Experiment 2.1

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Subject Name: AI &ML with Lab **Subject Code: 21CSH-316**

1. **Aim:** Implementation of Python basic Libraries such as Math, Numpy and Scipy

2. **Objective:** The objective is to assess how well the Pandas and Matplotlib performs in solving a specific problem or scenario, and to analyze its effectiveness in comparison.

3. **Input/Apparatus Used**:
   Google collab and python libraries.

4. **Hardwire Requirements:**
   Computer/Laptop minimum 4GB, windows and Power Supply

5. **Code:**

1.
```
import math
# Print the value of pi
print (math.pi)
```

2.
```
import math
# radius of the circle
r = 4
# value of pie
pie = math.pi
# area of the circle
print(pie * r * r)
```

3.
```
import math
a = 15
b = 5
# returning the gcd of 15 and 5
```

```
print ("The gcd of 5 and 15 is : ", end="")
print (math.gcd(b, a))
```

4.

```
import math
# print the square root of 0
print(math.sqrt(0))
# print the square root of 4
print(math.sqrt(4))
```

5.

```
import math
a = math.pi/6
# returning the value of sine of pi/6
print ("The value of sine of pi/6 is : ", end="")
print (math.sin(a))
# returning the value of cosine of pi/6
print ("The value of cosine of pi/6 is : ", end="")
print (math.cos(a))
# returning the value of tangent of pi/6
print ("The value of tangent of pi/6 is : ", end="")
print (math.tan(a))
```

6.

```
from scipy.special import perm
# permutations of 4
print([perm(4, 1), perm(4, 2), perm(4, 3),
      perm(4, 4), perm(4, 5)])
# permutations of 6
print([perm(6, 1), perm(6, 2), perm(6, 3),
      perm(6, 4), perm(6, 5)])
```

7.

```
from scipy.special import logsumexp
# logsum exp of numbers from
# 1 to 10
a = [1, 2, 3, 4, 5, 6, 7, 8, 9, 10]
# logsum exp of numbers from
# 10 to 15
b = [10, 11, 12, 13, 14, 15]
print([logsumexp(a), logsumexp(b)])
```

8.

```
from scipy.special import logsumexp
# logsum exp of numbers from
# 1 to 10
a = [1, 2, 3, 4, 5, 6, 7, 8, 9, 10]
print(logsumexp(a))
```

9.

```
from scipy.special import gamma
print([gamma(56), gamma(156), gamma(0),
      gamma(1), gamma(5)])
```

10.

```
from scipy.special import exp10
# 10 to the power of 2
print(exp10(2))
```

Output:

1.

```
[ ]  import math
     # Print the value of pi
     print (math.pi)

     3.141592653589793
```

2.

```
[ ]  import math
     # radius of the circle
     r = 4
     # value of pie
     pie = math.pi
     # area of the circle
     print(pie * r * r)

     50.26548245743669
```

3.

```
[ ]  import math
     a = 15
     b = 5
     # returning the gcd of 15 and 5
     print ("The gcd of 5 and 15 is : ", end="")
     print (math.gcd(b, a))
```

```
The gcd of 5 and 15 is : 5
```

4.

```
[ ]  import math
     # print the square root of 0
     print(math.sqrt(0))
     # print the square root of 4
     print(math.sqrt(4))
```

```
0.0
2.0
```

5.

```
[ ]  import math
     a = math.pi/6
     # returning the value of sine of pi/6
     print ("The value of sine of pi/6 is : ", end="")
     print (math.sin(a))
     # returning the value of cosine of pi/6
     print ("The value of cosine of pi/6 is : ", end="")
     print (math.cos(a))
     # returning the value of tangent of pi/6
     print ("The value of tangent of pi/6 is : ", end="")
     print (math.tan(a))
```

```
The value of sine of pi/6 is : 0.49999999999999994
The value of cosine of pi/6 is : 0.8660254037844387
The value of tangent of pi/6 is : 0.5773502691896257
```

6.

```
[ ]  from scipy.special import perm
     # permutations of 4
     print([perm(4, 1), perm(4, 2), perm(4, 3),
            perm(4, 4), perm(4, 5)])
     # permutations of 6
     print([perm(6, 1), perm(6, 2), perm(6, 3),
            perm(6, 4), perm(6, 5)])
```

```
[4.0, 12.0, 24.0, 24.0, 0.0]
[6.0, 30.0, 120.0, 360.0, 720.0]
```

7.

```
[ ]  from scipy.special import logsumexp
     # logsum exp of numbers from
     # 1 to 10
     a = [1, 2, 3, 4, 5, 6, 7, 8, 9, 10]
     # logsum exp of numbers from
     # 10 to 15
     b = [10, 11, 12, 13, 14, 15]
     print([logsumexp(a), logsumexp(b)])
```

```
[10.45862974442671, 15.456193316018123]
```

8.

```
[ ]  from scipy.special import logsumexp
     # logsum exp of numbers from
     # 1 to 10
     a = [1, 2, 3, 4, 5, 6, 7, 8, 9, 10]
     print(logsumexp(a))
```

```
10.45862974442671
```

9.

```
[ ]  from scipy.special import gamma
     print([gamma(56), gamma(156), gamma(0),
            gamma(1), gamma(5)])

     [1.2696403353658278e+73, 4.789142901463394e+273, inf, 1.0, 24.0]
```

10.

```
[ ]  from scipy.special import exp10
     # 10 to the power of 2
     print(exp10(2))

     100.0
```

6. Learning Outcomes:

1. Understand how to implement the Math
2. Understand how to implement the Numpy
3. Understand how to implement the Scipy