

PROGRAM 11.5.1:

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#RA2311004010332 ECE/F
#AMIT CHAUHAN
import numpy as np
import matplotlib.pyplot as plt
# Load sales data (excluding headers)
sales_data = np.genfromtxt('sales_data.csv', delimiter=',', skip_header=1, usecols=(1,2,3,4,5))
regions = ['North', 'South', 'East', 'West']
months = ['Jan', 'Feb', 'Mar', 'Apr', 'May']
# Compute statistics
mean_sales = np.mean(sales_data, axis=1)
total_sales = np.sum(sales_data, axis=0)
highest_sales_region = np.argmax(np.sum(sales_data, axis=1))
print("Mean Sales for Each Region:")
for i, region in enumerate(regions):
    print(f"{region}: {mean_sales[i]:.2f}")
print("\nTotal Sales for Each Month:")
for i, month in enumerate(months):
    print(f"{month}: {total_sales[i]:.2f}")
print(f"\nRegion with Highest Total Sales: {regions[highest_sales_region]}")
# Plot sales trends
plt.plot(months, sales_data.T, marker='o')
plt.xlabel('Months')
plt.ylabel('Sales')
plt.title('Sales Trend Over Months')
plt.legend(regions)
plt.grid()
plt.show()
```

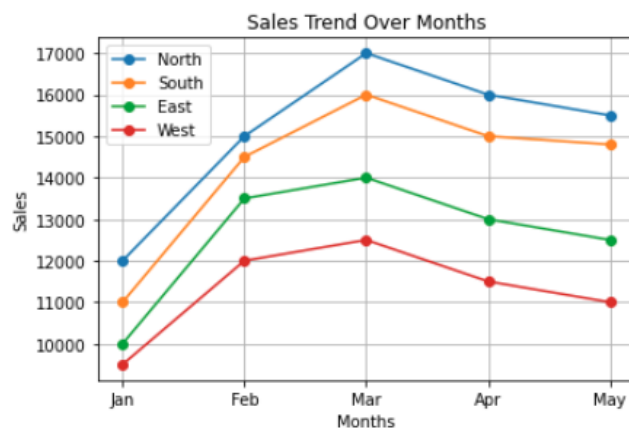
Mean Sales for Each Region:

North: 15100.00
South: 14260.00
East: 12600.00
West: 11300.00

Total Sales for Each Month:

Jan: 42500.00
Feb: 55000.00
Mar: 59500.00
Apr: 55500.00
May: 53800.00

Region with Highest Total Sales: North



PROGRAM 11.5.2:

```
#RA2311004010332 ECE/F
#AMIT CHAUHAN
import numpy as np
import matplotlib.pyplot as plt
# Load dataset (excluding header and student names)
data = np.genfromtxt('student_scores.csv', delimiter=',', skip_header=1, usecols=(1, 2, 3))
# Subject names
subjects = ['Math', 'Science', 'English']
# Compute and display statistical measures
for i, subject in enumerate(subjects):
    print(f"Statistics for {subject}:")
    print(f"  Mean: {np.mean(data[:, i]):.2f}")
    print(f"  Median: {np.median(data[:, i]):.2f}")
    print(f"  Standard Deviation: {np.std(data[:, i]):.2f}")
    print(f"  Max: {np.max(data[:, i])}, Min: {np.min(data[:, i])}\n")
# Identify the student with the highest average score
average_scores = np.mean(data, axis=1)
highest_avg_student_index = np.argmax(average_scores)
student_names = ['A', 'B', 'C', 'D', 'E']
print(f"Student {student_names[highest_avg_student_index]} has the highest average score: {average_scores[highest_avg_student_index]:.2f}")
# Plot histogram for score distribution per subject
plt.hist([data[:, 0], data[:, 1], data[:, 2]], bins=5, label=subjects, alpha=0.7, edgecolor='black')
plt.xlabel('Scores')
plt.ylabel('Frequency')
plt.title('Score Distribution by Subject')
plt.legend()
plt.grid(True)
plt.tight_layout()
plt.show()
```

```
Statistics for Math:
Mean: 82.60
Median: 85.00
Standard Deviation: 7.79
Max: 92.0, Min: 70.0
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Statistics for Science:
Mean: 83.00
Median: 85.00
Standard Deviation: 10.30
Max: 95.0, Min: 65.0
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```
Statistics for English:
Mean: 84.80
Median: 88.00
Standard Deviation: 6.31
Max: 92.0, Min: 75.0
```

```
Student C has the highest average score: 90.00
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