

Homework IV: Indirect Connections and Matrices

Indirect Connections

Consider the graph shown in Figure 1:

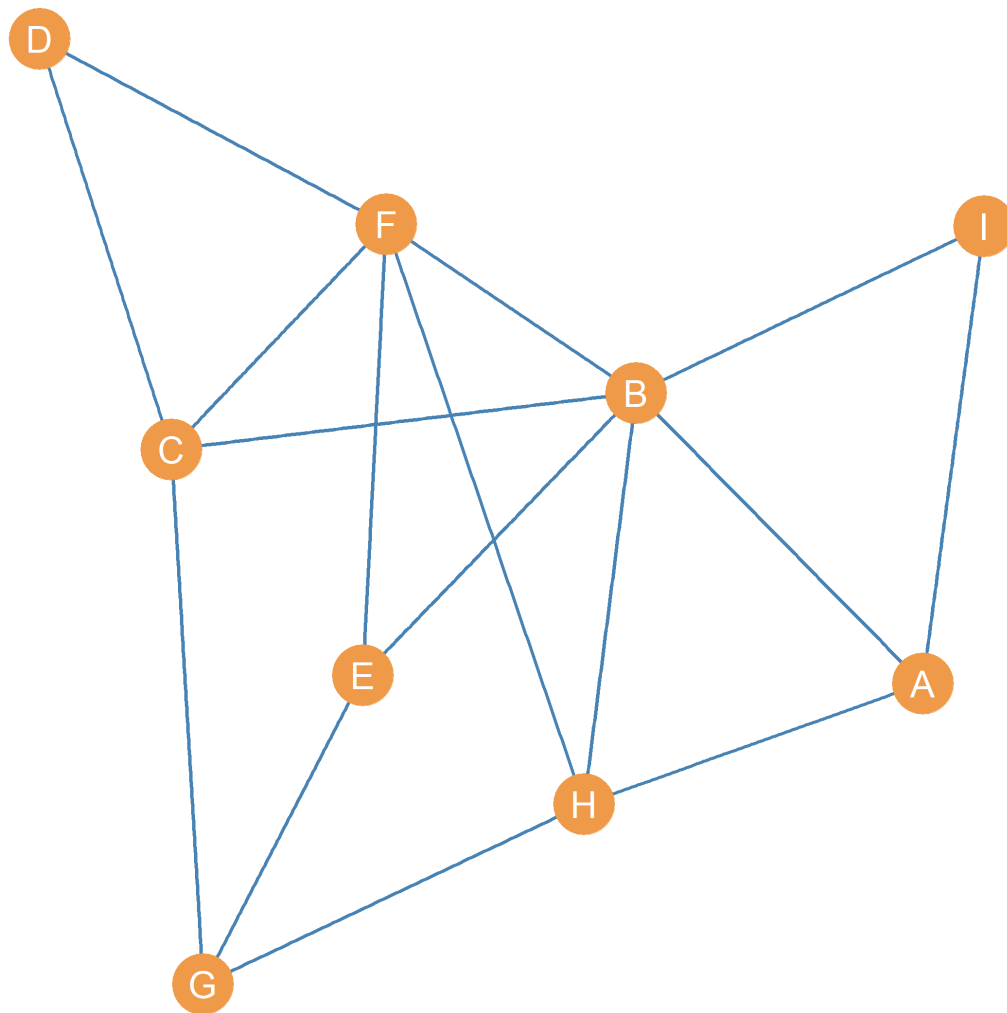


Figure 1: An undirected graph.

1. Write down *all* the **paths** connecting node A and node D:

2. Write down *all* the **paths** of length two ($|l| = 2$) featuring node B as the **inner node**:

3. Write down the the **shortest path(s)** connecting nodes G and I :

4. Write down *every* that **cycle** starts and ends with node F :

Directed Paths

Consider the graph shown in [Figure 2](#):

