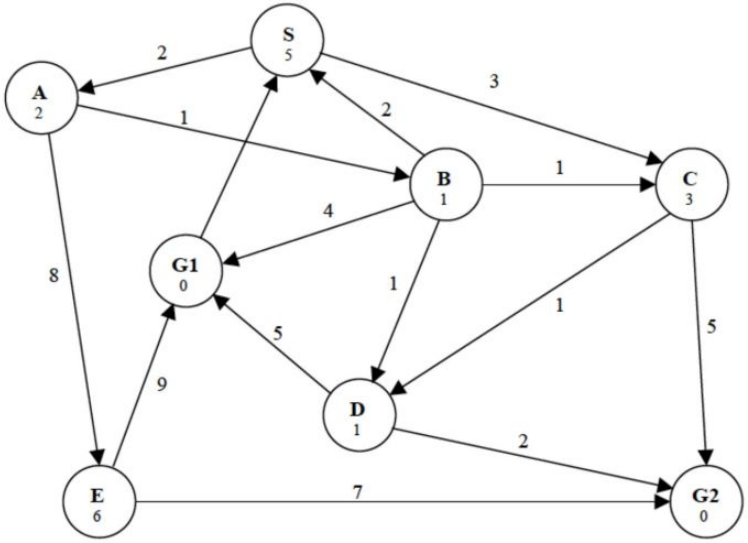
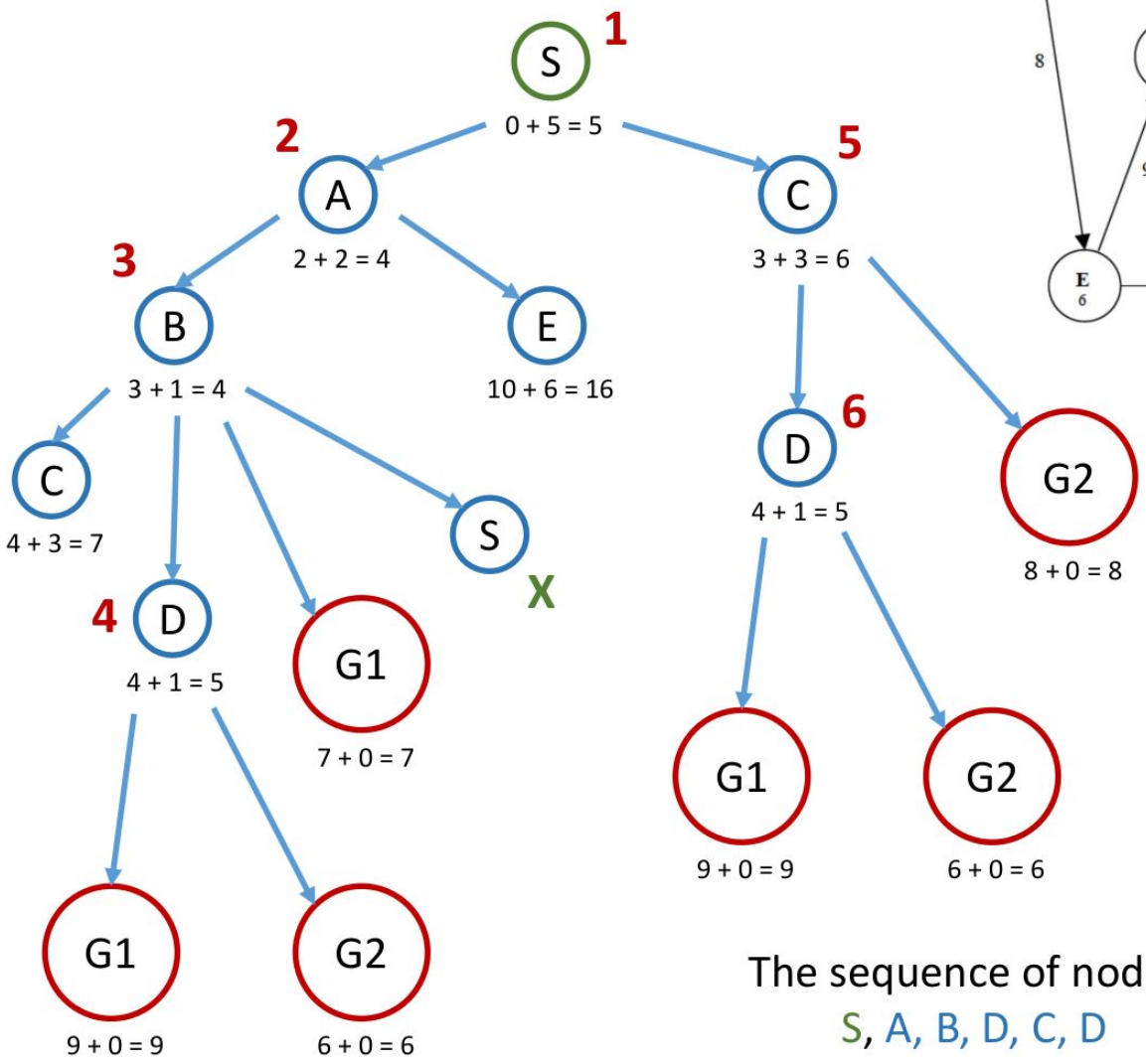
