# (a) Domain Description

**Food Chain**

In the food chain, there exist several species. Each species has an ID, one or more common names, a scientific name and a diet.

These species all live in an ecosystem. Ecosystems consist of a name, location and area code as well as a climate and area in km. Each ecosystem will also have a keystone species, that is, a species that has the greatest effect on an ecosystem [1]. There can only be one keystone species in an ecosystem and a species can only be keystone in one ecosystem.

Researchers are assigned to study the species. One researcher can study a variety of species and there is no need for more than one researcher studying a species at any one time. Researchers will have a name, area of expertise and an ORCID ID.

Each researcher will supervise a number of students. Keep track of the students names, courses and year of study.

The species in an ecosystem can interact with each other. This interaction type also needs to be recorded (Predation, parisitism, symbiosis etc).

### a Entities

- Species
- Ecosystem
- Researcher
- Student (weak)

### b 1:1 Binary relationships

- Keystone Species ↔ Ecosystem

### c 1:N Binary relationships

- Researcher ↔ Species
- Researcher ↔ Students

### d M:N Binary relationships

- Species ↔ Ecosystem

### e Recursive relationships

- Species ↔ Species (Interactions)

### f Weak entities or multivalued composite attributes

- Species common name (Comp/Multi)
- Student (Weak Entity)

## References

[1] R. T. Paine. A Note on Trophic Complexity and Community Stability. *The American Naturalist*, 103(929):91–93, January 1969. Publisher: The University of Chicago Press.