

EXPLANATION OF TRUTHSIFT LOGIC

TERMINOLOGY

- Graph/Topic - An idea/assumption which has to be argued.
- Node/Statement - Any input made to the graph. A Node consists of the following components:
 - Title
 - Description
 - Type - this is manually decided by the person submitting the node. This can be:
 - PROOF - Supports the argument
 - CHALLENGE - Challenges the argument
 - Rating - This is decided by the internal logic. Rating of a node can be :
 - TE - Tentatively Established
 - TR - Tentatively Refuted (Not Tentatively Established)
- Root Node/Statement - Every graph starts with a root statement. This is added when a graph is created. A Root Statement has no Type i.e it is neither a Proof or a Challenge. Its default rating is always TE when it is created.
- Incoming Edges - The lines/connectors which join one node to another. Edges always flow from bottom to top.

Every refutation should state clearly a rational reason why you believe the targeted statement is false or has not been proved, given what has already been added. Every proof should state clearly a rational reason why you believe the targeted statement is true.

METHODOLOGY

1. When a graph is created it only has a root node.
2. New nodes are added as an incoming reply to an existing node. For a new graph with only a root node, the first new node will always be an incoming reply to the root node.
3. As more nodes are added to the graph the structure becomes a hierarchy with the root node at the top. Each reply to a node is shown underneath it thus creating a new horizontal layer in the graph.
4. A node can have only one outgoing edge but it can have multiple incoming edges. In other words a node can have many incoming replies but it itself can only be a reply to a single node.
5. Each time a node is edited or added to the graph, the logic rating of all the affected nodes are again re-evaluated based on the rules explained in the next section.
6. The ultimate rating of the graph comes from the rating of the root node (Either it TE or TR). The root node rating comes from analysing the rating of all the nodes under it.

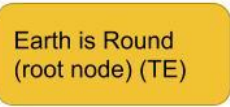
LOGIC EVALUATION

The TruthSift logic rules for evaluation are given below:

1. When a new node is added , its rating is always TE.
2. We evaluate the rating upwards from the newly added node.
3. A node is rated TE if :
 - a. It has no incoming replies. i.e it is a leaf node without incoming replies OR
 - b. it has no PROOF replies and all its Challenge replies are TR OR
 - c. It has at least one PROOF node which is TE and all its CHALLENGE nodes are TR.
4. If a node does not meet any of the conditions above then it is rated as TR.
5. The rule of thumb is that everything new added to the graph is taken as tentatively established by default unless someone refutes it with a Challenge.

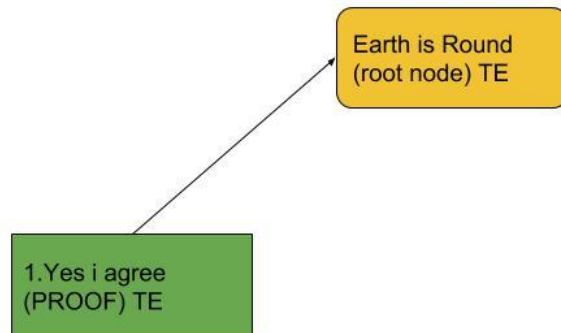
We use an example below to illustrate the rules above.

STEP 1



Earth is Round
(root node) (TE)

