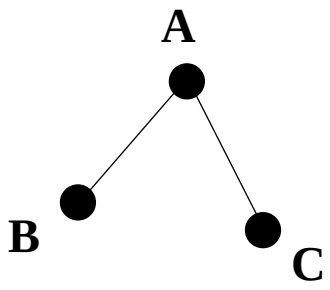
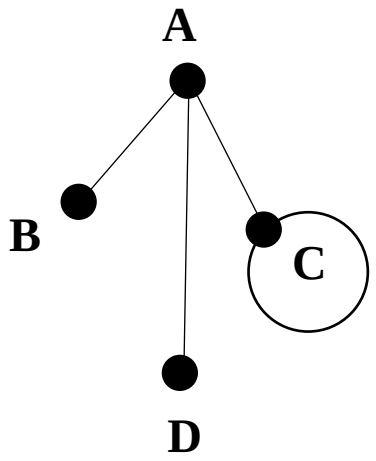
***Graph Theory:***

**A graph consists of a set of points called the vertices, and a set of segments or curves called the edges that connect one vertex to another. An edge that connects a vertex to itself is called a loop.**

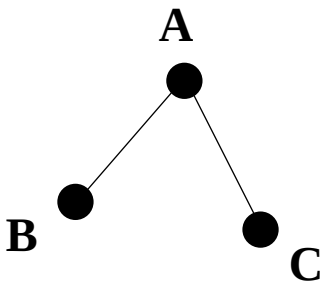
**Examples:**

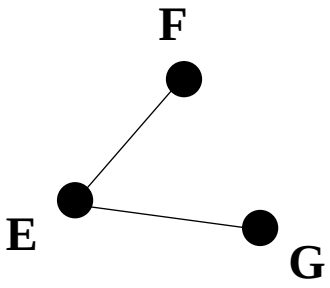


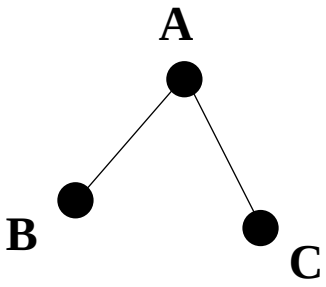



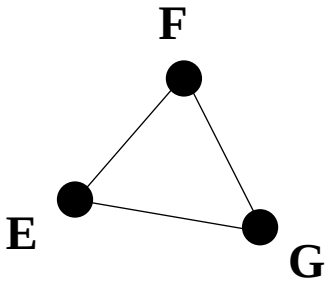
## Equivalent Graphs:

**Two graphs are equivalent if they have the same number of vertices connected in the same way.**



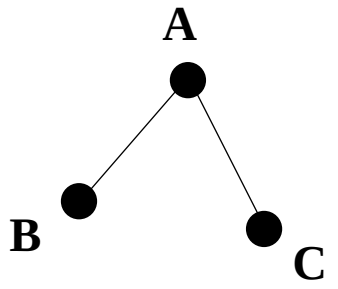



## Degree of a Vertex:

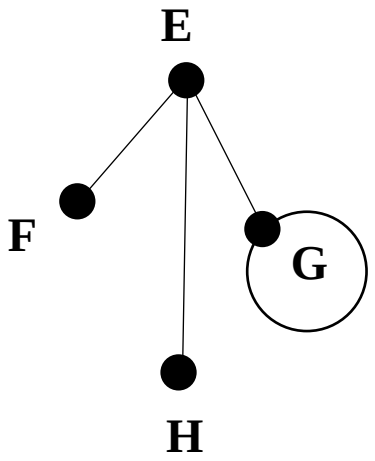
**It's the number of edges at the vertex. Loops count as 2 edges at a vertex.**

