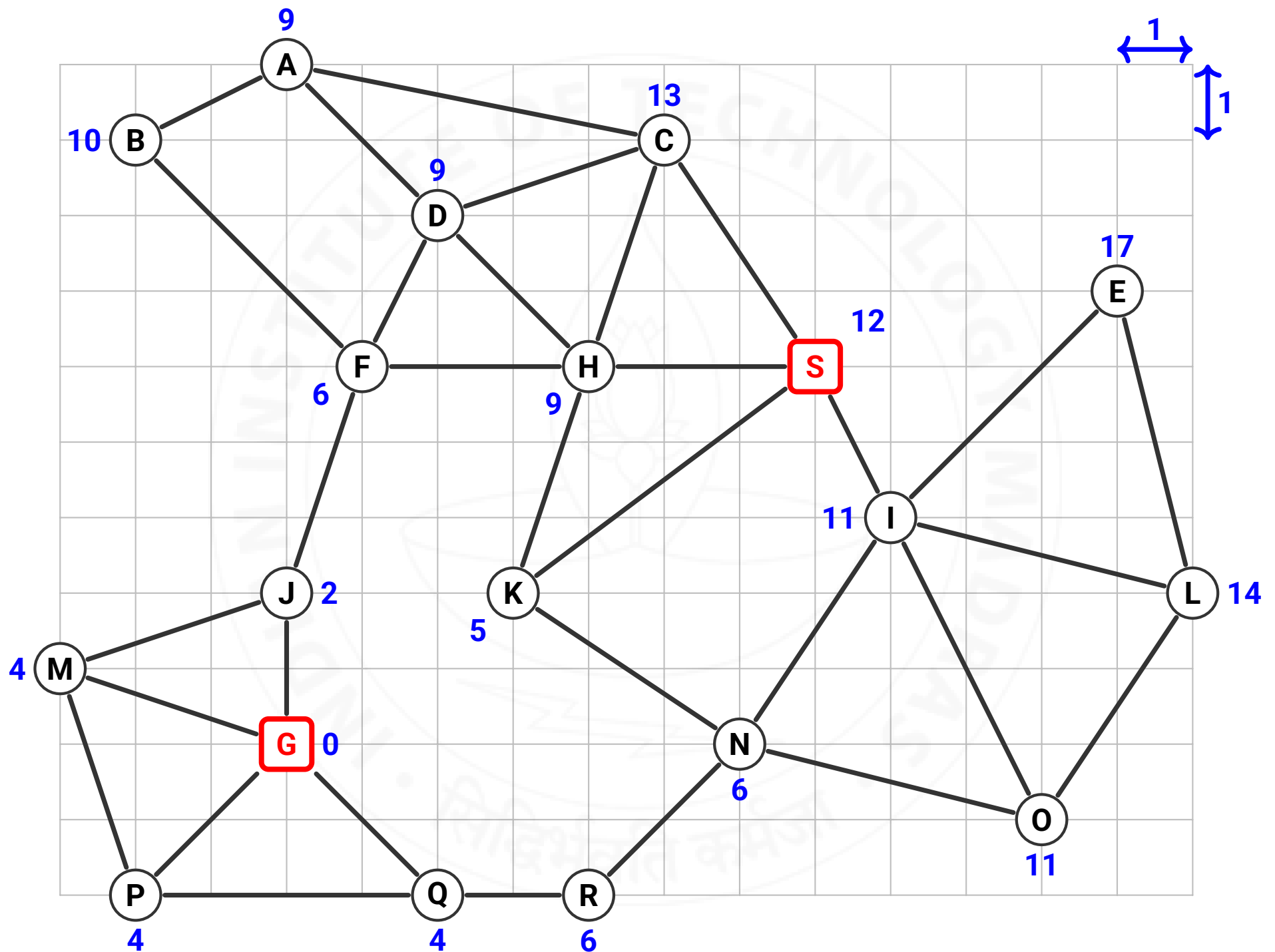


Practice Assignment: City Map Example

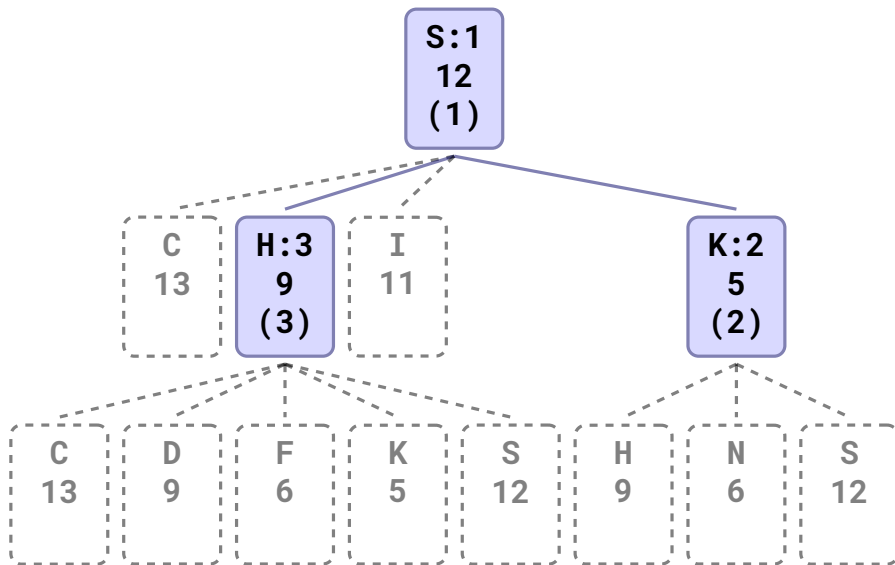
Beam Search ($w=2$)

Prepared by S. Baskaran

State Space



Search Tree



Solution

See Week 6 notes, Beam Search algorithm does not record the parents or maintain CLOSED lists. For the purpose of understanding the solution we are providing the parents and CLOSED lists.

OPEN and CLOSED carry triples: (NODE,PARENT,h)

1.

```