STEP 2

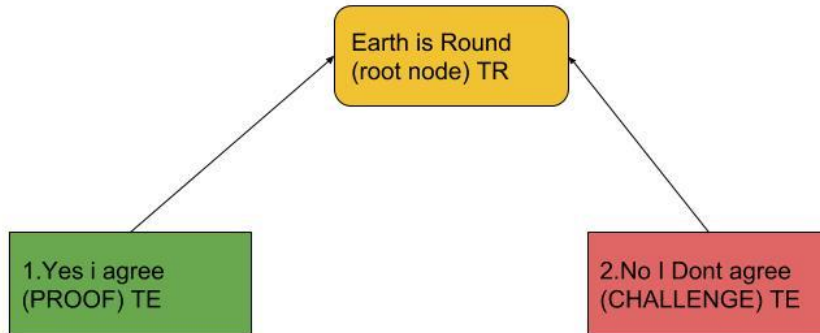


STEP 1

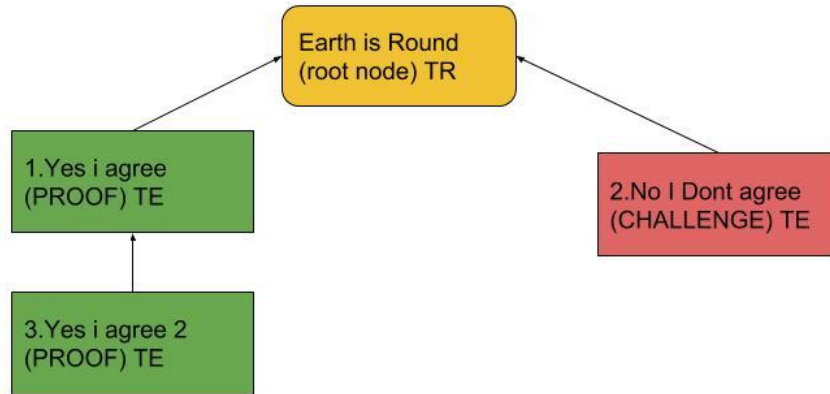
- In Step 1 Graph starts with a root node . It has a default rating of TE.

- In Step 2 a new node 1 is added. Since this is a Proof for the root node, the rating of the root node remains TE.

STEP 3



STEP 4



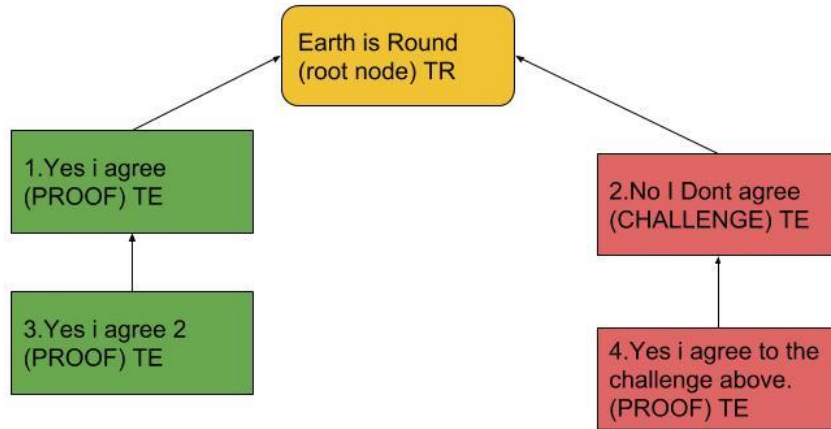
STEP 3

- A new node 2 is added which is a Challenge to the root node. Since this is a Challenge which has not been refuted, the root node becomes TR.

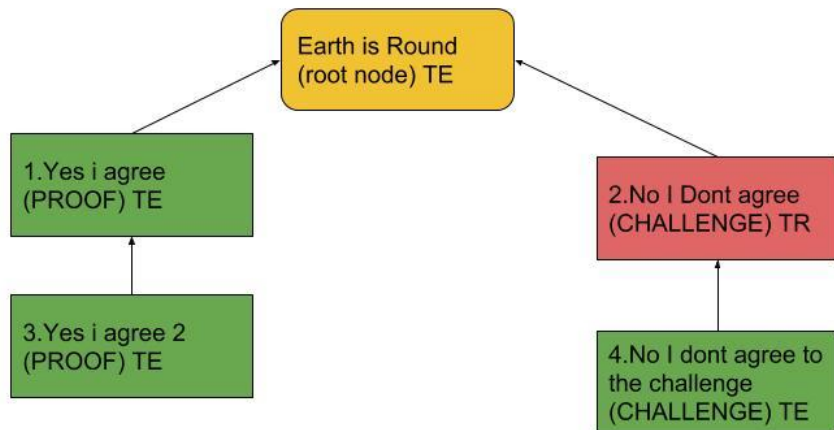
STEP 4

- Node 3 is added as a PROOF to node 1 which itself is a PROOF. Node 1 remains the same since node 3 is a supporting PROOF. The root node still remains TR because of Node 2 which is a CHALLENGE that is TE.

