NAME: Answers

1. Let $A$ be a numpy matrix of zeros and ones, representing the adjacency matrix of a graph. A cycle in a graph is a path that starts and ends at the same vertex.

Define a Python function $\text{FindCycle()}$. Among the input parameters are $A$ and a vertex $v$. $\text{FindCycle()}$ returns a list of vertices of a cycle, starting at $v$. Decide on the other additional input parameters and provide documentation for them.

Answer:

```python
def FindCycle(A,v,d,P):
    """
    Searches for a cycle starting at $v$
    in a graph with adjacency matrix $A$,
    using at most $d$ intermediary nodes.
    $P$ contains the list of visited nodes.
    """
    last = P[len(P)-1]
    if A[last][v] == 1:
        return P + [v]
    else:
        if d > 0:
            for k in range(0,len(A)):
                if A[last][k] == 1 and not k in P:
                    KP = FindCycle(A,v,d-1,P + [k])
                    if KP[len(KP)-1] == v: return KP
            return P
```

2. Addresses take the form 851 S. Morgan St. where S. and St. could be written in full as South and Street respectively. Use the re module to define the pattern to accept addresses consisting of a number and a street name. The pattern should allow to extract number and street name after a successful match.

Answer:

```python
import re

a = '851 S. Morgan St.'
p = '(\d+)\s+(.+)'
m = re.match(p,a)
print m.groups()
```

Final exam: Thursday 8 May from 8:00 to 10AM in BH 208.