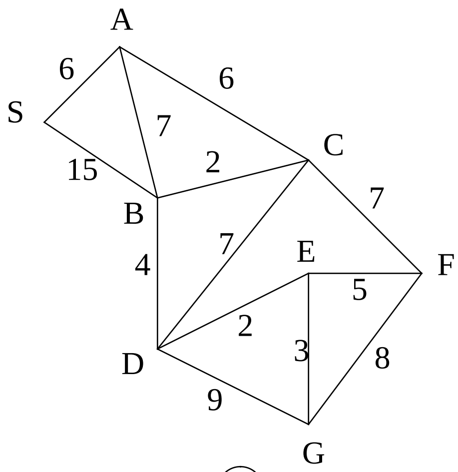
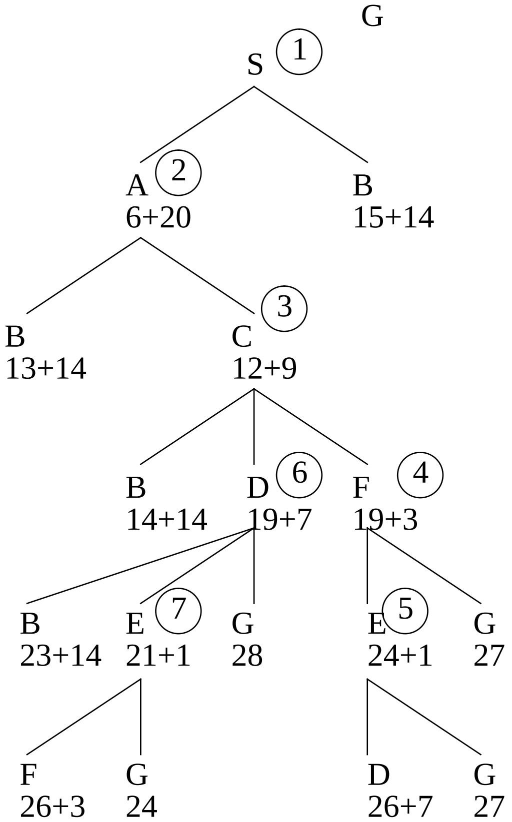
Proposed solutions A* lesson

A: 20 B: 14 C: 9 D:7 E: 1 F: 3

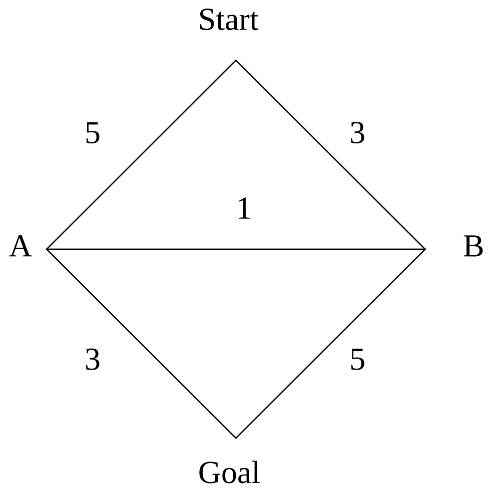
Task 3





If we define h(A)=10 and h(B)=11 in the example from the lecture , then f seems to be not optimistic, but monotone. How is that possible?

But f is NOT monotone because h(G) = 0 so h(A) - h(G) > cost(A, G).




```
 h(A)=0              h(A)=3               h(A)=1              h(A)=3
 h(B)=0              h(B)=4               h(B)=4              h(B)=6

   S                   S                    S                   S
  / \                 / \                  / \                 / \
 /   \               /   \                /   \               /   \
A     B             A     B              A     B             A     B
5     3            5+3   3+4            5+1   3+4           5+3   3+6
     / \                 / \            / |   / \           / \
    /   \               /   \          /  |  /   \         /   \
   A     G             A     G        B   G  A    G       B     G
   4     8            4+3    8       6+5  8 4+1   8      6+6    8
   |                   |                     |
   |                   |                     |
   G                   G                     G
   7                   7                     7
```

Optimistic and monotone

Also optimistic and monotone

Optimistic but not monotone h(B) - h(A) > cost(B,A)

Not Optimistic and therefore not monotone

Monotone but not optimistic is not possible.

Luger gives this argument in the section on monotonicity:
For any path from a node si to the goal sg we have:

```
s1 to s2       h(s1) - h(s2) <= cost(s1,s2)
s2 to s3       h(s2) - h(s3) <= cost(s2,s3)
s3 to s4       h(s3) - h(s4) <= cost(s3,s4)
 ....
sg-1 to sg     h(sg-1) - h(sg) <= cost(sg-1,sg)
```

If you add the columns and use h(sg) = 0

```
path s1 to sg h(s1) <=cost(s1,sg)
```

so every estimation is optimistic.