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Chapter 8

Multiple Choice Questions (MCQs)

1. Which of the following is NOT a core feature of NumPy?
a) N-dimensional arrays
b) Vectorized operations
c) Web routing and URL mapping
d) Broadcasting
2. In Pandas, which method is used to group data for aggregation?
a) group()
b) aggregate()
c) groupby()
d) merge()
3. Which library provides high-level visualization functions like heatmap and pairplot?
a) Matplotlib
b) Seaborn
c) NumPy
d) SciPy
4. Flask is considered a:
a) Micro web framework
b) Full-stack web framework
c) Machine learning library
d) Numerical computing library
5. In Django ORM, a database table is typically represented as:
a) A Python dictionary
b) A Pandas DataFrame
c) A model class
d) A NumPy array
6. Which library uses tensors and is widely used for deep learning?
a) TensorFlow
b) Flask
c) Pandas
d) Matplotlib
7. Which of the following can be achieved with SciPy but not directly with NumPy?
a) Eigenvalues computation
b) Array creation
c) Element-wise multiplication
d) Broadcasting
8. Which statement is true regarding PyTorch?

a) It does not support GPU acceleration.
b) It is mainly used for scientific computing like NumPy.
c) It supports dynamic computation graphs.
d) It cannot be used for deep learning.

True / False Questions

1. NumPy arrays are less efficient than Python lists for numerical computations. Answer=F
2. Pandas DataFrame is a two-dimensional labeled data structure. Answer=T
3. Seaborn is built on top of Matplotlib. Answer=T
4. Flask is heavier and more complex than Django. Answer=F
5. TensorFlow and PyTorch both provide tensor operations and automatic differentiation. Answer=T
6. Django ORM automatically creates SQL queries for models. Answer=T

Short Answer Questions

1. Explain the difference between NumPy and SciPy. Answer: NumPy is used for basic array operations, while SciPy provides advanced scientific and mathematical functions.
2. What is the purpose of the groupby() function in Pandas? Give an example.
Answer:It is used to preform statistical operations,Example:mean
3. Compare Flask and Django in terms of complexity and use cases. Answer: Flask is a lightweight framework, while Django is a full-featured framework
4. Why are tensors important in deep learning frameworks like PyTorch and TensorFlow? Answer: Tensors are important because they are the main data structure used to represent data in neural networks
5. What is the difference between Matplotlib and Seaborn in visualization?
Answer:
Matplotlib is used for basic plotting, while Seaborn provides advanced statistical visualizations.

Problem 1:

```
import numpy as np
array = np.arange(1, 11)
print("Mean:", np.mean(array))
print("Median:", np.median(array))
print("Standard Deviation:", np.std(array))
```

Problem 2:

```
import pandas as pd
data={
    "Name": ["Ali", "Sara", "Omar", "Mona"],
    "Age": [20, 22, 21, 23],
    "Score": [85, 70, 95, 60]
}
df=pd.DataFrame(data)
result=df[df["Score"] > 80]
print(result)
```

Problem 3:

```
import matplotlib.pyplot as plt
x = [1,2,3,4,5]
y = [1,4,9,16,25]
plt.plot(x, y)
plt.xlabel("x axis")
plt.ylabel("y axis")
plt.title("square numbers")
plt.show()
```

Problem 4:

```
from flask import Flask
app = Flask(__name__)
@app.route('/hello')
def hello():
    return "Hello, Advanced Python!"
if __name__ == "__main__":
    app.run()
Problem 5:
import torch
tensor1 = torch.tensor([1,2,3])
tensor2 = torch.tensor([4,5,6])
dot = torch.dot(tensor1, tensor2)
mul = tensor1 * tensor2
print("Dot Product:", dot)
print("Element-wise Multiplication:", mul)
```