CSE-103

DISCRETE MATHEMATICS

***ASSIGNMENT NO :******06 (Out of the book Assignment #4)***

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***DATE OF ASSIGNED*** *:* ***SUBMITTED BY***

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***SECTION*** *: B*

***LEVEL-1 TERM-2***

## ***( Out of the text assignment #3 )***

***Problem Statement :***

An old father told his son his son that he stored some gold in a forest. The son must find identical trees A and B, and a stone S. He then should walk from S to A and equal distance perpendicularly towards the other tree to find a point C. He should again come back to the stone S and do the same with respect to the other tree B to obtain a point D. Gold is just in the middle of the line joining C and D. The som could find trees but not the stone. How could he find the gold?

***Answer***

It is not important where is the stone, because wherever the stone is , the treasure is always in the same position. Here is my prove:

For the prove , let draw a square imaging that AB , here A and B is the point where the tree is located , is the diagonal of the square .

Suppose that the stone is at S . Now draw SA from S to A and AB from S to B and then AC from A to C and BD from B to D so that AC = SA and BD = SB

Now we will prove that G is midpoint of CD , that’s all . And thus G point contains treasure.

<SAC = <GAH [ both are 90 degrees ]

Or <SAH = <CAG [ subtracting <HAC> ]

Now in triangle SAH and triangle CAG ,

**D**

**S**

**A**

**B**

**G**

H

**C**

**A’**

SA = CA

HA = GA and <SAH = <CAG

So they are compatible hence

SH = CG

and <AHS = <AGC ………….. (1)

Again <SBD = <HBG So <SBH = <DBG ………………….[subtracting <SBG]

Then in triangle SBH and triangle DBG

SB = DB

HB = GB and <SBH = <DBG

So they are compatible hence

HS = GD

and < SHB = <DGB …………. (2)

Also < SHB = <SHA + <AHB

Or <DGB = <AGC + 90 ………….. [from (1) and (2) ]

Or <DGB - 90 = <AGC

Or <DGA’ = <AGC ..………… [A’ is in extention of AG, so <A’GB = 90]

So these two are vertical angles hence D, G, C are collinear and

as DG = GC ……………. [from (1) and (2)]

so G is the midpoint of CD. So G is the point where the treasure is located according to the question . So the sons had no need to find the stone , if they can find the trees they can find the gold . But there is a possibility that the gold is not at the position G but it is at the position of opposite of G and from figure this point is H (it can prove using the point S at the side of G is located ).

***This condition is same for any position of S . (Proved)***