CSE-103
DISCRETE MATHEMATICS

ASSIGNMENT NO : *01*
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Problem-1:

You walk to a fork from where two roads come out one to post office and the other one to university . You need to go university. There is a man standing on the fork who alternates on speaking the truth and telling lies, and who knows the direction. You can ask only one question to find your way. What is the question?

Probem-2:

You walk to a fork from where two roads come out one to post office and the other one to university . You need to go university. There is a man standing on the fork who consistently either speaks the truth or lies and who knows the direction. You can ask only one question to find your way . What is the question ?

Interestingly the two question can be solved by asking one question for each of them.

The question would be :

"If I ask you in which one is the road to university , what will you say?"

Analysis for Problem-1:

Whatever he/she answers , I will go to opposite direction.

Case-1:

Speaker's Condition : Now he/she tells truth .

Explanation :

If he/she tells truth then which road he/she tells is the right road to university . Because he tells the truth at this condition and so he/she can't give me wrong direction.

Case-2:

Speaker's Condition : Now he/she tells lie.

Explanation :

If he/she lies at this moment then he would answer that it was in this direction. But I asked that if I question you then what will you say so he/she would answer wrong but he/she have to tell me true second time so he/she will give direction to the false.

By this way inverting this I always find him/her to speak truth.

Always answer is a statement with truth value "True" .

But asking the question , the speaker have to tell the false twice so the truth value of his statement remain true as we know that if ,

Truth value of

p is true [p is the statement (answer)]

Then

¬(¬(p)) = true [Double Negation]

Analysis for Problem-2:

Whatever he/she answers , I will go to same direction.

But the condition and logic for every case in problem 2 is same by asking this question .

Problem-3 :

From a point , say A , you walk 20 kms to the north to reach B, from where you walk another 20 kms to the south to reach point B. What is the maximum distance between points A and B ?

Answer :

The maximum distance is 40 kms .

Suppose the man starts walking from A to B when he walked 20 kms to north he reaches north pole from this point he walked 20 kms onward because from this point onward direction is to south direction . So waking onward 20 kms he reaches to point B . Thus the max. distance is 40 kms.