

```
>>> a = [[1,2,3],[4,5,6],[6,7,8]]
```

To access the center element 5, use

```
>>> print a[1][1]
```

7. Look up documentation for 'join' method and join the content of the list ['Minneapolis','MN','USA'] and obtain the string 'Minneapolis, MN, USA'

Solution:

```
>>> loc = ['Minneapolis','MN','USA']
```

```
>>> loc_string = ",".join(loc)
```

Chapter 2

1. Python is an open-source and free software. Hence, there are many modules created for image processing. Perform a research and discuss some of the benefits of each module over other.

Solution: Solution varies.

3. Why is it more convenient to arrange the various functions as modules?

Solution:

Python modules are

- Reusable. Thus, a Python module can be shared with others.
- Provide simple interface. The module functions can be documented, so that the interface to the user is transparent.

5. Create a numpy array of size 5-by-5 containing all random values. Determine the transpose and inverse of this matrix.

Solution:

```
>>> import numpy as np
>>> a = np.random.rand(5,5)
>>> mytranspose = np.transpose(a)
>>> print mytranspose
>>> myinv = np.linalg.inv(a)
>>> print myinv
```

Chapter 3

1. An image of size 100-by-100 has isotropic pixel size of 2-by-2 microns. The number of pixels in the foreground is 1000. What is the area of the foreground and background in square microns?