OPEN      (S,null,12):[]
moveGen    C:H:I:K:[]
neighbours (K,S,5):(H,S,9):(I,S,11):(C,S,13):[]
```

```
OPEN      (K,S,5):(H,S,9):[]
CLOSED    (S,null,12):[]
```

2.

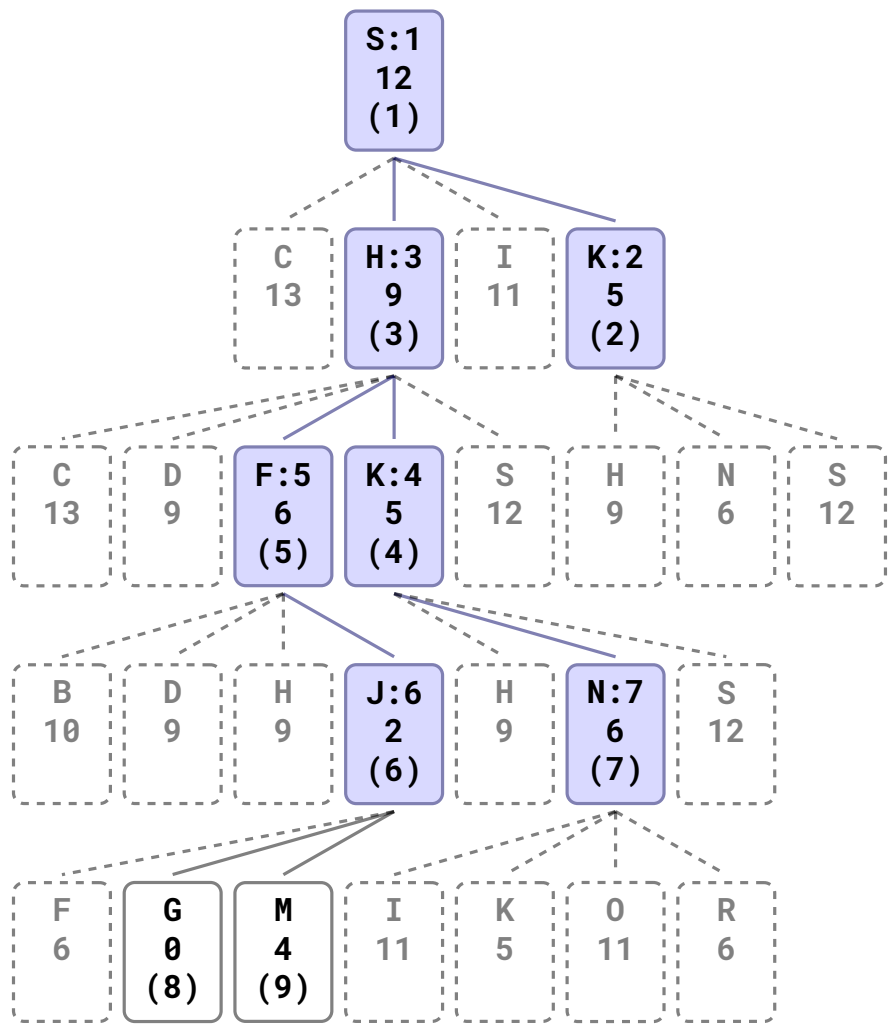
```
OPEN      (K,S,5):(H,S,9):[]
moveGen    H:N:S:[]
moveGen    C:D:F:K:S:[]
neighbours (K,H,5):(F,H,6):(N,K,6):(D,H,9):
           (H,K,9):(S,K,12):(S,H,12):(C,H,13):[]
```

```
OPEN      []
CLOSED    (H,S,9):(K,S,5):(S,null,12):[]
```

```
PATH      []
```