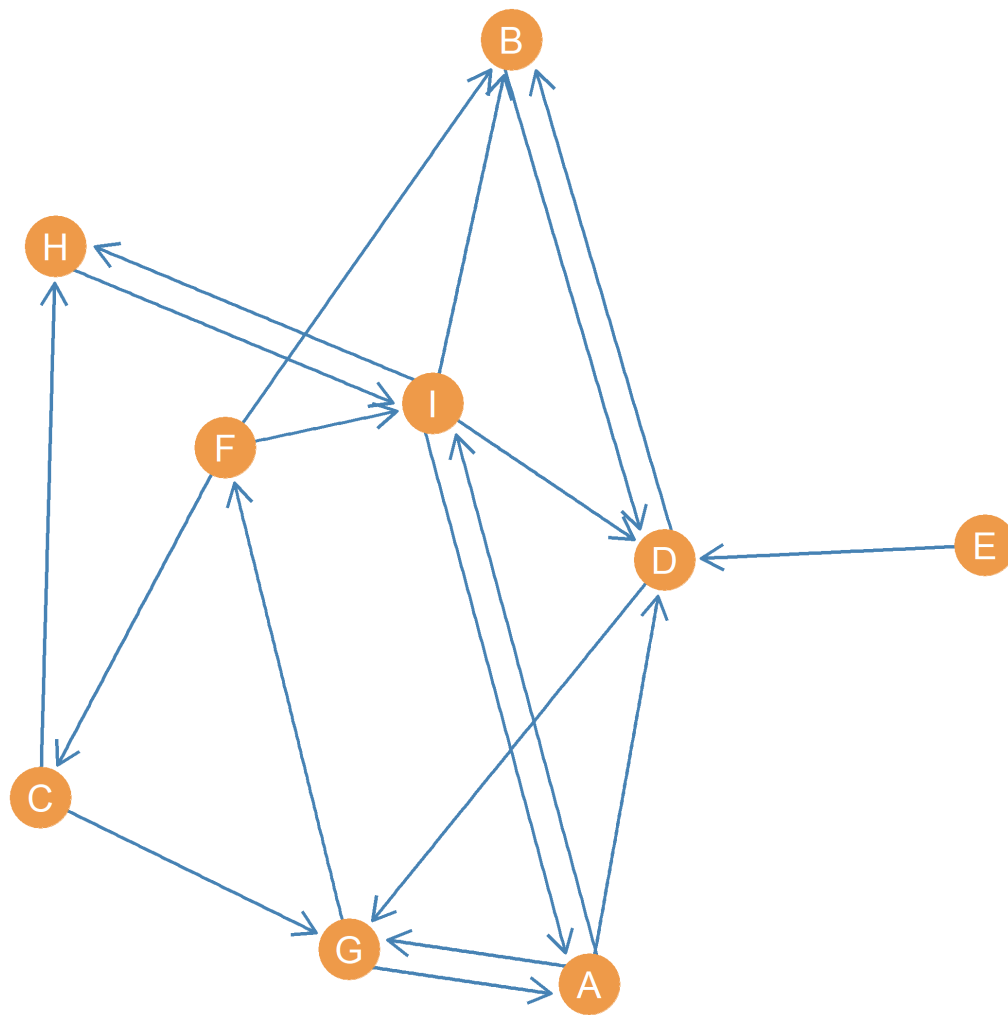


Figure 2: A directed graph.

1. Write down *all* the **directed path(s)** going *from* node *G* to node *B*:

2. What is the length of the **shortest directed path(s)** connecting going *from* node *A* to node *C*?

3. If B wanted to send a message to H in the most efficient way, how many intermediaries would B have to use?
4. Write down *every* that **cycle** starts and ends with node D :

Matrices

- In the matrix below, write down the cell entries for the **adjacency matrix** corresponding to the graph shown in [Figure 2](#):

	A	B	C	D	E	F	G	H	I
A	----								
B		----							
C			----						
D				----					
E					----				
F						----			
G							----		
H								----	
I									----

- In the matrix below, write down the cell entries for the **reachability matrix** corresponding to the graph shown in [Figure 2](#):

[illegible]

- In the matrix below, write down the cell entries **geodesic distance matrix** corresponding to the graph shown in [Figure 1](#):

	A	B	C	D	E	F	G	H	I
A	----								
B		----							
C			----						
D				----					
E					----				
F						----			
G							----		
H								----	
I									----

- What is the **diameter** of the graph shown in [Figure 1](#)?