Assignment

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Registration:

FA20 - BSM - 024

Course:

Graph theory

COMSAT'S University Islamabad,
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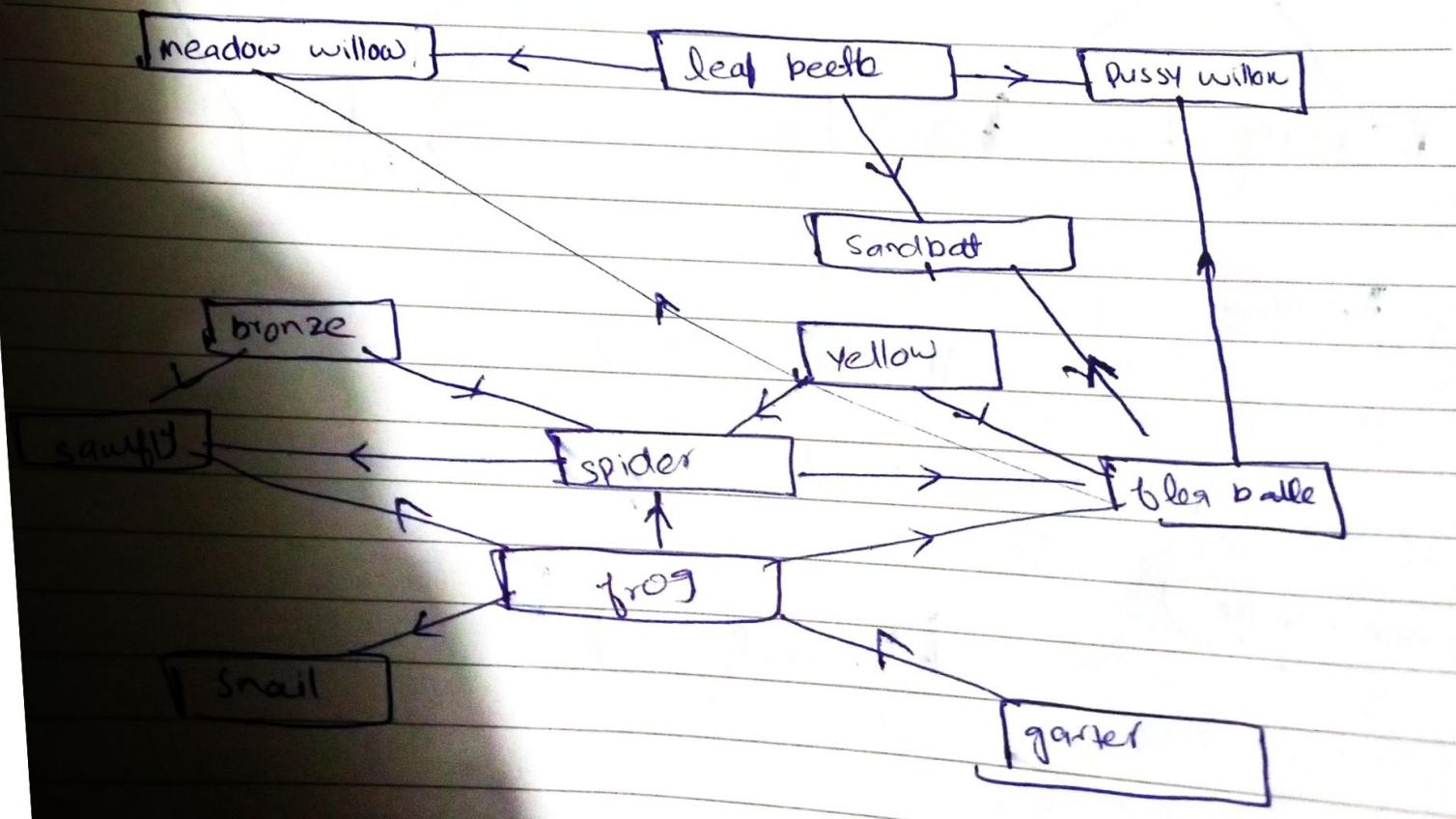
Q.No.1:-

Ecology:-

Snakes eat frogs, and birds eat spiders; birds and spiders both eat insects; frogs eat snails, spiders and insed. Given any such tangle of interrelationships between predator and prey, how do ecologists sort out the overall predatory behavior of the various species they are investigating?



