Inapplicable algorithm description

1 First downpass

1. Enter on one of the most nested tips on the tree and focus on its closest ancestor (hereafter referred as the "focal node") then go to 2.

2. **If** there is a state in common between both descendants of the focal node, **set** the focal node state to the states in common **then** go to 3. **Else** go to 4.

3. **If** the state of the focal node is now only the inapplicable token but that both descendants also have at least one applicable state, **set** the focal node state to be the union of both descendants states; **then** go to 6.

4. **If** there is a no state in common between both descendants, **set** the focal node state to be the union of both descendants states; **then** go to 5.

5. **If** both descendants have also applicable states, **remove** the inapplicable token from the the focal node state; **then** go to 6.

6. Go to the closest ancestor from the focal node and repeat from 2 until all the nodes in the tree have been visited.

2 First uppass

1. Enter the tree on the root. **If** if the root has both inapplicable *and* applicable states, **remove** the inapplicable state; then go to 2.

2. Select the next focal node after the root; then go to 3.

3. **If** that focal node as an inapplicable token go to 4; **else** go to 9.

4. **If** the node also has at least one applicable state, **then** go to 5. **Else** go to 6.

5. **If** the node's ancestor has an inapplicable token, **set** the node state to be the inapplicable token; **then** go to 10. **Else leave** the node's state unchanged but **remove** any inapplicable token; **then** go to 10.

6. **If** the node's ancestor has an inapplicable token, **set** the node's state to be the inapplicable token; **then** go to 10. **Else if** the union between the descendants have an applicable state, go to 7. **Else** go to 8.

7. **Set** the node's state to be the union between the descendants without the inapplicable token; **then** go to 10.

8. **Set** the node's state to be the inapplicable token; **then** go to 10.

9. **Leave** the focal node's state unchanged then go to 10.

10. Select to the next node and repeat from 3 until all nodes have been visited; then go to 11.

11. Exit the first uppass.

3 Second downpass

1. Enter on one of the most nested tips on the tree and focus on its closest ancestor then go to 2.

2. **If** the focal node state has an applicable state, go to 3. **Else** go to 6.

3. **If** the focal node's two descendants have a state in common go to 4. **Else** go to 5.

4. **If** the state in common between both descendants has at least one applicable state, **set** the focal node to be this state (without any inapplicable token); **then** go to 6. **Else** set the focal node state to be the inapplicable token; **then** go to 6.

5. **Set** the focal node's state to be the union between both descendants without any eventual inapplicable token; **then** go to 6.

6. **Leave** the focal node's state unchanged and repeat from 2 until all nodes have been visited; **then** go to 7.

7. Exit the second downpass

4 Second uppass

1. Enter the node next to the root an **leave** the root state unchanged; **then** go to 2

2. **If** any state on the focal node is applicable; **then** go to 3. **Else** go to 12.

3. **If** the ancestor also has at least one applicable state; **then** go to 4. **Else** go to 11.

4. **If** there is a common state between the ancestor and the node's state, **set** the focal node's state to be the state of it's ancestor; **then** go to 12. **Else** go to 5.

5. **If** there is a state in common between the focal node's descendants, **set** the focal node's state to be the union between the node's state and the state in common between the node's ancestor and the node's descendants; **then** go to 12. **Else** go to 6.

6. **If** the union between the focal node's descendants have an inapplicable token, go to 7; **else** go to 9.

7. **If** the union of the focal node's descendants have a state in common with its ancestor, **set** the node state to be the union of the node's ancestor states and the states in common between the node's ancestor states and its descendants states; **then** go to 12. **Else** go to 8.

8. **Set** the focal node state to be the union between the descendants and the ancestral states without any inapplicable token; **then** go to 12.

9. **Set** the focal node state to be the union between the node state from the previous pass and its ancestor state. **then**, go to 10.

10. **If** the state in common between the focal node and its ancestor is the state of the ancestor, **set** the focal node's state to be the state in common between the focal node and its ancestor; **then** go to 12. **Else**, go to 12.

11. **If** there is a state in common between the focal node's descendants, **set** the focal node state to be the states in common between it's descendants **then** go to 12. **Else**, go to 12.

12. Leave the focal node's state unchanged and repeat from 2 until all nodes have been visited; **then** go to 13.

13. Exit the second uppass