Diels
1950	Literature	Bertrand Russell
1950	Medicine	Philip S. Hench
1950	Medicine	Edward C. Kendall
1950	Medicine	Tadeus Reichstein
1950	Peace	Ralph Bunche

1962 Literature

2. 😊

Show who won the 1962 prize for Literature.

```
SELECT winner
FROM nobel
WHERE yr = 1962
AND subject = 'Literature'
```

Submit SQL

Restore default

Correct answer

winner
John Steinbeck

Albert Einstein

3. 😊

Show the year and subject that won 'Albert Einstein' his prize.

```
SELECT yr, subject FROM nobel
WHERE winner = 'Albert Einstein'
```

Submit SQL

Restore default

Correct answer

yr	subject
1921	Physics

Recent Peace Prizes

4. 😊

Give the name of the 'Peace' winners since the year 2000, including 2000.

```
SELECT winner FROM nobel
WHERE subject = 'Peace' AND yr >= 2000
```

Submit SQL

Restore default

Correct answer

winner
Tunisian National Dialogue Quartet
Kaillash Satyarthi
Malala Yousafzai
European Union
Ellen Johnson Sirleaf
Leymah Gbowee
Tawakel Karman

Literature in the 1980's

5. 😊

Show all details (yr, subject, winner) of the Literature prize winners for 1980 to 1989 inclusive.

```
SELECT * FROM nobel
WHERE 1980 <= yr AND yr <= 1989 AND subject = 'Literature'
```

Submit SQL

Restore default

Correct answer

yr	subject	winner
1989	Literature	Camilo José Cela
1988	Literature	Naguib Mahfouz
1987	Literature	Joseph Brodsky
1986	Literature	Wole Soyinka
1985	Literature	Claude Simon
1984	Literature	Jaroslav Seifert
1983	Literature	William Golding

Only Presidents

6. 😊

Show all details of the presidential winners:

- Theodore Roosevelt
- Woodrow Wilson
- Jimmy Carter
- Barack Obama

```
SELECT * FROM nobel
WHERE winner IN ('Theodore Roosevelt',
                 'Woodrow Wilson',
                 'Jimmy Carter',
                 'Barack Obama')
```

Correct answer

yr	subject	winner
2009	Peace	Barack Obama
2002	Peace	Jimmy Carter
1919	Peace	Woodrow Wilson
1906	Peace	Theodore Roosevelt

John

7. 😊

Show the winners with first name John

```
SELECT winner FROM nobel
WHERE winner LIKE 'John%'
```

Submit SQL

Restore default

Correct answer

winner
John O'Keefe
John B. Gurdon
John C. Mather
John L. Hall
John B. Fenn
John E. Sulston
John Pople

Chemistry and Physics from different years

8. 😊

Show the year, subject, and name of Physics winners for 1980 together with the Chemistry winners for 1984.

```
SELECT * FROM nobel
WHERE (yr = 1980 AND subject = 'Physics') OR (yr = 1984 AND subject = 'Chemistry')
```

Submit SQL

Restore default

Correct answer

yr	subject	winner
1984	Chemistry	Bruce Merrifield
1980	Physics	James Cronin
1980	Physics	Val Fitch

Exclude Chemists and Medics

9. 😊

Show the year, subject, and name of winners for 1980 excluding Chemistry and Medicine

```
SELECT * FROM nobel
WHERE yr = 1980 AND NOT subject IN ('Chemistry', 'Medicine')
```

Submit SQL

Restore default

Correct answer

yr	subject	winner
1980	Economics	Lawrence R. Klein
1980	Literature	Czeslaw Milosz
1980	Peace	Adolfo Pérez Esquivel
1980	Physics	James Cronin
1980	Physics	Val Fitch

Early Medicine, Late Literature

10. 😊

Show year, subject, and name of people who won a 'Medicine' prize in an early year (before 1910, not including 1910) together with winners of a 'Literature' prize in a later year (after 2004, including 2004)

```
SELECT * FROM nobel
WHERE (subject = 'Medicine' AND 1910 > yr) OR (subject = 'Literature' AND yr >= 2004)
```

Submit SQL

Restore default

Correct answer

yr	subject	winner
2015	Literature	Svetlana Alexievich
2014	Literature	Patrick Modiano
2013	Literature	Alice Munro
2012	Literature	Mo Yan
2011	Literature	Tomas Tranströmer
2010	Literature	Mario Vargas Llosa
2009	Literature	Herta Müller