

§ Week I §

Problem 1: All representations

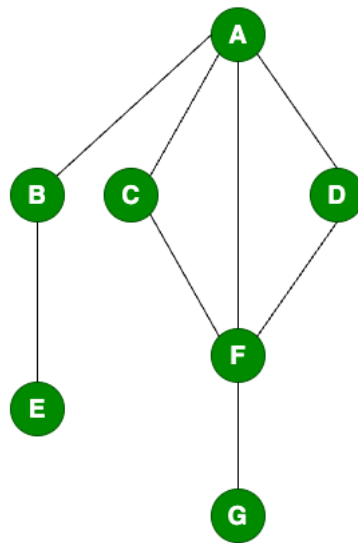


Figure 1: Example of a DAG

Represent the graph above using **incidence matrix** and **list adjacency**.

Problem 2: DFS by Hand

Considering the graph from the previous problem, write up all the steps required to complete the **DFS** algorithm.

Problem 3: Escape Room

Using any graph representation of your choice, express the following **maze as a graph**:

Problem 4: Escaping

Using DFS, find at least **two different** routes to reach **room H**.

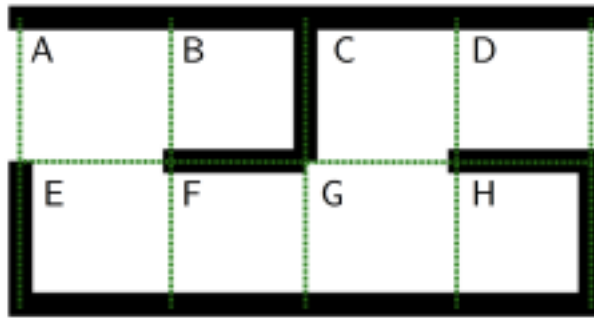


Figure 2: Search for the keys

Problem 5: DFS vs Reachability

In a sufficient large graph, a **DFS algorithm** showed that such a graph is disconnected. How would you **justified** that.

Problem 6: Building blocks organically

The hydrocarbons known as alkanes have chemical formula C_pH_{2p+2} , alkanes where C and H represent atoms of carbon and hydrogen, respectively. Graphs can represent alkane molecules. Draw a figure of a methane C_1H_4 molecule. How many “different” C_3H_8 molecules are there?