Q1. AI-driven code generation (e.g., Copilot)

➡️ Explain how it saves time and what its limitations are.
(Use my earlier sample answers as reference.)

Q2. Supervised vs Unsupervised Learning

➡️ Compare how each applies to automated bug detection.
Make a small table or 2 short paragraphs.

Q3. Bias mitigation in personalization

➡️ Explain why fairness is needed in AI-driven user experiences.

Ethical Reflection

The deployment of an AI model within a company, while promising efficiency, carries the inherent risk of perpetuating and amplifying societal and operational biases. A model intended to streamline internal processes—such as resume screening for internal promotions, project assignment, or performance prediction—can become a vehicle for unfairness if not carefully audited.

Key biases can emerge from the training data. For instance, the dataset might suffer from **representation bias** if it under-represents certain teams, such as remote workers or newer departments, causing the model to perform poorly for them. Similarly, a historical **gender imbalance** in leadership roles could lead a model to unfairly associate male pronouns with seniority, disadvantaging qualified female candidates for promotions.

This is where fairness toolkits like **IBM AI Fairness 360 (AIF360)** become critical. This open-source library provides a comprehensive set of metrics to **detect** bias. It can quantify disparities in outcomes across different protected groups (e.g., different genders or departments), measuring metrics like disparate impact and equal opportunity difference.

Furthermore, AIF360 offers a suite of algorithms to **mitigate** these identified biases. Interventions can be applied at various stages: pre-processing the training data to create a more balanced set, in-processing by incorporating fairness constraints directly into the model's learning objective, or post-processing by adjusting the model's outputs to ensure equitable predictions. By integrating such tools, a company can move beyond good intentions to actively ensure its AI systems are fair, trustworthy, and beneficial for all employees..

```python
import pandas as pd

# Now load your dataset
df = pd.read_csv('breast_cancer.csv')

# Optional: check the first few rows
print(df.head())
```

[3] Python

```
...          id diagnosis  radius_mean  texture_mean  perimeter_mean  area_mean  \
0    842302         M        17.99         10.38          122.80     1001.0
1    842517         M        20.57         17.77          132.90     1326.0
2  84300903         M        19.69         21.25          130.00     1203.0
3  84348301         M        11.42         20.38           77.58      386.1
4  84358402         M        20.29         14.34          135.10     1297.0

   smoothness_mean  compactness_mean  concavity_mean  concave points_mean  \
0          0.11840           0.27760          0.3001              0.14710
1          0.08474           0.07864          0.0869              0.07017
2          0.10960           0.15990          0.1974              0.12790
3          0.14250           0.28390          0.2414              0.10520
4          0.10030           0.13280          0.1980              0.10430

   ...  texture_worst  perimeter_worst  area_worst  smoothness_worst  \
0  ...          17.33           184.60      2019.0            0.1622
1  ...          23.41           158.80      1956.0            0.1238
2  ...          25.53           152.50      1709.0            0.1444
3  ...          26.50            98.87       567.7            0.2098
4  ...          16.67           152.20      1575.0            0.1374

   compactness_worst  concavity_worst  concave points_worst  symmetry_worst  \
0             0.6656           0.7119                0.2654          0.4601
1             0.1866           0.2416                0.1860          0.2750
2             0.4245           0.4504                0.2430          0.3613
...
3                 0.17300          NaN
4                 0.07678          NaN

[5 rows x 33 columns]
```

Output is truncated. View as a scrollable element or open in a text editor. Adjust cell output settings...

Github link : https://github.com/Jowekbeltan/Week-4-Assignment-AI-in-Software-Engineering.git