

CSCI 405: Algorithm Analysis II
Homework 4: Depth-First Search

1. DVS-Comp and DFS-VISIT-Comp

Algorithm: DFS-Comp

Data: G

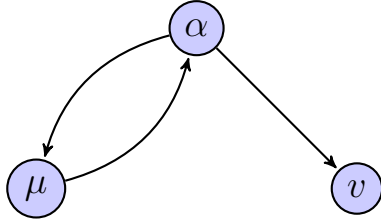
```
foreach Vertex  $\mu \in G.V$  do
     $\mu.color = WHITE;$ 
     $\mu.\pi = NULL;$ 
end
 $time = 0;$ 
 $c = 1 ;$ 
foreach Vertex  $\mu \in G.V$  do
    if  $\mu.color == WHITE$  then
        DFS-VISIT-Comp( $G, \mu, c$ );
         $c = c + 1;$ 
    end
end
```

Algorithm: DFS-VISIT-Comp

Data: G, μ, c

```
 $time = time + 1;$ 
 $\mu.d = time;$ 
 $\mu.color = GRAY;$ 
 $\mu.c = c;$ 
foreach Vertex  $v \in G.Adj[\mu]$  do
    if  $v.color == WHITE$  then
         $v.\pi = \mu;$ 
        DFS-VISIT-Comp( $G, v, c$ );
    end
end
 $\mu.color = BLACK;$ 
 $time = time + 1;$ 
 $\mu.f = time;$ 
```

2. If we start at node α , in whose adjacency list μ comes before v , μ will finish before v is discovered, but there is a path from μ to v .



3. Using the same graph and adjacency lists as in (2), we find that μ is discovered before v , but v is not G_π descendant of μ .