**Examples:**

| Vertex | Degree |
|---|---|
| A | |
| B | |
| C | |




| Vertex | Degree |
|---|---|
| E | |
| F | |
| G | |
| H | |



**Even Vertex:**

**It's a vertex with an even degree.**

**Odd Vertex:**

**It's a vertex with an odd degree.**

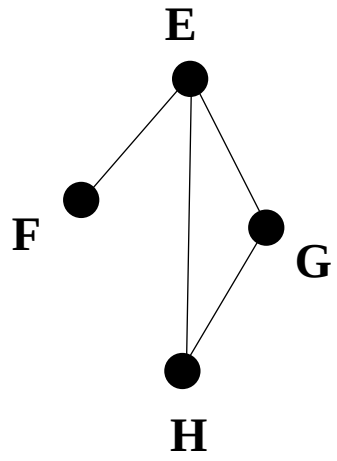
**Adjacent Vertices:**

**It's a pair of vertices that are connected by at least one edge.**

**Odd vertices:**

**Even vertices:**

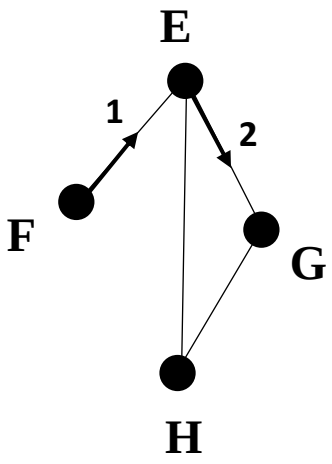
**Adjacent vertices:**



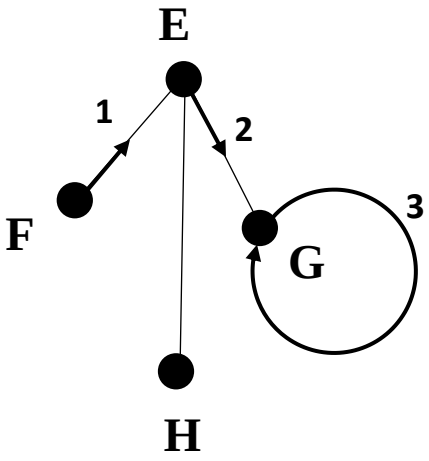
**Path:**

**It's a sequence of adjacent vertices and the edges that connect them. A vertex can appear more than once, but an edge can only be used once.**

**Examples:**



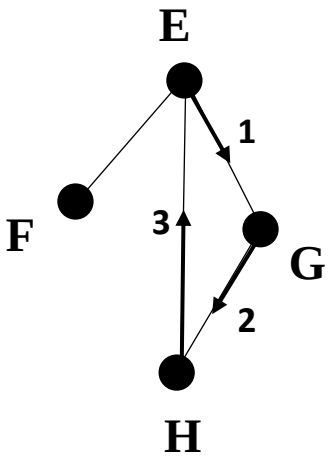

**F, E, G**




**F, E, G, G**

**Circuit:**

**It's a path that begins and ends at the same vertex.**

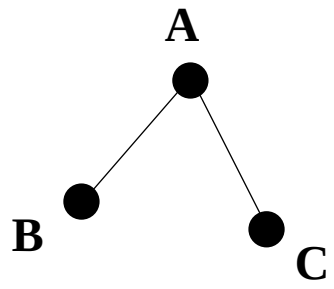


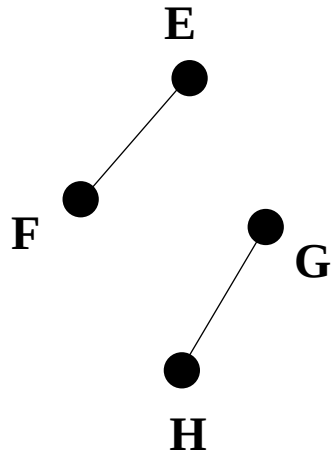

**E, G, H, E**

**Connected Graph:**

**It's a graph in which any two vertices can be connected by a path. In other words, the graph consists of one piece. A graph that is not connected is said to be disconnected.**