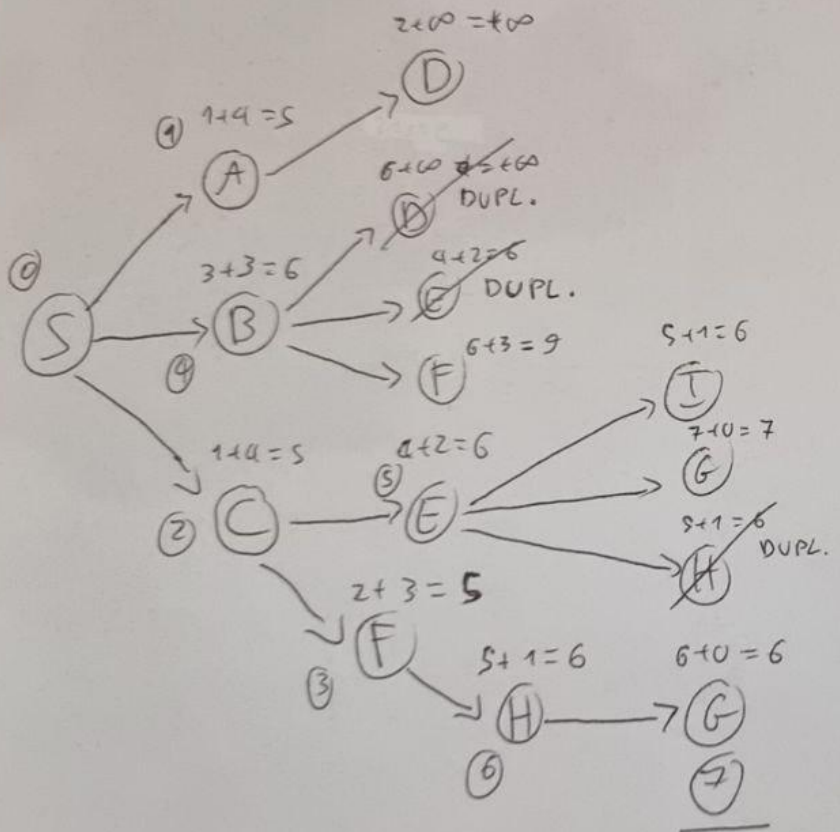
Exercise





