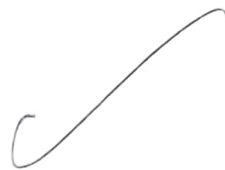1) Write a program in Python to find prime number in range.

~~Algorithm~~

Source Code

```
n1 = int(input("Enter n1: "))
n2 = int(input("Enter n2: "))
print(f"Prime numbers in range {n1} to {n2}")
while (n1 < n2):
    f = True
    for i in range(2, n1):
        if (n1 % i == 0):
            f = False
            break
    if (f):
        print(n1, end = "%")
    n1 += 1
```
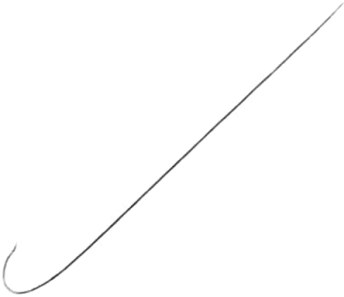
Output

```
Enter n1: 5
Enter n2: 15
Prime numbers in range 5 to 15:
5  7  11  13
```
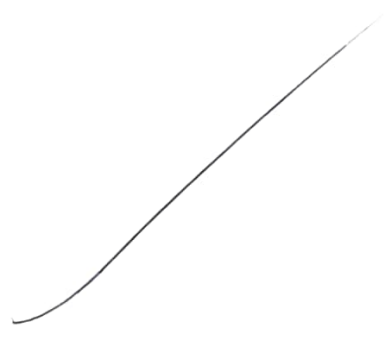
2) Write a program in Python to implement the concept of list slicing.

Source Code

```
l = [1, 2, 3, 4, 5]
print(l[:])
print(l[:2])
print(l[1:0])
print(l[::])
print(l[::2])
print(l[::-1])
print(l[::-2])
```

Output

```
[1, 2, 3, 4, 5]
[1, 2]
[2, 3, 4, 5]
[1, 3, 5]
[5, 4, 3, 2, 1]
[5, 3, 1]
```

3) Write a program in Python to implement matrix multiplication.

Source Code

```python
m = int(input("m: "))
n = int(input("n: "))
p = int(input("p: "))
q = int(input("q: "))
if (n==p):
    a,b = [],[]
    print(f"Enter matrix ({m} x {n}):")
    for i in range(m):
        row = []
        for j in range(n):
            row.append(int(input(f"a[{i}][{j}]:")))
        a.append(row)
    print(f"Enter matrix ({p} x {q}):")
    for i in range(p):
        row = []
        for j in range(q):
            row.append(int(input(f"b[{i}][{j}]:")))
        b.append(row)
    c = []
    for i in range(m):
        row = []
        for j in range(q):
            row.append(0)
        c.append(row)
    for i in range(m):
        for j in range(q):
            for k in range(n):
                c[i][j] += a[i][k] * b[k][j]
    print(f"Resultant matrix ({m} x {q}):")
```

```
        for row in c :
            print(row)
else :
    print (" Matrix Multiplication not possible !")
```

Output

① m: 2
  n: 2
  p: 4
  q: 5
  Matrix Multiplication not possible!

② m: 2
  n: 2
  p: 2
  q: 2
  Enter matrix (2×2):
  a [0] [0] : 1
  a [0] [1] : 2
  a [1] [0]: 3
  a [1] [1]: 4
  Enter matrix (2×2):
  b [0] [0] : 1
  b [0] [1] : 0
  b [1] [0] : 0
  b [1] [1] : 1
  Resultant matrix (2×2):

  [1   2],
  [3   4]

4) Write a brief about the below packages :
numpy, pandas, matplotlib, scikit-learn, seaborn, mlxtend

NumPy

- NumPy stands for Numerical Python
- Used to working with arrays
- NumPy is written in C/C++
- It has functions for working in domain of linear algebra, fourier transform, and matrices.
- Used in data science.

Pandas

- Python library used for working with datasets.
- It has functions for analyzing, cleaning, exploring, and manipulating data.

MatPlotLib

- Low level graph plotting library in python.
- Served as a visualisation utility.
- It can be used for creating graphs, histograms, bargraph, piechart, etc.
- Used in data science.

Scikit-Learn

- Scientific toolkit for ML.
- Used for -
  - i) Classification
  - ii) Regression
  - iii) Clustering
  - iv) Dimensionality reduction
  - v) Model selection and Evaluation

Seaborn

- For creating graphs and plots.
- Used for exploring relationships within datasets.
- Used for visualising statistical relationships, distributions, and categorical data
- It is built on top of matplotlib

MLXtend

- Used for ML tasks
- Feature Selection
- Ensemble methods
- Model Evaluation.
- Data preprocessing
- Frequent Pattern mining.
- Visualisation: MLxtend includes functions for visualising model performance, decision boundaries, and feature interactions, aiding in model understanding and analysis.