Homework IV: Indirect Connections and Matrices

Indirect Connections

Consider the graph shown in Figure 1:

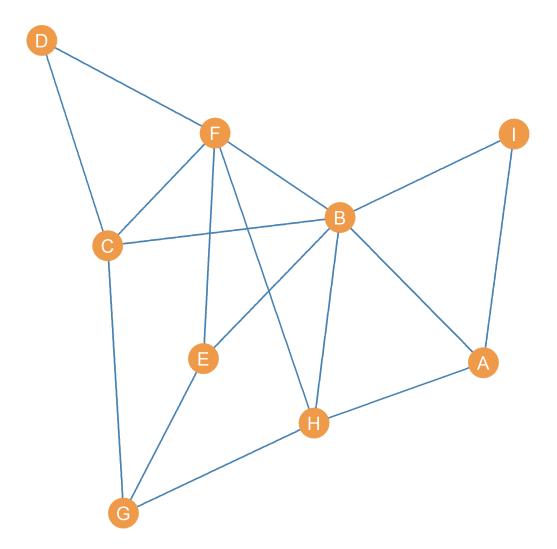


Figure 1: An undirected graph.

1. Write down *all* the **paths** of length four (l = 4) connecting node *G* and node *F*:

2.	Write down all the paths of length two (l = 2) featuring node B as the inner node :
3.	Write down all the shortest paths connecting nodes G and I :
4.	Write down one cycle of length six that starts and ends with node <i>C</i> :
Direc	ted Paths
	der the graph shown in Figure 2:

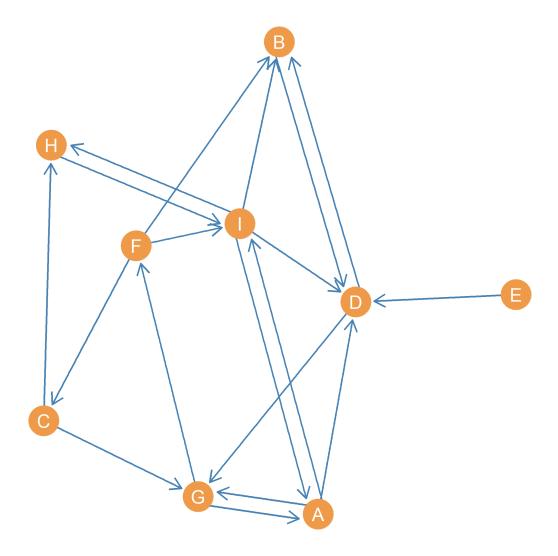


Figure 2: A directed graph.

1. Write down *all* the **directed path(s)** of length four (*l* = 4) 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 a directed **cycle** of length five (l = 5) 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:

	Α	В	С	D	Е	F	G	Н	I
Α									
В									
С									
D									
Е									
F									
G									
Н									
I									

• In the matrix below, write down the cell entries for the **reachability matrix** corresponding to the graph shown in Figure 2:

			1	U		0 1			U
	Α	В	С	D	Е	F	G	Н	I
Α									
В									
С									
D									
Е									
F									
G									
Н									
Ι									

• In the matrix below, write down the cell entries **geodesic distance matrix** corresponding to the graph shown in Figure 1:

	Α	В	С	D	Е	F	G	Н	I
Α									
В									
С									
D									
E									
F									
G									
Н									
I									

What is the **diameter** of the graph shown in Figure 1?