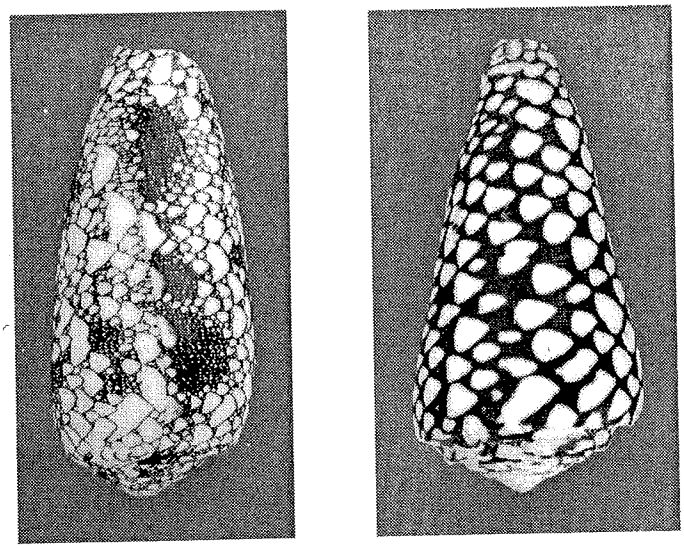

Figure 9.9. *Shells of* Olivia *and* Conus *species.*

Project 24: Mollusk Patterns

Many mollusks show very interesting patterns on their shells. Figure 9.9 shows examples of *Olivia spec.* and *Conus spec.* Since these shells grow gradually on the outer edge only and since the patterns do not change later, it can be seen as the time record of a one-dimensional pattern-producing system.

These shell patterns are very similar to some patterns produced by some simple Wolfram automata (discussed in Section 6.1.1). Therefore, they might be modeled with cellular automata as done by Kusch and Markus [103].

Find rules for a one-dimensional cellular automaton that produces patterns as shown in Figure 9.9. You may also look for pictures of other *Olivia* and *Conus* species and reproduce their patterns. If you look closely at these pictures, you see that real shell patterns are never as perfect as patterns produced by simulations. Introduce stochasticity in your automaton to generate more realistic patterns.

Please note that if two patterns look alike, it does not necessarily mean that they are produced by the same mechanism. You may compare your model with the reaction-diffusion models in [117].

Project 25: Run-Bike-Fun

A "Run-Bike-Fun" sports event takes place every year in a small university town in Germany. Each participating team consists of two people. Both people have to complete a 15 km course through a combination of running and cycling. Each team has one bicycle. Only one person is allowed to ride the bicycle at any one time, but team members can switch between running and cycling as often as they wish. The first team with both partners at the finish line wins.