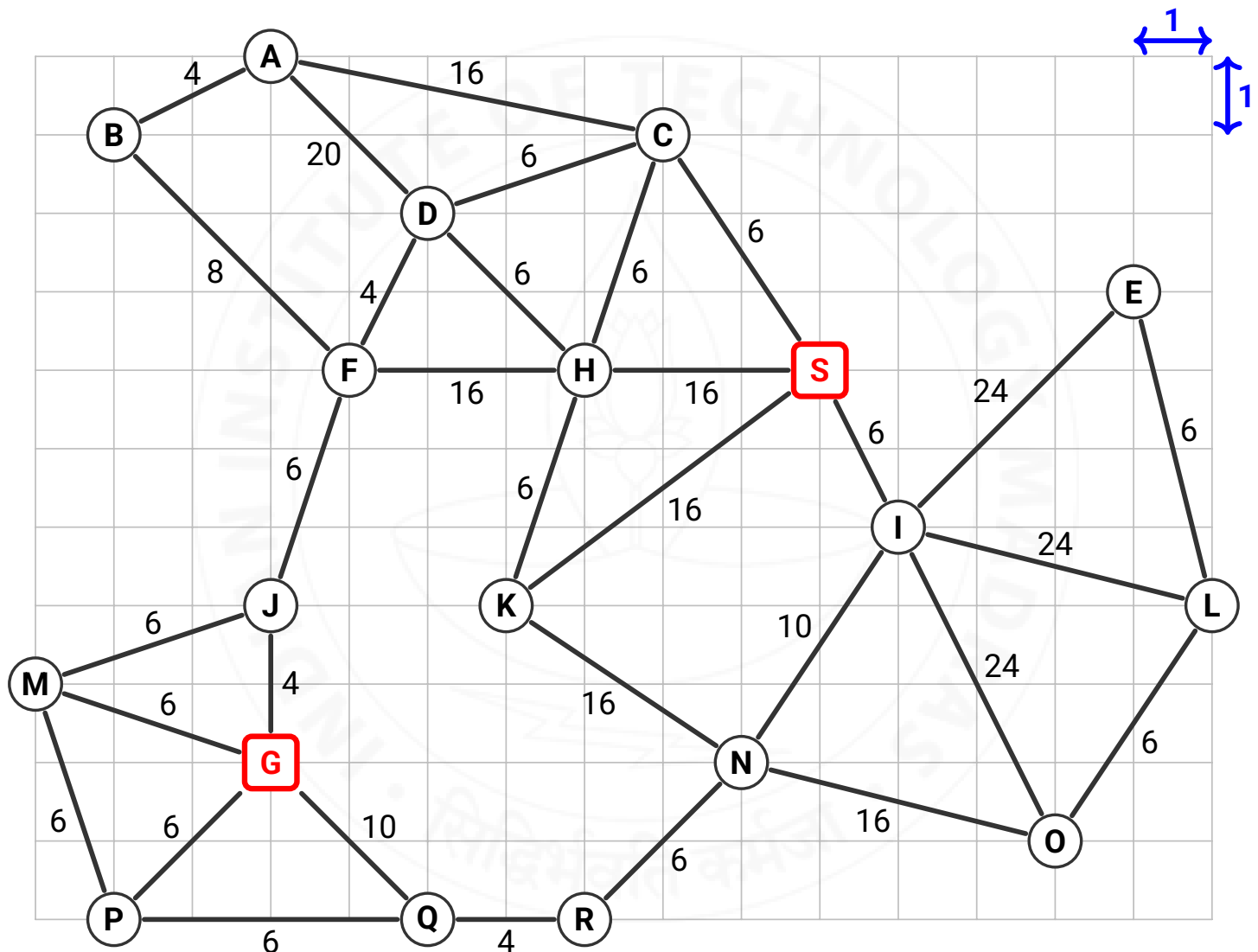# Practice Assignment: City Map Example
wA* (w=3) Search
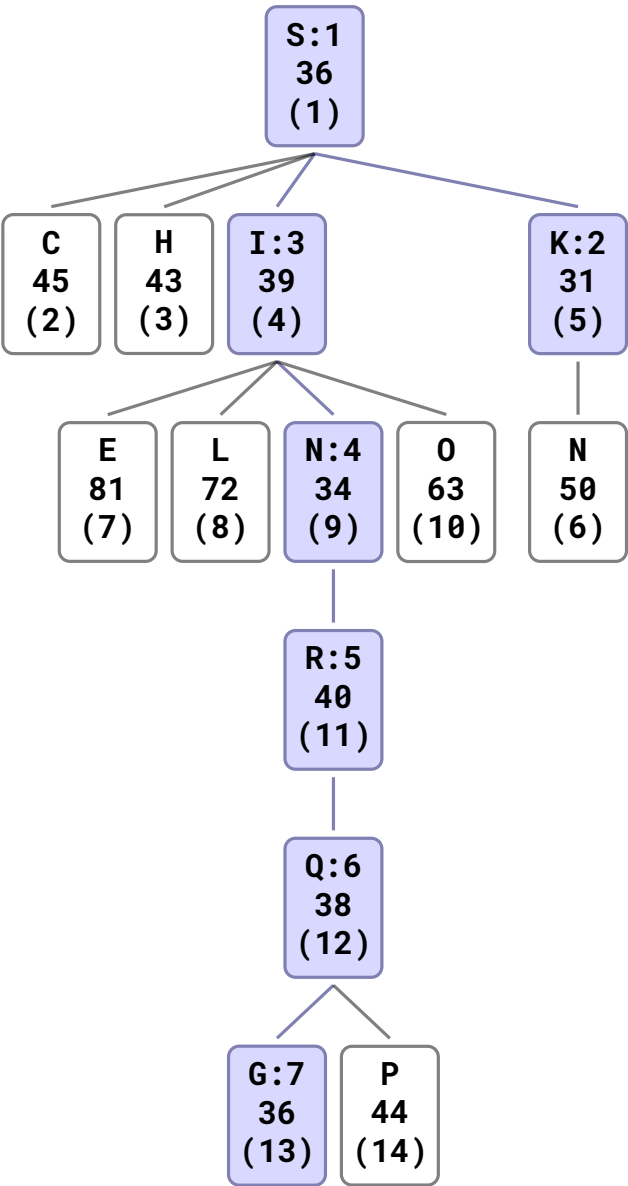Prepared by S. Baskaran

