

Problem 6: Complex Caves - Solution

Suppose we have some minimum number of tunnels we need to remove from our cave in order for it to have no more loops. Then, if we remove all these tunnels, we observe that the left over graph is a tree, as there are no more loops. Moreover, we may assume it is a maximum spanning tree as otherwise we could always add more edges without it containing loops.

Thus, we see that the complexity score is the size of the number of edges $|T|$ minus the size of the maximum spanning tree $|R| - 1$

So the solution is $|T| - |R| + 1$.