

```

1. import numpy as np
v1 = np.random.rand(100)
print("original array:")
print(v1)
v1_sorted = np.sort(v1)
print("sorted array:")
print(v1_sorted)

2. import numpy as np
v1 = np.random.rand(100)
print("original array:")
print(v1)
print("multiplied by 3:")
print(v1 * 3)

3. import numpy as np
v1 = np.random.rand(100)
print(" array:")
print(v1)
print("Mean:",np.mean(v1))
print("standard deviation:",np.std(v1))

4. import numpy as np
matrix = np.zeros((4,3))
matrix = np.random.rand(4,3)
array = matrix.flatten()
print("matrix:",matrix)
print("array:",array)

5. S1 = "I am a great learner. I am going to have an awesome life."
substring = "am"
count = S1.count(substring)
print(f"count of '{substring}' in s1: {count}")

6. S1 = "I am a great learner. I am going to have an awesome life."
S2 = "I work hard and shall be rewarded well."

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print("concatenated string S3:",S1 + " " + S2)
```

7. S3 = "I am a great learner. I am going to have an awesome life. I work hard and shall be rewarded well"

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import re
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words_array = re.split(r'\s+|\.', S3)
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```
words_array = [word for word in words_array if word]
```

```
print("Array of words:")
```

```
print(words_array)
```

```
print("\nLength of the array:", len(words_array))
```

8. import re

S3 = "I am a great learner. I am going to have an awesome life. I work hard and shall be rewarded well."

```
words_array = re.split(r'\s+|\.', S3)
```

```
words_array = [word for word in words_array if word]
```

```
words_to_remove = {"I", "am", "to", "and"}
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```
filtered_array = [word for word in words_array if word.lower() not in words_to_remove and len(word) <= 6]
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print("Filtered array of words:")
```

```
print(filtered_array)
```

```
print("\nLength of the filtered array:", len(filtered_array))
```

9. date\_str = "01-JUN-2021"

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day, month_str, year = date_str.split('-')
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month_map = {
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    "JAN": 1, "FEB": 2, "MAR": 3, "APR": 4,
```

```
    "MAY": 5, "JUN": 6, "JUL": 7, "AUG": 8,
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    "SEP": 9, "OCT": 10, "NOV": 11, "DEC": 12
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month_num = month_map[month_str.upper()]
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print("Day:", day)
```

```
print("Month:", month_str, "(", month_num, ")")
```

```
print("Year:", year)
```

10. import pandas as pd

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data = {
```

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"City": ["BENGALURU", "CHENNAI", "MUMBAI", "MYSURU", "PATNA",
        "JAMMU", "GANDHI NAGAR", "HYDERABAD", "ERNAKULAM", "AMARAVATI"],
"State": ["KA", "TN", "MH", "KA", "BH",
          "JK", "GJ", "TS", "KL", "AP"],
"PIN Code": [560001, 600001, 400001, 570001, 800001,
             180001, 382001, 500001, 682001, 522001]
}

```

```

df = pd.DataFrame(data)
df["City, State"] = df["City"] + ", " + df["State"]
df.to_excel("city_state_pincode.xlsx", index=False)
df_loaded = pd.read_excel("city_state_pincode.xlsx")
print(df_loaded)
df_loaded.to_excel("updated_city_state_pincode.xlsx", index=False)

```

```

11. import numpy as np
import matplotlib.pyplot as plt
v1 = np.random.rand(100)
v1_sorted = np.sort(v1)
plt.plot(v1_sorted)
plt.title("Sorted Array")
plt.show()
plt.plot(v1_sorted, color='red')
plt.title("Sorted Array in Red")
plt.show()

```

```

12. import numpy as np
import matplotlib.pyplot as plt
v1 = np.random.rand(100)
v1_sorted = np.sort(v1)
v2 = v1_sorted ** 2
plt.plot(v1_sorted, label='V1 (sorted)')
plt.plot(v2, label='V2 (squared)', color='red')
plt.title("V1 and V2")

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plt.legend()
```

```
plt.show()
```