EXPERIMENT NO.:- 4

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Roll No.:-53

Aim:-TO IMPLEMENT FUNCTIONS ANDOPERATIONS INVOLVING GRAPHS.

Q1.

In [2]:

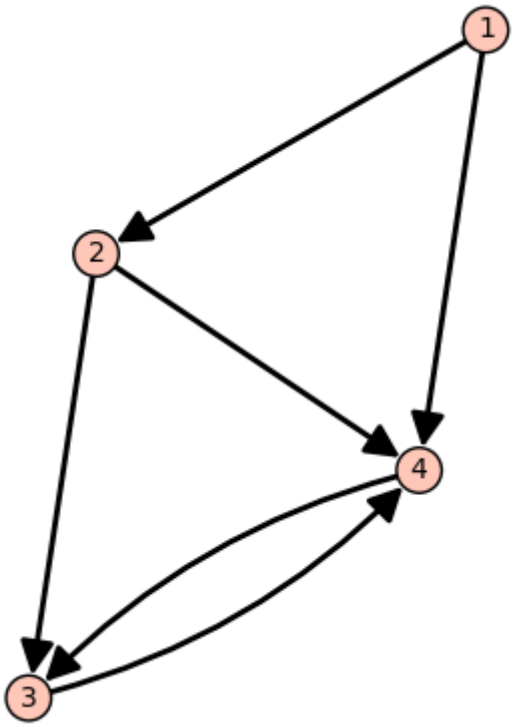
```
G = DiGraph({1:[2,4],2:[3,4],3:[4],4:[3]})
```

In [3]:

```
G.plot()
```

```
Matplotlib is building the font cache; this may take a momen
t.
```

Out[3]:



In [4]:

```
G.out_degree()
```

Out[4]:

```
[2, 2, 1, 1]
```

In [5]:

```
G.in_degree()
```

Out[5]:

```
[0, 1, 2, 3]
```

In [6]:

```
G.all_simple_paths()
```

Out[6]:

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

Q2.

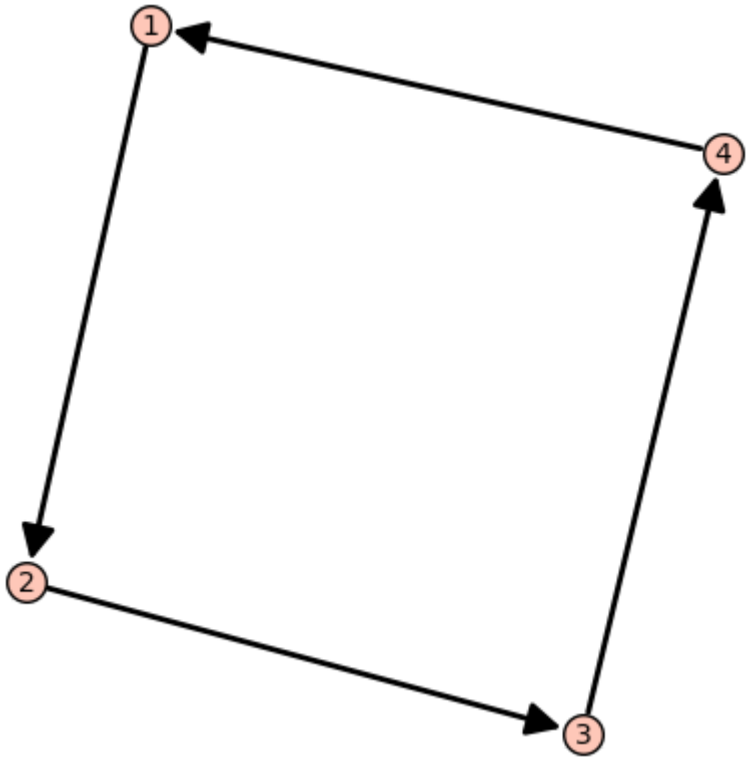
In [7]:

```
H = DiGraph({1:[2],2:[3],3:[4],4:[1]})
```

In [8]:

```
H.plot()
```

Out[8]:



In [9]:

```
H.out_degree()
```

Out[9]:

```
[1, 1, 1, 1]
```

In [10]:

```
H.in_degree()
```

Out[10]:

```
[1, 1, 1, 1]
```

In [21]:

```
H.eccentricity()
```

Out[21]:

```
[3, 3, 3, 3]
```

In [22]:

```
H.radius()
```

Out[22]:

```
3
```

In [23]:

```
H.radius()
```

Out[23]:

```
3
```

In [11]:

```
H.all_simple_paths()
```

Out[11]:

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

Q3.

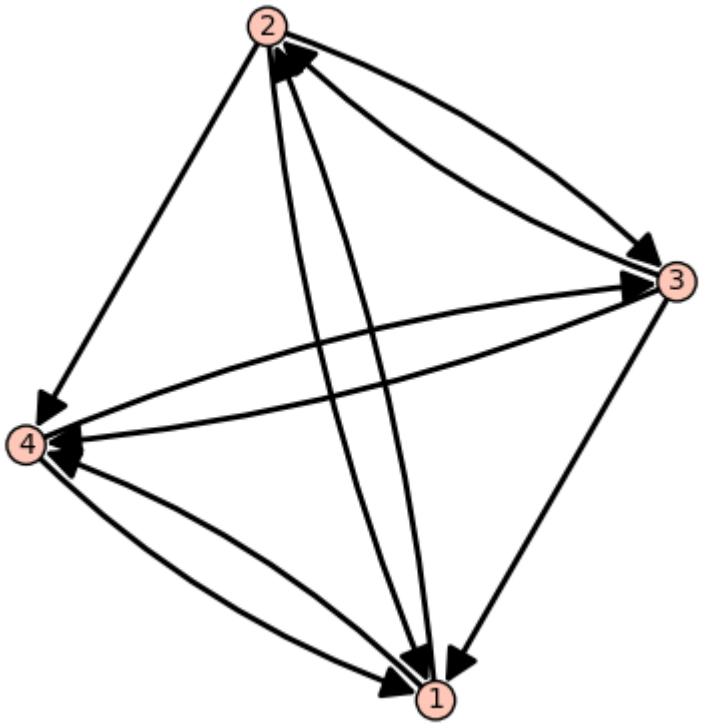
In [14]:

```
I = DiGraph({1:[2,4],2:[1,3,4],3:[1,2,4],4:[1,3]})
```

In [15]:

```
I.plot()
```

Out[15]:



In [16]:

```
I.out_degree()
```

Out[16]:

```
[2, 3, 3, 2]
```

In [17]:

```
I.in_degree()
```

Out[17]:

```
[3, 2, 2, 3]
```

In [24]:

```
I.eccentricity()
```

Out[24]:

```
[2, 1, 1, 2]
```

In [25]:

```
I.radius()
```

Out[25]:

```
1
```

In [26]:

```
I.diameter()
```

Out[26]:

2

In [27]:

```
I.all_simple_cycles()
```

Out[27]:

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

Conclusion :-The functions and Operations Related to Graphs are sucessfully Studied.