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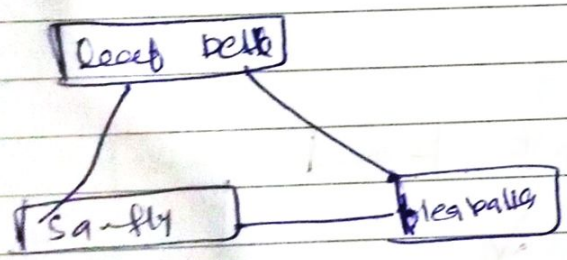
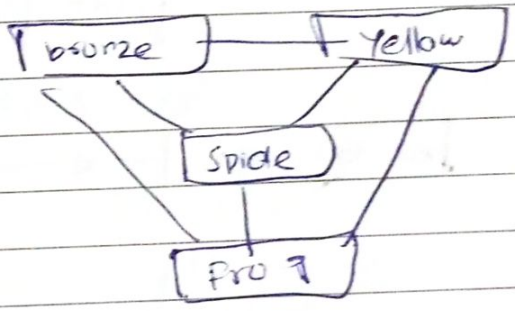
In untangling such food webs, ecologists introduce a graph that tells them which species compete for food. This graph is known as the competition graph or niche overlap graph, and its edges join pairs of vertices representing species that share a common prey.





Pussy willow

Meadow willow

Sandbar willow

garter snake

snail

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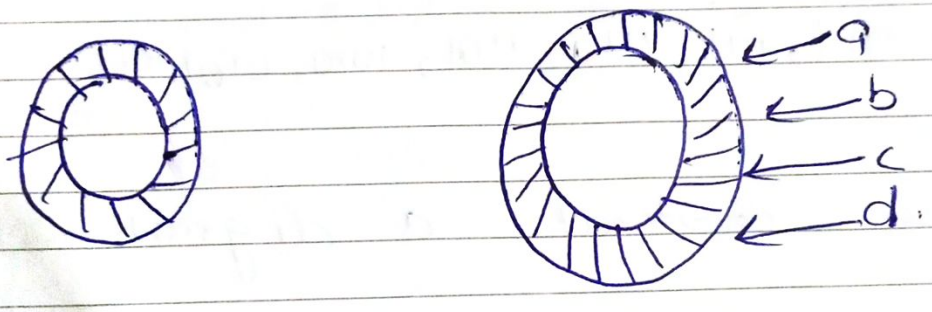
Rotating Drum Problem:-

A problem that has arisen in telecommunications is the rotating drum problem or tele-printer's problem



The surface of a rotating drum is divided into sixteen parts. We can represent the position of the drum by four binary digits a, b, c and d as indicated on right.

A solution is given in the right hand diagram. The position shown

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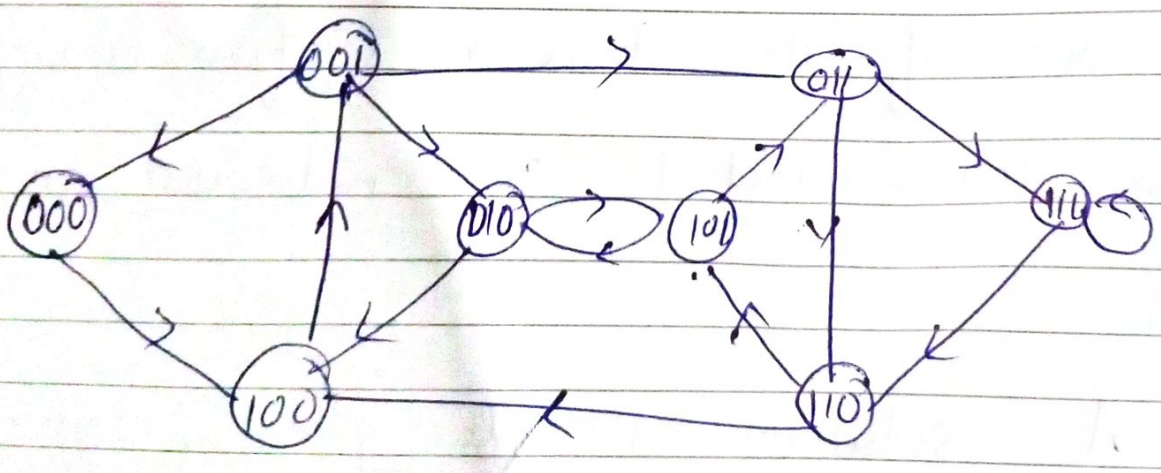
corresponds to the four-digit binary word 1001. Rotating the drum anticlockwise successively gives the binary words.

0110, 1100, 1001, 0010, 0100, 1000, 0000, 0001, 0011, 0111, 1111, 1110, 1101, 1010, 0101, 1011.

Now we construct a digraph with eight vertices.

000, 001, 010, 011, 100, 101, 110, 111



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This digraph is clearly Eulerian, since the out degree and in degree of each vertex are both equal to 2.

101 → 011 → 110 → 100 → 001 → 010 → 100 → 000

→ 000 → 001 → 011 → 111 → 110 → 010 → 101.

So,

1011001000111 0.

Circular Arrangement will be.