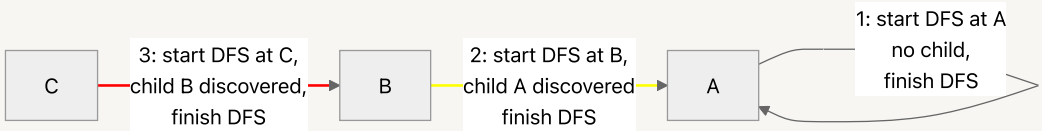
Exercise 2

A.

In this graph, $u = B$, have $\text{in-degree} = \text{out-degree} = 1$

Using DFS starts at A, the path follows $1 \to 3$, resulting in a DFS forest with 3 tree: $\{\{A\}, \{B\}, \{C\}\}$. Therefore, we have a node with $\text{in-degree} = \text{out-degree} = 1$ that only has one node(itself) in tree of DFS Forest.



B

In text book chapter 6.1, a path is a sequence of vertices that form a unique traverse from vertex v_1 to v_{n-1}, meaning that from vertex v_1 to vertex v_{n-1}, there can be as many vertices as possible given all the vertices and edges are unique.

In the chart below, there is a unique path from $u = B$ to $v = C (B \to A \to C)$

Using DFS start at A, we have the forest $\{\{A, B, C\}\}$. The start time for each vertex is A at 1, B at 2, and C at 3. $u.\text{start\_time}(2) < v.\text{start\_time}(3)$, yet C is discovered by traversing from the root A; C is not a descendant of B.