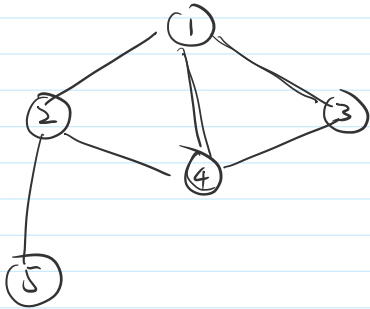


if the graph is sparse $m = \Theta(n)$

$$\text{average degree} = \frac{\sum_{i \in V} \text{degree}(i)}{n} = \frac{2m}{n} = \Theta(1).$$

- DFS



DFS-visit(1)

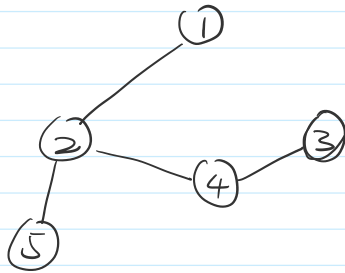
→ DFS-visit(2)

→ DFS-visit(4)

→ DFS-visit(3)

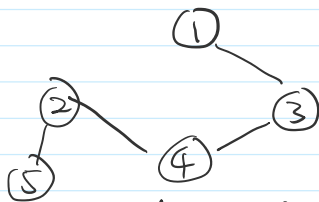
→ DFS-visit(5)

- DFS tree

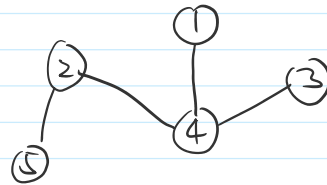


- DFS tree is not unique

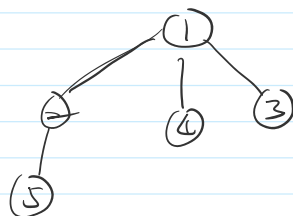
can choose different starting points and/or the ordering of edges



decide to follow (1,3) before (1,2)



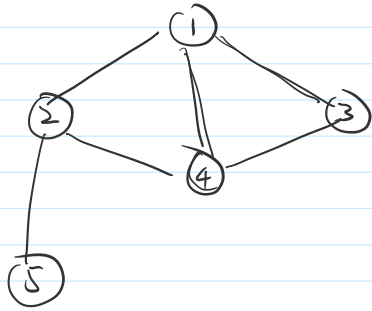
(1,4) first.



cannot be a DFS tree if ① is the root (starting point)

- pre-order and post-order

- Pre-Order and Post-Order



DFS-visit (1)

→ DFS-visit (2)

→ DFS-visit (4)

→ DFS-visit (3)

→ DFS-visit (5)

- pre-order: ① ② ④ ③ ⑤

- post-order ③ ④ ⑤ ② ①

- Pre-order: ordering that draw the vertices.

- Post-order: ordering in which the subtrees are finished

