Machine, Data and Learning

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1. a)

① Initial state description:
Consider the state as a tuple T with T[0] being the number of litares in jug three and T[1] being the number of litares in jug four.

∴ initial state is $T = (0, 0)$

② goal condition for our state space is if

$T[1] == 2$

③ The operators we have access to are:

→ $d_3(T) = (T[0] + (3 - T[0]), T[1])$

→ $d_4(T) = (T[0], T[1] + (4 - T[1]))$

→ $d_3(T) = (0, T[1])$

→ $d_4(T) = (T[0], 0)$

t34

→ transform34(T)

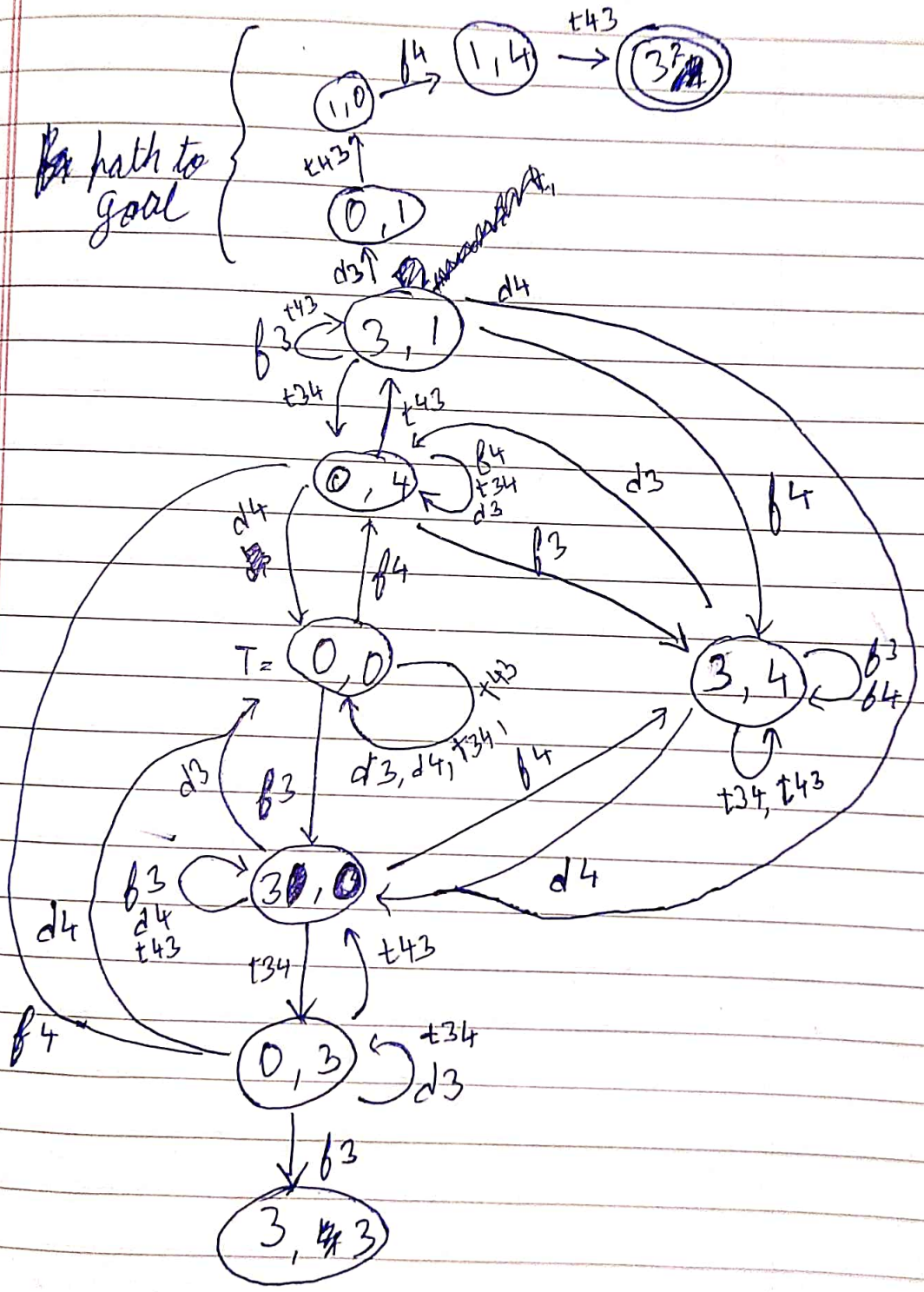
$$= \begin{cases} (T[0]+T[1]-4,\ 4) & \text{if } (T[0]+T[1])>4 \\ (0,\ T[0],\ T[1]) & \text{if } (T[0]+T[1])\leq 4 \end{cases}$$

t43

→ transform43(T)

$$= \begin{cases} (3,\ T[0]+T[1]-3) & \text{if } (T[0]+T[1])>3 \\ (T[0]+T[1],\ 0) & \text{if } (T[0]+T[1])\leq 3 \end{cases}$$

b)


path to Goal
1,0
f4
1,4
t43
3,4
t43
0,1
d3
3,1
d4
f3
t43
t34
t43
0,4
f4
t34
d3
d4
d3
f4
f4
f3
T=
0,0
t43
3,4
f3
f4
d3
f3
d3, d4, t34
f4
t34, t43
3,0
f3
d4
d4
d4
t43
t34
t43
0,3
t34
d3
f4
f3
3,3