1) Create a 4*4 matrix containing first 16 odd nos. perform svd on the matrix, getting 3 matrices X,B,T.

Perform the following operations

X+T

X-T

2X^3

PROGRAM

```python
import numpy as np
from numpy.linalg import svd

A =np.array([[2,3,4,5], [2,2,2,2], [1,2,1,2], [3,2,1,3]])
print("matrix:")
print(A)
X,B,T = svd(A)
print("decomposition of matrix:", X)
print("inverse of matrix:", B)
print("transporse of a matrix:", T)

print("perform matrix operations:")

print(np.array(A))
print("addition of two matrix - X+T")
print(np.add(X,T))
print("substraction of two matrix - X-T" )
print(np.subtract(X,T))
print("multiplication of matrix")
print(np.multiply(X,X,X))
D = np.array(X)
print("D:",D)
print("2*X^3")
print(np.multiply(2,D))
```

output

matrix:

[[2 3 4 5]

 [2 2 2 2] [1 2 1 2]

[3 2 1 3]]

decomposition of matrix: [[-0.73280151 0.59583193 -0.1160327   0.3074454]

 [-0.39686271 -0.13765233 0.83055113 -0.36570021]

 [-0.31064955 -0.06981907 -0.51144406 -0.79815232]

 [-0.45716386 -0.78813796 -0.18747319 0.3670062]]

inverse of matrix: [9.89089356 1.98696504 0.79736455 0.76577039]

transporse of a matrix: [[-0.39849479 -0.45777024 -0.45423043 -0.65216794]

 [-0.76391569 -0.10252971 0.62913337 0.10055685]

 [0.44543393 -0.10638841 0.62462547 -0.63254497]

 [0.24335844 -0.87670723 0.08780058 0.40552701]]

perform matrix operations:

[[2 3 4 5]

 [2 2 2 2]

 [1 2 1 2]

 [3 2 1 3]]

addition of two matrix - X+T

[[-1.1312963   0.13806168 -0.57026313 -0.34472253]

 [-1.1607784 -0.24018204 1.4596845 -0.26514336]

 [0.13478439 -0.17620748 0.1131814 -1.43069729]

 [-0.21380542 -1.6648452 -0.09967261 0.77253322]]

substraction of two matrix - X-T

[[-0.33430672 1.05360217 0.33819773 0.95961334]

 [0.36705298 -0.03512262 0.20141776 -0.46625705]

 [-0.75608348 0.03656934 -1.13606953 -0.16560735]

 [-0.7005223   0.08856927 -0.27527377 -0.03852081]]

multiplication of matrix

[[0.53699805 0.35501568 0.01346359 0.09452268]

 [0.15750001 0.01894816 0.68981518 0.13373664]

 [0.09650314 0.0048747 0.26157503 0.63704713]

[0.2089988 0.62116145 0.0351462 0.13469355]]

D: [[0.53699805 0.35501568 0.01346359 0.09452268]

 [0.15750001 0.01894816 0.68981518 0.13373664]

 [0.09650314 0.0048747 0.26157503 0.63704713]

 [0.2089988 0.62116145 0.0351462 0.13469355]]

2*X^3

[[1.07399611 0.71003137 0.02692718 0.18904535]

 [0.31500002 0.03789633 1.37963037 0.26747328]

 [0.19300628 0.0097494 0.52315006 1.27409426]

 [0.4179976 1.2423229 0.07029239 0.26938711]]

Process finished with exit code 0

```
C:\Users\mca\PycharmProjects\pythonProject\venv\Scripts\python.exe C:/Users/mca/Pyc
matrix:
[[2 3 4 5]
 [2 2 2 2]
 [1 2 1 2]
 [3 2 1 3]]
decomposition of matrix: [[-0.73280151  0.59583193 -0.1160327   0.3074454 ]
 [-0.39686271 -0.13765233  0.83055113 -0.36570021]
 [-0.31064955 -0.06981907 -0.51144406 -0.79815232]
 [-0.45716386 -0.78813796 -0.18747319  0.3670062 ]]
inverse of matrix: [9.89089356 1.98696504 0.79736455 0.76577039]
transporse of a matrix: [[-0.39849479 -0.45777024 -0.45423043 -0.65216794]
 [-0.76391569 -0.10252971  0.62913337  0.10055685]
 [ 0.44543393 -0.10638841  0.62462547 -0.63254497]
 [ 0.24335844 -0.87670723  0.08780058  0.40552701]]
perform matrix operations:
[[2 3 4 5]
 [2 2 2 2]
 [1 2 1 2]
 [3 2 1 3]]
addition of two matrix - X+T
[[-1.1312963   0.13806168 -0.57026313 -0.34472253]
 [-1.1607784  -0.24018204  1.4596845  -0.26514336]
 [ 0.13478439 -0.17620748  0.1131814  -1.43069729]
 [-0.21380542 -1.6648452  -0.09967261  0.77253322]]
substraction of two matrix - X-T
```

```
[[-1.1312983    0.13866168  -0.57628313  -0.34472253]
 [-1.1607784  -0.24018204   1.4596845   -0.26514336]
 [ 0.13478439 -0.17620748   0.1131814   -1.43069729]
 [-0.21380542 -1.6648452   -0.09967261   0.77253322]]
substraction of two matrix - X-T
[[-0.33430672  1.05360217   0.33819773   0.95961334]
 [ 0.36705298 -0.03512262   0.20141776 -0.46625705]
 [-0.75608348  0.03656934 -1.13606953 -0.16560735]
 [-0.7005223   0.08856927 -0.27527377 -0.03852081]]
multiplication of matrix
[[0.53699805 0.35501568 0.01346359 0.09452268]
 [0.15750001 0.01894816 0.68981518 0.13373664]
 [0.09650314 0.0048747  0.26157503 0.63704713]
 [0.2089988  0.62116145 0.0351462  0.13469355]]
D: [[0.53699805 0.35501568 0.01346359 0.09452268]
 [0.15750001 0.01894816 0.68981518 0.13373664]
 [0.09650314 0.0048747  0.26157503 0.63704713]
 [0.2089988  0.62116145 0.0351462  0.13469355]]
2*X^3
[[1.07399611 0.71003137 0.02692718 0.18904535]
 [0.31500002 0.03789633 1.37963037 0.26747328]
 [0.19300628 0.0097494  0.52315006 1.27409426]
 [0.4179976  1.2423229  0.07029239 0.26938711]]

Process finished with exit code 0
```

2) Program for natural language processing which performs chunking.

PROGRAM

```
import requests
import nltk
from nltk.tokenize import word_tokenize

from nltk import util
from bs4 import BeautifulSoup
sampletxt = """this is very usefull book for study and explore"""
word_tokenize(sampletxt)
print(word_tokenize(sampletxt))

#new = nltk.tokenize
#new_data = new.sent_tokenize
#def word_tokenize(text: sampletxt,
                   #language: sampletxt = "english",
                   #preserve_line: bool = False) -> list[sampletxt]:
```

output

['this', 'is', 'very', 'usefull', 'book', 'for', 'study', 'and', 'explore']

Process finished with exit code 0

```
C:\Users\mca\PycharmProjects\pythonProject\venv\Scripts\python.exe C:/Users/mca/PycharmPr
['this', 'is', 'very', 'usefull', 'book', 'for', 'study', 'and', 'explore']

Process finished with exit code 0
```

['this', 'is', 'very', 'usefull', 'book', 'for', 'study', 'and', 'explore']