

11 $X + 2y = 5$

minimize $|LHS - RHS|$

1) increment x

2) decrement x

3) increment y

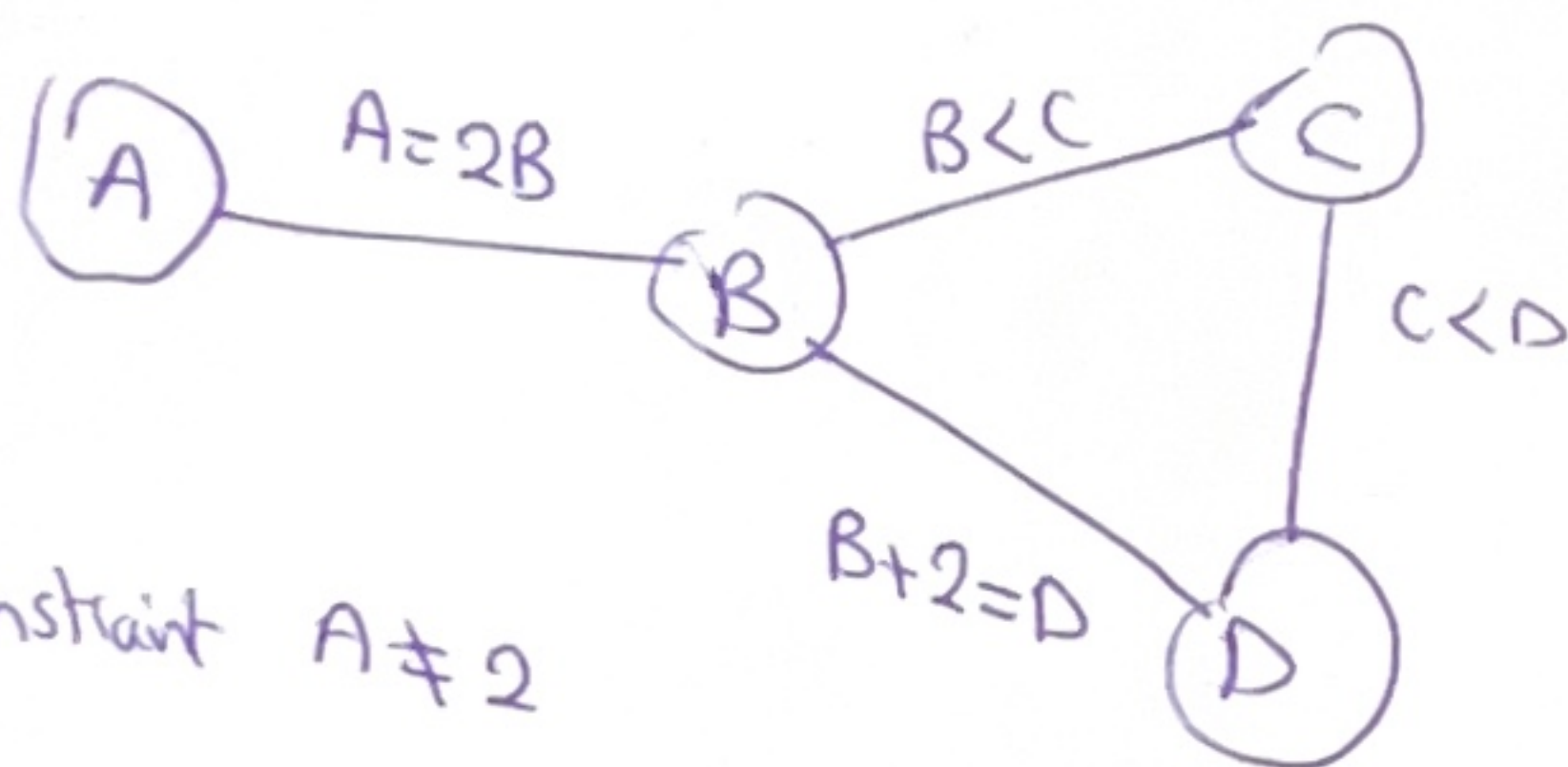
4) decrement y

i) starting from $(0,0)$, at which state will it terminate if used hill climbing?

ii) value at $(0,0)$?

iii) Probability to go from $(4,0)$ to $(5,0)$ if using simulated annealing with $T=4$

2]



wrong constraint $A \neq 2$

1) apply arc consistency

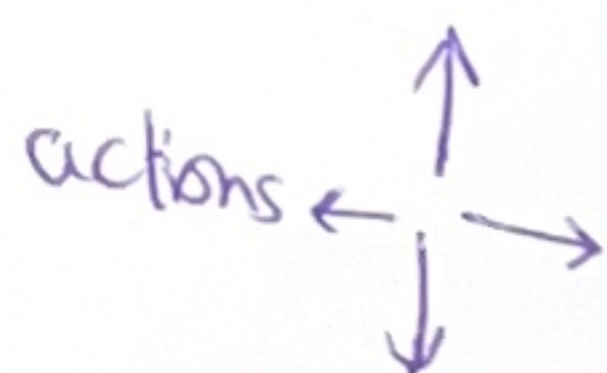
A	1	2	3	4	5
B	1	2	3	4	5
C	1	2	3	4	5
D	1	2	3	4	5

2) Is it now node consistent? Justify.

3) Convert it to a tree by combining B and D show diagram, constraints and domains

3] MDP

A ₁	C ₃
B ₂	4 D



UP : 0.8 UP, 0.2 Left

DOWN : 0.8 DOWN, 0.2 RIGHT

Left : 0.8 Left, 0.2 UP

Right : 0.8 Right, 0.2 DOWN

$\gamma = 0.5$

assume $U_A = 1$ $U_B = 2$ $U_C = 3$ $U_D = 4$

1) What is the value of $U_2 A$ after 1 value iteration?

2) Equations of policy iteration if $\pi_A = \text{right}$ $\pi_B = \text{down}$ $\pi_C = \text{up}$

3) Best action (π) for 1.

4] Reinforcement (Same problem as above) but given episodes.

1] $A \rightarrow C \rightarrow B \rightarrow A \rightarrow D$ (from memory) (example)

2] $B \rightarrow D$

3] $C \rightarrow B \rightarrow D$

i) Direct estimated utility of A.

ii) Get transitional models (ADP).

iii) Table of $Q(s, a)$ already filled.
given $(s, a, s', a') = (A, \rightarrow, B, \downarrow)$
get $Q(A, \text{right})$
using Q-learning and SARSA

5] Searching Zady.

- ii) New question: can another heuristic function dominate the given in the table?
- The given one was the exact cost, so NO.
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6] Bayesian Networks. (Numbers may not be accurate)

Ahmed took money to buy books, probability that he will buy the books is 60%

If he buys the books, the prob. to master the course is 80%
if not the probability to master the course is 40%

This is an open-book exam.

The probability that he will pass is as follows:

Bought and mastered 90%

Didn't buy and mastered 80%

Bought and didn't master 20%

Didn't buy and didn't master 10%

Let B be variable that he bought books

M " " " he mastered the course.

P " " " he passes the exam.

i) Draw network with CPTs.