DHARMSINH DESAI UNIVERSITY, NADIAD
FACULTY OF TECHNOLOGY
ONLINE SESSIONAL EXAMINATION

B.Tech (CE) sem → 7
Subject :→ Artificial Intelligence.

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Date: 5/10/2020
Time: 10:00 to 11:15
total pages: 9

Q.1

A. Genotype representation vs. phenotype representation

* Genotype representation :→

→ The solutions are shown that are easily understandable & can be manipulated easily using computation system.

→ It is population in computation space.

e.g. people with blue eyes must have genotype trait

* phenotype :

→ population in real world soln space.

→ solutions are represented in real world situations.

→ we have to encode it to convert to genotype.

e.g. → visible color of eyes.

(B) defuzzification

→ process of converting fuzzy set to crisp set or fuzzy member into crisp member

e.g. By taking COG, we can get certain value of estimate in in tall men example

(c) principle behind min max algo

→ principle tells that a path is chosen in a tree with assumption that in computer's turn, max node chooses move giving highest static evaluation & in human player's turn, min node will choose move giving lowest static evaluation.

(d) concept of mutation.

→ it is genetic operator maintaining genetic diversity from one generation to next.

→ it occurs during evolution according to mutation probability.

→ it ~~~~ contains reversing value of a bit in a chromosome, which can result into completely new one in gene pool.

→ it helps to prevent population having at only local optima.

(e) uniform crossover.

→ here probability p is used to determine whether given bit from which parent is used.

→ i.e. child may have any bits randomly from each of parents.

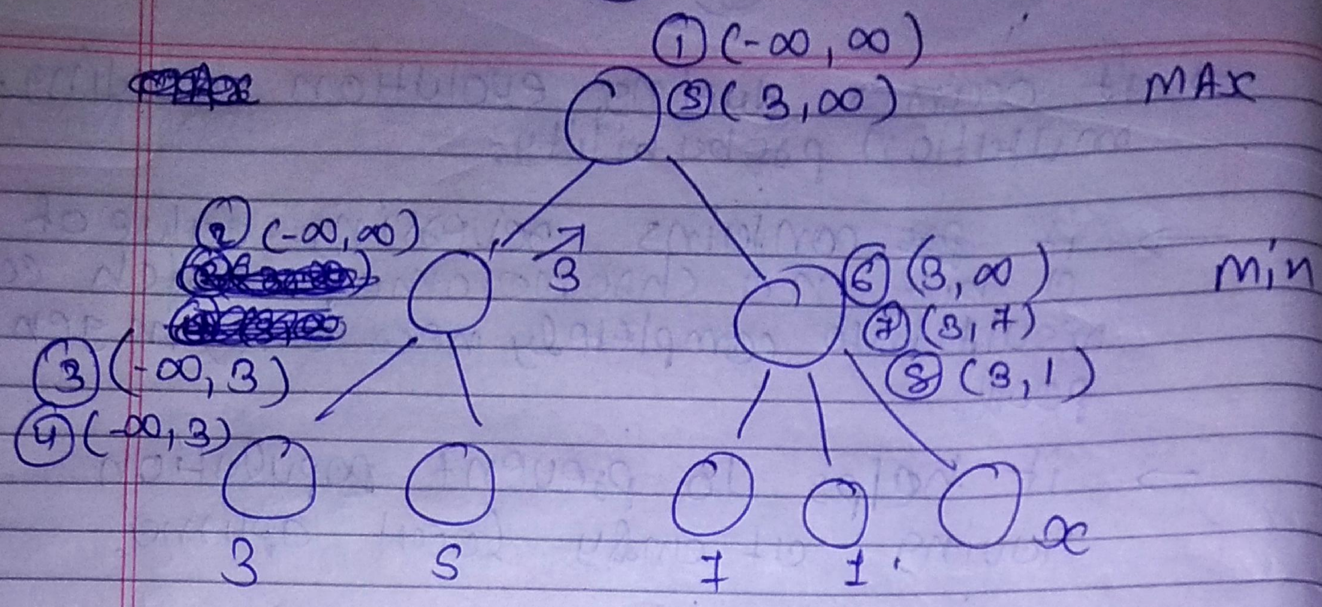
→ this operator decides mixing ratio this based on

(f) first turn is of player MAX

to identify x, we will have to try alpha-beta pruning on the tree.

(P.T.O)

4



on 8^{th} step we get $\alpha = 3$ & $\beta = 1$ & hence $\alpha \geq \beta$ is true so for any ~~wh~~ value of x, its branch will be pruned.