The sequence of nodes expanded by A* is

S, A, B, D, C, D



m	l(m)
S	5
A	4
B	3
C	4
D	+∞
E	2
F	3
G	0
H	1
I	1

EXPANSION ORDER

S, A, C, F, B, E, H, G

SOLUTION

S, C, F, H, G

Exercise: Forbidden numbers

$S = \{(N, o) \mid N = num(x,y,z), N \notin F \text{ and } o \in O\}$

$num(x, y, z) = 100*x + 10*y + z$
with $y, z \in \{0,1,..,9\}$ and $x \in \{1,..,9\}$
$O = \{u, t, h, no\text{-}op\}$

$I = (num(5,6,7), no\text{-}op)$
$G = \{(num(7,7,7), o) \mid o \in O\}$

$h(n) = |x-7| + |y-7| + |z-7|$

Exercise: Forbidden numbers

Specify the **operators**

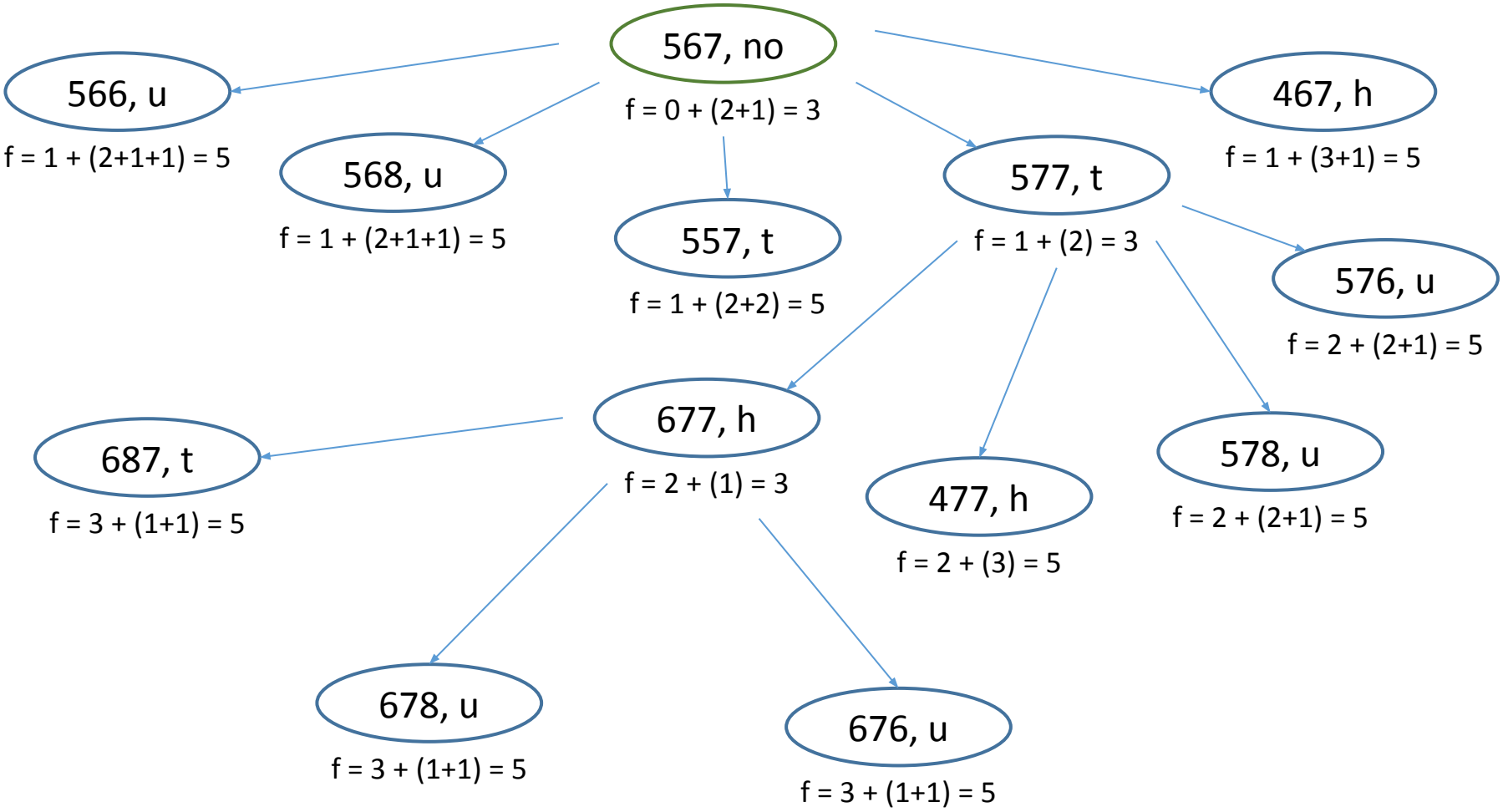
State = (num(x,y,z), o)

Op	Conditions	New state
add(u)	z!=9 and o!=u and num(x,y,z+1) not in F	(num(x,y,z+1), u)
sub(u)	z!=0 and o!=u and num(x,y,z-1) not in F	(num(x,y,z-1), u)
add(t)	y!=9 and o!=t and num(x,y+1,z) not in F	(num(x,y+1,z), t)
sub(t)	y!=0 and o!=t and num(x,y-1,z) not in F	(num(x,y-1,z), t)
add(h)	x!=9 and o!=h and num(x+1,y,z) not in F	(num(x+1,y,z), h)
sub(h)	o!=h and num(x-1,y,z) not in F	(num(x-1,y,z), h)

Exercise: Forbidden numbers

A* tree

G=777, Forbidden set: {666, 667}



Exercise: Forbidden numbers

A* tree

G=777, Forbidden set: {666, 667}