STEP 5 a



STEP 5 b



Step 5a and Step 5b show two possible options.

STEP 5a

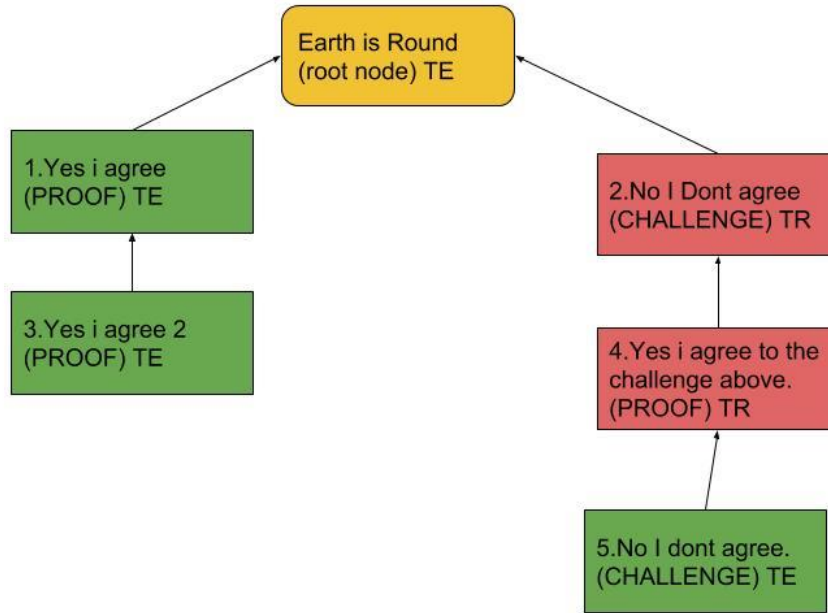
- Node 4 is added as a supporting PROOF for Node 2. Node 2 remains the same since node 4 supports it. Since Node 4 supports Node 2 which is a Challenge, it becomes a CON node (colored in red). The root node remains TR since Node 2 is still challenging it and is TE.

STEP 5b

- Node 4 is added as a CHALLENGE against Node 2. Node 2 becomes TR because node 4 is now refuting it. Since Node 4 is a Challenge to Node 2 which is also a Challenge, it becomes a CON node (colored in green).
- The root node becomes TE since it has at least one PROOF which is TE and all its CHALLENGE nodes are TR. Note that for the root node, we only evaluate the state of Node 1 and Node 2 since these are its two immediate incoming nodes.