State Space

MoveGen returns nodes in ALPHABETICAL ORDER.

Search Tree: wA* (w=3)

```
                    S:1
                    36
                    (1)

   C      H      I:3           K:2
   45     43     39            31
   (2)    (3)    (4)           (5)

      E      L     N:4    O       N
      81     72    34     63      50
      (7)    (8)   (9)    (10)    (6)

                   R:5
                   40
                   (11)

                   Q:6
                   38
                   (12)

              G:7     P
              36      44
              (13)    (14)
```

Solution: wA* (w=3)

f = g + w * h

OPEN and CLOSED carry tuples: (NODE,PARENT,f,g,h)

```
OPEN       (S,null,36,0,12):[]
CLOSED     []

1.
NODE       S
close      (S,null,36,0,12)
moveGen    C:H:I:K:[]
new-open   (C,S,45,6,13)
new-open   (H,S,43,16,9)
new-open   (I,S,39,6,11)
new-open   (K,S,31,16,5)

OPEN       (K,S,31,16,5):(I,S,39,6,11):(H,S,43,16,9):(C,S,45,6,13):[]

CLOSED     (S,null,36,0,12):[]

2.
NODE       K
close      (K,S,31,16,5)
moveGen    H:N:S:[]
new-open   (N,K,50,32,6)

OPEN       (I,S,39,6,11):(H,S,43,16,9):(C,S,45,6,13):(N,K,50,32,6):[]

CLOSED     (K,S,31,16,5):(S,null,36,0,12):[]

3.
NODE       I
close      (I,S,39,6,11)
moveGen    E:L:N:O:S:[]
new-open   (E,I,81,30,17)
new-open   (L,I,72,30,14)
pi-open    (N,I,34,16,6)
new-open   (O,I,63,30,11)

OPEN       (N,I,34,16,6):(H,S,43,16,9):(C,S,45,6,13):(O,I,63,30,11):
           (L,I,72,30,14):(E,I,81,30,17):[]

CLOSED     (I,S,39,6,11):(K,S,31,16,5):(S,null,36,0,12):[]

4.
NODE       N
close      (N,I,34,16,6)
moveGen    I:K:O:R:[]
new-open   (R,N,40,22,6)

OPEN       (R,N,40,22,6):(H,S,43,16,9):(C,S,45,6,13):(O,I,63,30,11):
           (L,I,72,30,14):(E,I,81,30,17):[]

CLOSED     (N,I,34,16,6):(I,S,39,6,11):(K,S,31,16,5):(S,null,36,0,12):[]

5.
NODE       R
close      (R,N,40,22,6)
moveGen    N:Q:[]
new-open   (Q,R,38,26,4)

OPEN       (Q,R,38,26,4):(H,S,43,16,9):(C,S,45,6,13):(O,I,63,30,11):
           (L,I,72,30,14):(E,I,81,30,17):[]

CLOSED     (R,N,40,22,6):(N,I,34,16,6):(I,S,39,6,11):(K,S,31,16,5):
           (S,null,36,0,12):[]

6.
NODE       Q
close      (Q,R,38,26,4)
moveGen    G:P:R:[]
new-open   (G,Q,36,36,0)
new-open   (P,Q,44,32,4)

OPEN       (G,Q,36,36,0):(H,S,43,16,9):(P,Q,44,32,4):(C,S,45,6,13):
           (O,I,63,30,11):(L,I,72,30,14):(E,I,81,30,17):[]

CLOSED     (Q,R,38,26,4):(R,N,40,22,6):(N,I,34,16,6):(I,S,39,6,11):
           (K,S,31,16,5):(S,null,36,0,12):[]

7.
NODE       G
close      (G,Q,36,36,0)
GOAL       G

OPEN       (H,S,43,16,9):(P,Q,44,32,4):(C,S,45,6,13):(O,I,63,30,11):
           (L,I,72,30,14):(E,I,81,30,17):[]

CLOSED     (G,Q,36,36,0):(Q,R,38,26,4):(R,N,40,22,6):(N,I,34,16,6):
           (I,S,39,6,11):(K,S,31,16,5):(S,null,36,0,12):[]


PATH       S:I:N:R:Q:G:[]

PATH COST  36
```