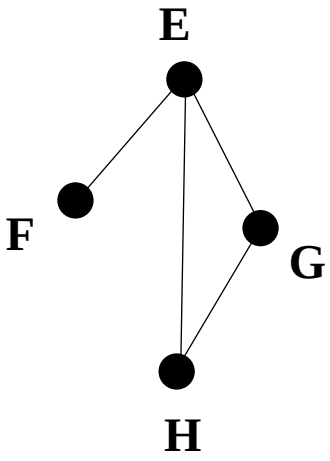
**Examples:**



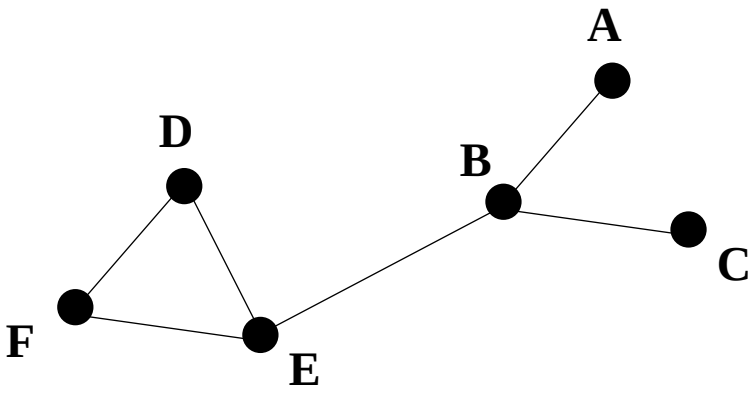



**Bridge:**

**It's an edge in a connected graph that if removed would leave a disconnected graph.**



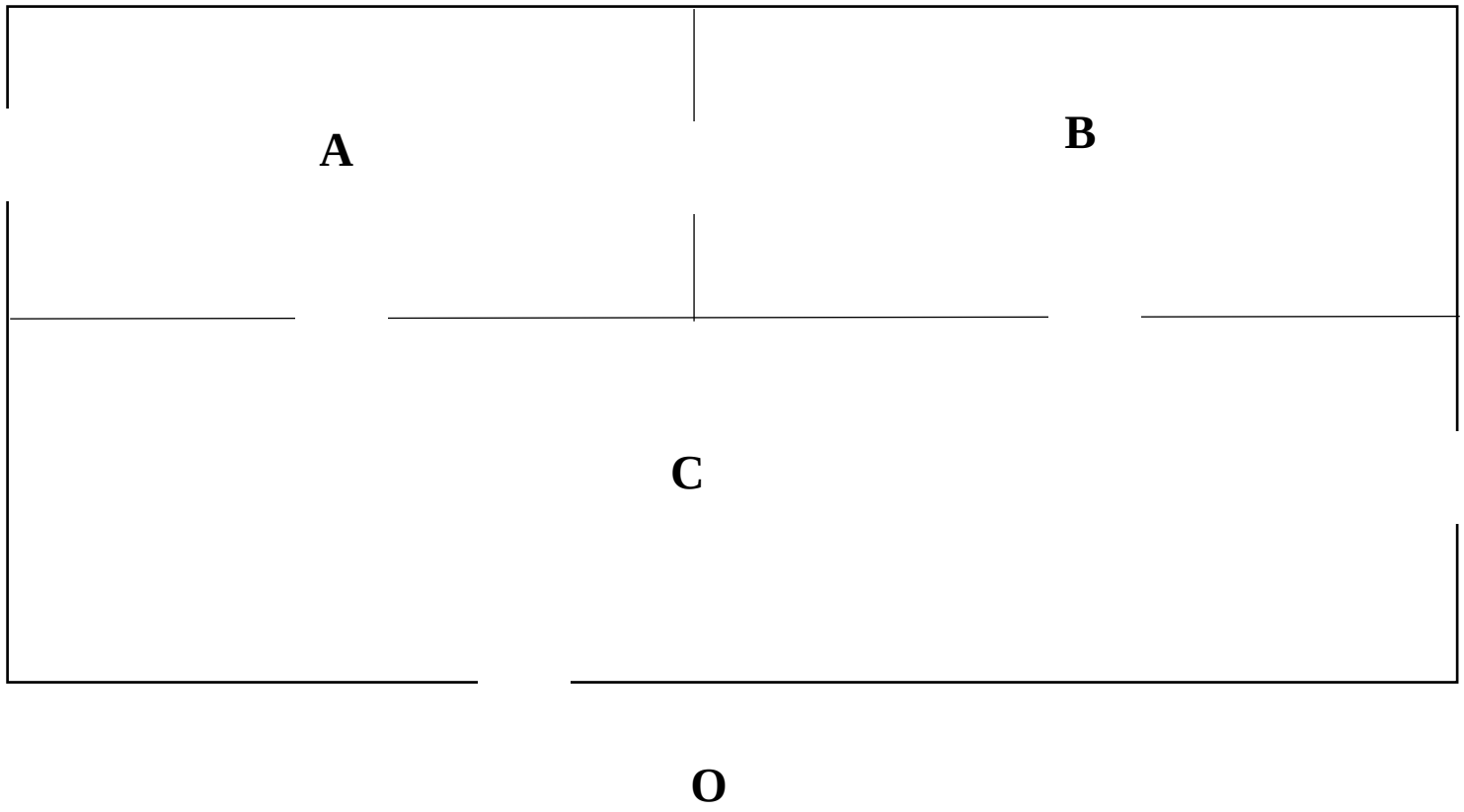

**Bridges:**




**Bridges:**

**Graphs as Models:**

**Model the building floorplan using vertices as rooms and the exterior and edges for connecting doorways.**

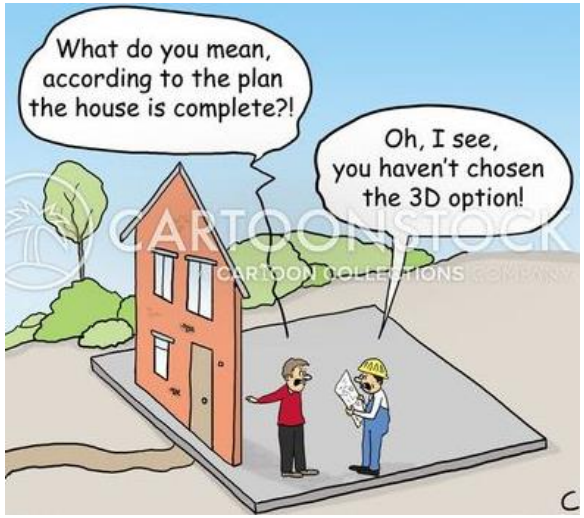


A

B

C

O


What do you mean, according to the plan the house is complete?!
Oh, I see, you haven't chosen the 3D option!