Assignment 1

Three networks

Tiago de Paula Alves (187679)
tiagodepalves@gmail.com

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List three different real networks and state the nodes and links for each of them.

1 Food Webs

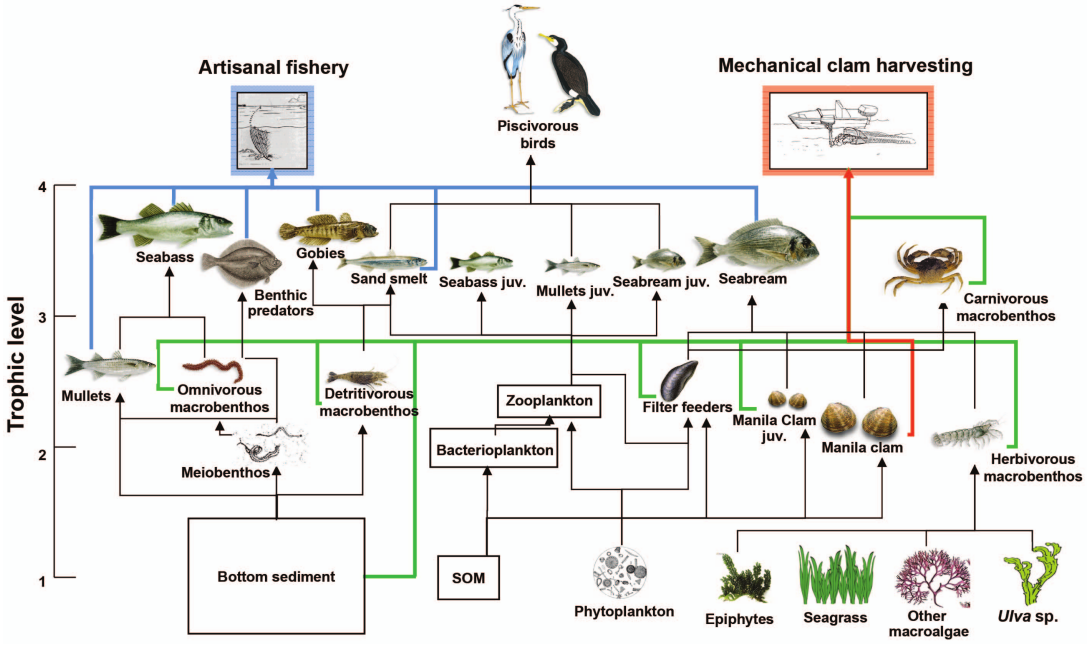

Figure 1: Food web diagram of the Venice lagoon. From: Johanna Heymans et al. "Global Patterns in Ecological Indicators of Marine Food Webs: A Modelling Approach". In: *PloS one* 9 (Apr. 2014), e95845. DOI: 10.1371/journal.pone.0095845.

One of the most common networks used in school comes from biology: food webs. Here, the nodes usually are species in a given ecological community (Venice lagoon, for figure 1) and the links map the feeding connection between the species, showing which species feeds on another.

2 Gene Co-expression Networks

Another type of network from the field of biology are the gene co-expression networks. Each node there corresponds to a specific gene and they are connected by a link whenever there is a significant co-expression relationship between them.

These networks are usually constructed with the help of some analysis software ot algorithm. This is because they are commonly big networks with very complex connections and unexpected clusters.