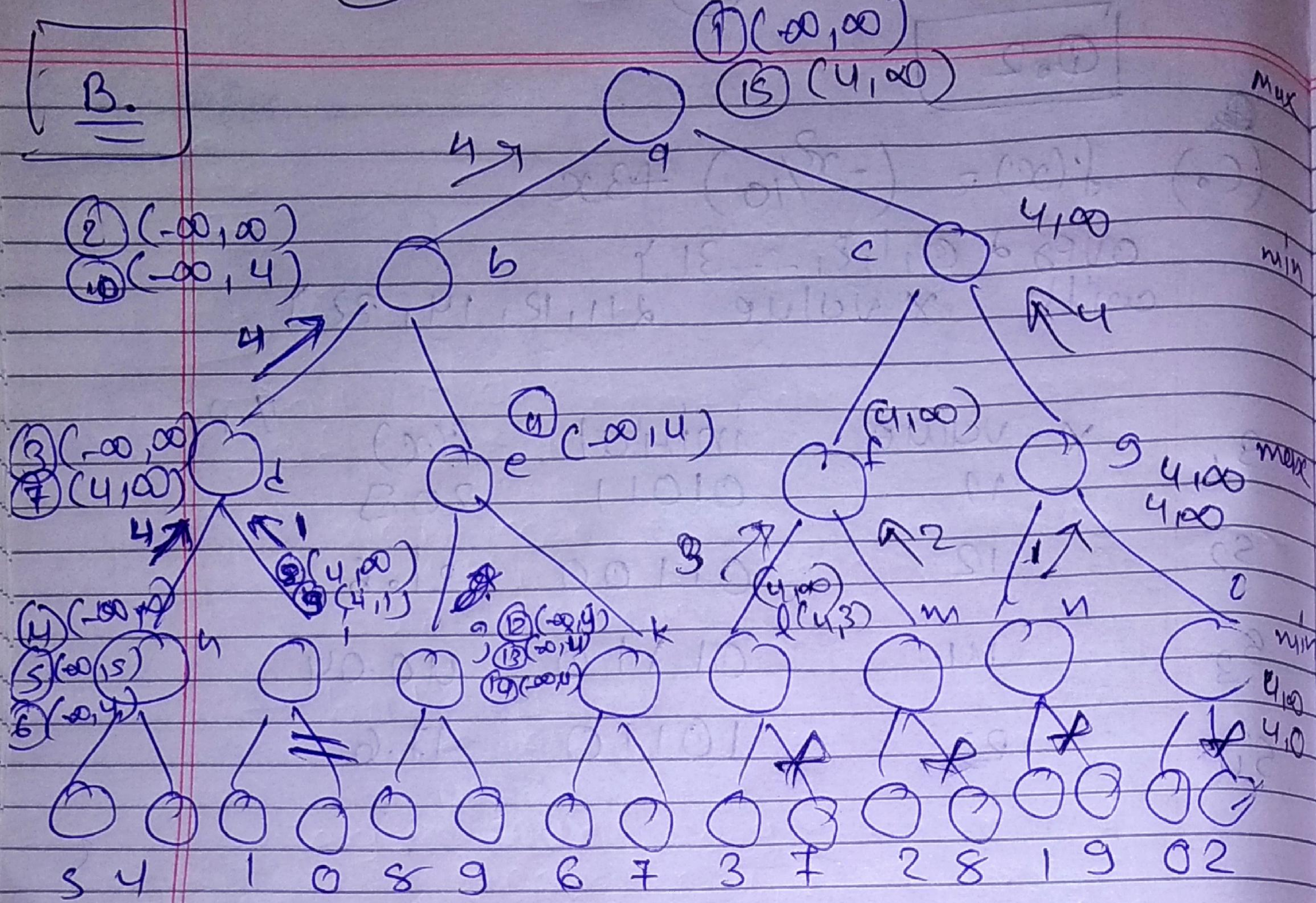
Q.2

(c.) $f(x) = (-x^2/10) + 3x$
over $\{0, 1, 2, --- 31\}$
with x value $\{11, 12, 14, 22\}$

	x - value	initial	f(x)	% P_i
S_1	11	01011	20.9	
S_2	12	01100	21.6	
S_3	14	01110	40.04	
S_4	22	10110	17.6	

6

B.



Step	node	(α, β)
1	a	$(-\infty, \infty)$
2	b	$(-\infty, \infty)$
3	d	$(-\infty, \infty)$
4	h	$(-\infty, \infty)$
5	h	$(-\infty, 15)$
6	h	$(-\infty, 4)$
7	d	$(4, \infty)$
8	i	$(4, \infty)$
9	i	$(4, 1)$
10	b	$(-\infty, 4)$
11	e	$(-\infty, 4)$
12	j	$(-\infty, 4)$

$\alpha \geq \beta$

13 i $(-\infty, 4)$
14 j $(-\infty, 4)$
15 a $(4, \infty)$
16 e $(4, \infty)$
17 f $(4, \infty)$
18 k $(4, \infty)$
19 l $(4, 3)$ $\alpha \geq \beta$
20 f $(4, \infty)$
21 m $(4, \infty)$
22 m $(4, 2)$ $\alpha \geq \beta$
23 f $(4, \infty)$
24 c $(4, \infty)$
25) g $(4, \infty)$
26) n $(4, \infty)$
27) n $(4, 1)$ $\alpha \geq \beta$
28) g $(4, \infty)$
29) o $(4, \infty)$
o $(4, 0)$ $\alpha \geq \beta$

4 passed
to path towards
a

& result is 4

Q.3

A. Green cut.

→ cut that dont change meaning of predicate.

→ new code using cut gives exactly same ~~x~~ answer as old version.

→ but using cut makes it more efficient.

e.g. max(x, y, y) :- x =< y , ! .
max (x, y, x) :- x > y.

Red cut.

→ cuts that change meaning of predicate.

→ if we take cut out, program is changed.

→ it makes program partially declarative, hard to read & lead to mistakes.

e.g. max(x, y, z) :- x =< y , ! , y = z
max(x, y, x).

(B) Program to check for neighbours.
e.g. lnrbr ([1,2,3] , 1,2) must be yes

domains

list = integer*

predicates

lrnbr(list, integer, integer)
append (list, list, list)

clauses.

```
append( [], L, L).
append ( [H | L1 ], L2 , [H | L3 ])
        :- append (L1, L2, L3).

lrnbr ( L, A, B ):-
        append (_, [A, B|_] , L ).
```

(idea :→ if we append A, B & some tail to something we should have L as our result)

— end of answersheet —