Search Tree – Expand all layers

A variation of Beam Search that expands all layers irrespective of how good or bad it is compared to the current layer.



Solution — Expand all layers

A variation of Beam Search that expands all layers irrespective of how good or bad it is compared to the current layer.

OPEN and CLOSED carry triples: (NODE,PARENT,h)

1.

```
OPEN      (S,null,12):[]
moveGen    C:H:I:K:[]
neighbours (K,S,5):(H,S,9):(I,S,11):(C,S,13):[]
```

```
OPEN      (K,S,5):(H,S,9):[]
CLOSED     (S,null,12):[]
```

2.

```
OPEN      (K,S,5):(H,S,9):[]
moveGen    H:N:S:[]
moveGen    C:D:F:K:S:[]
neighbours (K,H,5):(F,H,6):(N,K,6):(D,H,9):
           (H,K,9):(S,K,12):(S,H,12):(C,H,13):[]
```

```
OPEN      (K,H,5):(F,H,6):[]
CLOSED     (H,S,9):(K,S,5):(S,null,12):[]
```

3.

```
OPEN      (K,H,5):(F,H,6):[]
moveGen    H:N:S:[]
moveGen    B:D:H:J:[]
neighbours (J,F,2):(N,K,6):(D,F,9):(H,K,9):
           (H,F,9):(B,F,10):(S,K,12):[]
```

```
OPEN      (J,F,2):(N,K,6):[]
CLOSED     (F,H,6):(K,H,5):(H,S,9):(K,S,5):
           (S,null,12):[]
```

4.

```
OPEN      (J,F,2):(N,K,6):[]
moveGen    F:G:M:[]
moveGen    I:K:O:R:[]
neighbours (G,J,0):(M,J,4):(K,N,5):(F,J,6):
           (R,N,6):(I,N,11):(O,N,11):[]
```

```
OPEN      (G,J,0):(M,J,4):[]
CLOSED     (N,K,6):(J,F,2):(F,H,6):(K,H,5):
           (H,S,9):(K,S,5):(S,null,12):[]
```

5.

```
OPEN      (G,J,0):(M,J,4):[]
GOAL      G
```

```
OPEN      (G,J,0):(M,J,4):[]
CLOSED     (N,K,6):(J,F,2):(F,H,6):(K,H,5):
           (H,S,9):(K,S,5):(S,null,12):[]
```

```
PATH      S:H:F:J:G:[]
```

```
PATH COST 42
```