A graph on 10 vertices has 3 isolated vertices (degree 0) and 7 vertices of degree 2. Could such a graph be bipartite? How many vertices are there in an optimal vertex cover for this graph? (Consider all possible cases.)

Ans:

1. Not necessary. It can be bipartite. It can also be heptagon.

A picture containing skiing, photo, sitting, wooden

Description automatically generated

1. In order to find its vertex cover, we need to find its matching. Vertex cover is a subset C of vertices such that for any edge at least one its endpoint belongs to C. We use greedy method. At each step, we pick new edges and remove edges which are adjacent to it. We stop until we can not add new edges.

* Bipartite: matching size: 3, vertex size 6.
* Heptagon: matching size:3, vertex size 6.