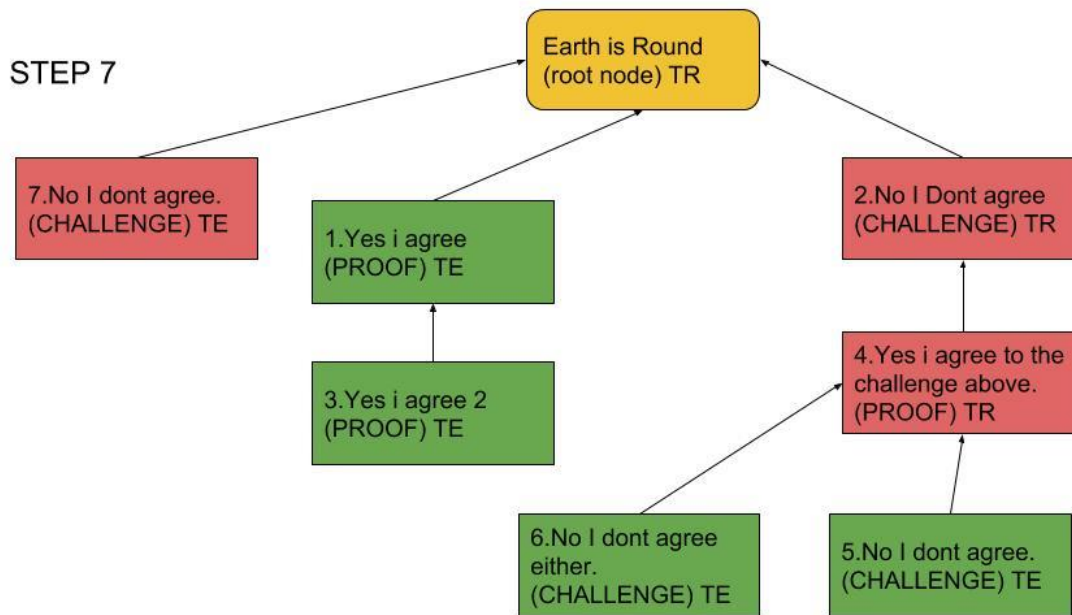
We will continue the example from STEP 5a onwards.

STEP 6



STEP 6 (CONTINUING FROM STEP 5a)

- Node 5 is added as a CHALLENGE to node 4. Node 4 becomes TR since it is now refuted. Node 2 becomes TR since Node 4 stands refuted. Node 5 is a challenge to Node 4 which is a CON node (colored in red). Hence Node 5 becomes a PRO node (colored in green).
- The root node becomes TE since it has at least one PROOF node which is TE and all its CHALLENGE nodes are TR.



STEP 7

- A new node 6 is added as a CHALLENGE to node 4. Node 4 remains TR since it was already refuted by node 5. Node 2 remains the same.
- A new node 7 is added as a CHALLENGE to the root node.
- The root node becomes TR since it has at least one CHALLENGE node which is TE

It is important to know the difference between the following:

- Type: PROOF/CHALLENGE
- Rating: TE/TR
- Color: PRO - green/CON - red

The Type is entered manually by the person entering a reply. The type of a Node never changes. A Proof will always remain a Proof and a Challenge will always remain a Challenge.

The Rating is assigned by the graph logic and can change for a Node over its lifetime, depending on what new nodes are added to the graph.

The Color is deduced by the graph logic. The color depends on whether a Node is PRO (supporting) or a CON (refuting). The color of a Node can change depending on other nodes that are added to the graph. The supporting or refuting rule is applied against the node to which this reply is addressed to. So the following rules apply:

- A PROOF (supporting) reply to a PROOF (supporting) node = PRO reply
- A CHALLENGE (refuting) reply to a PROOF (supporting) node = CON reply
- A PROOF (supporting) reply to a CHALLENGE (refuting) node = CON reply
- A CHALLENGE (refuting) reply to a CHALLENGE (refuting) node = PRO reply

So it is not necessary that all CHALLENGE nodes are red and all PROOF nodes are green. The PRO or CON status of a Node basically signifies whether the Node is supporting or refuting the Root node. Example nodes:

- Node 5 is a CHALLENGE node which has been Tentatively Established (TE) and is a PRO Node because it is supporting the assumption made by the root node.
- Node 4 is a PROOF node which has been Tentatively Refuted (TR) and is a CON node because it refutes the assumption made by the root node.
- Node 2 is a CHALLENGE node which has been Tentatively Refuted (TR) and is a CON node because it refutes the assumption made by the root node.

Even though in the big picture, every Node is either supporting or refuting the root node, it is not so easy to directly look at the root node and understand if a particular Node is supporting or refuting it, specially if the Node is several levels below. The correct and logical way is to follow the edges from the Node and move up the hierarchy till you reach the Root node.