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Category Theory and Applications

Computer science, logic, data, and structures

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1 Why applications?

Category theory studies structures and structure-preserving maps. For this reason, it naturally appears in many areas of mathematics and computer science.

A good informal slogan is:

category theory studies things by studying their transformations.

2 Computer science

Example 2.1. Types may be viewed as objects, and programs may be viewed as morphisms. Composition of programs then becomes composition of morphisms.

3 Databases

Functors can be used to describe migrations between database schemas.

4 Quantum computing

Monoidal categories and string diagrams can be used to reason about processes and circuits.