

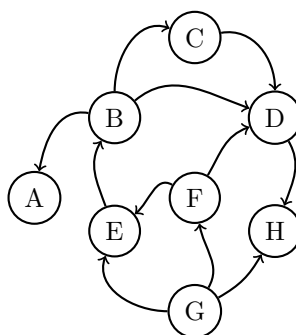
# Solutions for Data Structures and Algorithms Spring 2023 — Problem Sets

By Dmitriy Okoneshnikov, B22-DSAI-04

April 4, 2023

## Week 11. Problem set

1. Write down **all** possible topological sortings for the nodes of the following directed graph:



**Answer.**

- (a) GFEB CDHA
  - (b) GFEB CDAH
  - (c) GFEB CADH
  - (d) GFEB ACDH
2. Give an example of a directed graph  $G = (V, E)$ , a source vertex  $s$ , and a set of tree edges  $T \subseteq E$  such that for each vertex  $v \in V$ , the unique simple path in the graph  $(V, T)$  from  $s$  to  $v$  is a shortest path in  $G$ , yet the set of edges  $T$  cannot be produced by running BFS on  $G$ , no matter how the vertices are ordered in each adjacency list.

**Answer.**

The red arrows are part of the tree  $T$ .