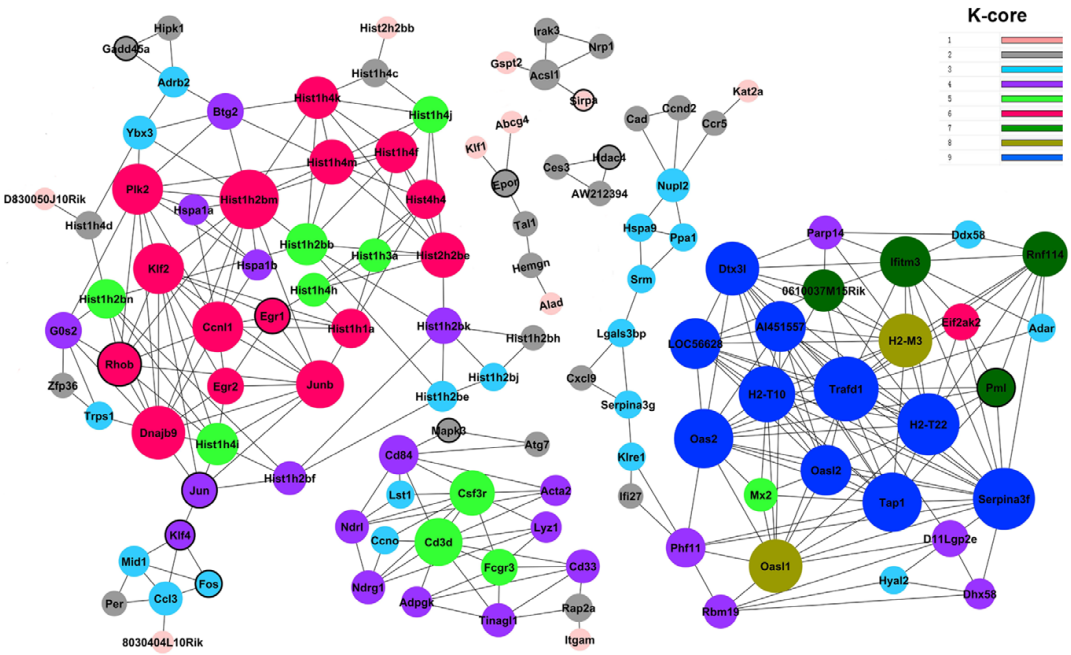

Figure 2: Co-expression of genes related to irradiation injury. From: Jing Zhang et al. "Identification of Hub Genes Related to the Recovery Phase of Irradiation Injury by Microarray and Integrated Gene Network Analysis". In: *PloS one* 6 (Sept. 2011), e24680. DOI: 10.1371/journal.pone.0024680.

3 Computer Networks

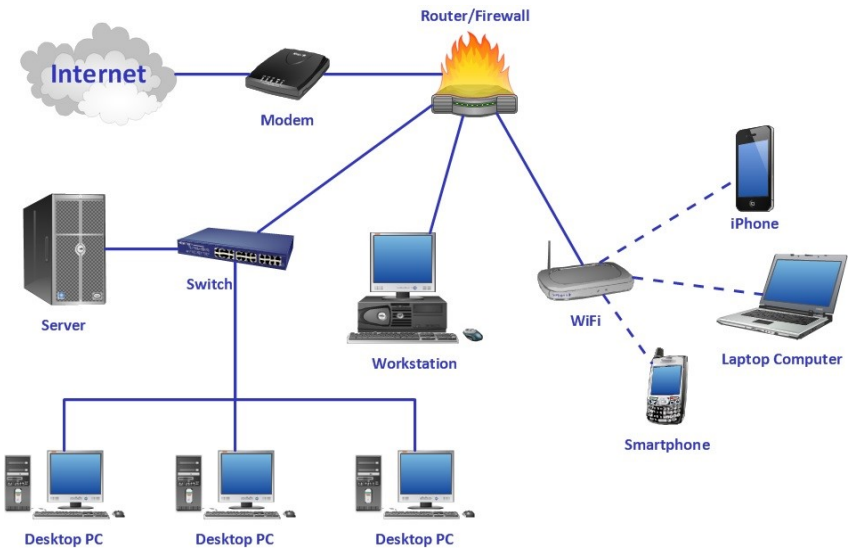

Figure 3: Computer Networking. From: https://www.learnelectronicsindia.com/post/collection-of-computers.

Maybe the most famous kind of networks, Computer Networks are composed of computers some other form of hardware communicating between them. The links are either physical cables or some form of wireless communication protocol. These networks are the base of the Internet.

Different from previous networks, Computer Netorks are physical and can't be fully represented with drawings. However, if you consider some limited aspects of the network, they might still be useful to analyze the topology of a specific netowrk, like figure 3.